



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 68

List View

General Information | [Contact](#) | [Default Values](#) | [Discount](#) | [Document Information](#) | [Clarification Request](#)

Procurement Folder: 1137853

Procurement Type: Central Master Agreement

Vendor ID: VS0000011255

Legal Name: CREATIVE BUS SALES INC

Alias/DBA:

Total Bid: \$0.00

Response Date: 01/12/2023

Response Time: 13:18

Responded By User ID: CreativeBus

First Name: Nick

Last Name: Corley

Email: biddepartment@creativebuss

Phone: 9094655528

SO Doc Code: CRFQ

SO Dept: 0810

SO Doc ID: DMT2300000009

Published Date: 12/16/22

Close Date: 1/12/23

Close Time: 13:30

Status: Closed

Solicitation Description: 176" - 190" Wheelbase Cutaway Vehicle

Total of Header Attachments: 68

Total of All Attachments: 68



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder: 1137853
Solicitation Description: 176" - 190" Wheelbase Cutaway Vehicle
Proc Type: Central Master Agreement

Solicitation Closes	Solicitation Response	Version
2023-01-12 13:30	SR 0810 ESR01112300000003099	1

VENDOR
VS0000011255
CREATIVE BUS SALES INC

Solicitation Number: CRFQ 0810 DMT2300000009
Total Bid: 0
Response Date: 2023-01-12
Response Time: 13:18:45
Comments:

FOR INFORMATION CONTACT THE BUYER
David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	173" - 190" WB Cutaway Vehicles	0.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
25101502			

Commodity Line Comments:

Extended Description:

To establish an open ended contract for 176" - 190" WB Cutaway Vehicles to provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #1

REQUIRED BID FORM TO BE SUBMITTED WITH BID

Location(s) of the Technical Service Representative(s) and parts distribution center(s) closest or in the State of West Virginia.

Location(s) of the technical service representative(s).

Name: Creative Bus Sales - Indiana

Address: 9365 Counselors Row, Suite 112. Indianapolis, Indiana, 46240

Contact: Matt Mashuda - Transit Bus Sales

Telephone: 412-992-0184

Name: Creative Bus Sales, Inc - Georgia

Address: 1926 Hyannis Court, College Park, Georgia, 30337

Contact: Carl Henderson - Eastern Service Manager

Telephone: 844-374-8915

Location(s) of parts distribution center(s).

Name: Creative Bus Sales, Inc. - Indiana

Address: 57475 County Road, Elkhart, Indiana, 46517

Telephone: 877-686-9448

Name: Creative Bus Sales, Inc. - Parts Distribution Warehouse

Address: 3832 E. Roeser, Phoenix, Arizona, 85040

Telephone: 888-993-5040

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #3

**DISADVANTAGED BUSINESS ENTERPRISE
VENDORS/ MANUFACTURERS CERTIFICATION**

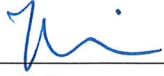
REQUIRED BID FOR TO BE SUBMITTED WITH BID

(Check appropriate statement)

_____ The Vendor, if a transit vehicle manufacturer, hereby certifies that it has complied with the requirements of 49 CFR Section 26.49 by submitting an annual DBE goal to the Federal Transit Administration (FTA). The goal has either been approved or not disapproved by FTA.

☒ The Vendor, if a non-manufacturing supplier, hereby certifies that the manufacturer of the transit vehicle to be supplied has complied with the above-referenced requirement of 49 CFR Section 26.49.

_____ 1-11-2023
Date

_____ 
Authorized Signature

_____ Sales Operations Manager
Title

_____ Creative Bus Sales, Inc.
Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #4

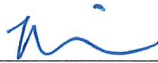
**BUY AMERICA CERTIFICATION
ROLLING STOCK
REQUIRED BID FOR TO BE SUBMITTED WITH BID**

Certificate of Compliance

The bidder or offeror hereby certifies that it will comply with the requirements of section 165(b) (3), of the Surface Transportation Assistance Act of 1982, as amended, and the applicable regulations of 49 CFR 661.11:

1-11-2023

Date



Authorized Signature

Creative Bus Sales, Inc.

Company Name

Nick Corley

Name

Sales Operations Manager

Title

Certificate for Non-Compliance

The bidder or offeror hereby certifies that it cannot comply with the requirements of section 165(b) (3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirement consistent with section 165(b) (2) or (b) (4) of the Surface Transportation Assistance Act, as amended, and the applicable regulations in 49 CFR 661.7.

Date

Authorized Signature

Company Name

Name

Title

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #5


**FEDERAL MOTOR VEHICLE
SAFETY STANDARDS CERTIFICATION**

REQUIRED BID FORM TO BE SUBMITTED WITH BID

The vendor hereby certifies that it shall submit, as required by Title 49 of the CFR, Part 663 - Subpart D, its self-certification information stating that the vehicle(s) will comply with the relevant Federal Motor Vehicle Safety Standards issued by the National Highway Traffic Safety Administration in Title 49 of the Code of Federal Regulations, Part 571.

1-11-2023

Date



Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle


BID FORM #6
U.S. Comptroller's Debarment List Certification
REQUIRED BID FOR TO BE SUBMITTED WITH BID

____ Creative Bus Sales, Inc. _____ hereby certifies that it

____ **IS or**

 X **IS NOT** (specify one) included on the. U.S. GSA's debarment and suspension
information available at <https://www.sam.gov>.

____ 1-11-2023 _____
Date

____  _____
Authorized Signature

____ Sales Operations Manager _____
Title

____ Creative Bus Sales, Inc. _____
Company Name

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle


BID FORM #6
U.S. Comptroller's Debarment List Certification
REQUIRED BID FOR TO BE SUBMITTED WITH BID

____ Creative Bus Sales, Inc. _____ hereby certifies that it

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 X **IS NOT** (specify one) included on the U.S. GSA's debarment and suspension information available at <https://www.sam.gov>.

____ 1-11-2023 _____
Date

____  _____
Authorized Signature

____ Sales Operations Manager _____
Title

____ Creative Bus Sales, Inc. _____
Company Name

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

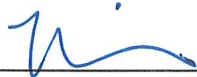
BID FORM #8
REQUIRED BID FOR TO BE SUBMITTED WITH BID

***VENDOR'S CERTIFICATION OF
UNDERSTANDING AND ACCEPTANCE***

The Vendor hereby certifies that all Technical Specifications and Contract Terms and Conditions have been carefully reviewed, are fully understood and shall be adhered to in performance and completion of any contract resulting from this bid.

1-11-2023

Date



Authorized Signature

Sales Operations Manager

Title

Creative Bus Sales, Inc.

Company Name

SPECIFICATION COMPLIANCE

NOTE: Please check if what is offered is in exact compliance with specifications. **Any discrepancies must be listed as an attachment to the bid proposal. Exact dimensions and/or descriptions must be provided as a part of the Vendor's bid proposal when submitted.**

☒ Bid proposal submitted meets and/or exceeds all specification requirements.

☐ Bid proposal submitted contains deviations from specification requirements. Detailed descriptions of these deviations have been provided with this bid proposal.

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #9
REQUIRED BID FOR TO BE SUBMITTED WITH BID

CERTIFICATION OF RESTRICTIONS ON LOBBYING

The undersigned (Vendor, Contractor) certifies, to the best of his or her knowledge and belief, that:


1. No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influence or attempt to influence an officer or employee of any Federal agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress regarding the award of a federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, or the extension, continuation, renewal, amendment, or modification of any Federal grant, loan (Including a line of credit), cooperative agreement, loan guarantee, or loan insurance.
2. If any funds other than Federal appropriated funds have been or will be paid to any person to influence or attempt to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or any employee of a Member of Congress in connection with any application for a federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance, the undersigned assures that it will complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," Rev. 7-97; and
3. The undersigned understands that the language of this certification shall be included in the award documents for all sub awards at all tiers (including subcontracts, sub grants, sub agreements. and contracts under grants, loans (including a line of credit), cooperative agreements, loan guarantees, and loan insurance.

Undersigned understands that this certification is a material representation of fact upon which reliance is placed by the Federal government and that submission of this certification is a prerequisite for providing a Federal grant, loan (including a line of credit), cooperative agreement, loan guarantee, or loan insurance for a transaction covered by 31 U.S.C. 1352. The undersigned also understands that any person who fails to file a required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The (Vendor, Contractor) Creative Bus Sales, Inc., certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the (Vendor, Contractor) understands and agrees that the provisions of 31 U.S.C. §§ 3801, et seq., apply to this certification and disclosure.

1-11-2023

Date



Authorized Signature

Sales Operations Manager

Title

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #10

REQUIRED BID DOCUMENTATION CHECKLIST

Model Year: Ford 2024 Model: Glaval Universal

Mandatory Bid Forms – must be submitted with bid:

- ☒ Bid Form #1: Locations of Technical Service Representatives and Parts Distribution Centers
- ☒ Bid Form #2: Certification for Air & Water Pollution
- ☒ Bid Form #3: Disadvantaged Business Enterprise Vendors/Manufacturers Certification
- ☒ Bid Form #4: Buy America Certification Rolling Stock
- ☒ Bid Form #5: Federal Motor Vehicle Safety Standards Certification
- ☒ Bid Form #6: U.S. Comptroller's Debarment List Certification
- ☒ Bid Form #7: Certification of Primary Participant Regarding Debarment, Suspension, and Other Responsibility Matters
- ☒ Bid Form #8: Vendor's Certification of Understanding and Acceptance
- ☒ Bid Form #9: Certification of Restrictions on Lobbying
- ☒ Exhibit A Pricing Page

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

BID FORM #10

REQUIRED BID DOCUMENTATION CHECKLIST

Model Year: Ford 2024 Model: Glaval Universal

Mandatory Bid Forms – must be submitted with bid:

- ☒ Bid Form #1: Locations of Technical Service Representatives and Parts Distribution Centers
- ☒ Bid Form #2: Certification for Air & Water Pollution
- ☒ Bid Form #3: Disadvantaged Business Enterprise Vendors/Manufacturers Certification
- ☒ Bid Form #4: Buy America Certification Rolling Stock
- ☒ Bid Form #5: Federal Motor Vehicle Safety Standards Certification
- ☒ Bid Form #6: U.S. Comptroller's Debarment List Certification
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- ☒ Bid Form #8: Vendor's Certification of Understanding and Acceptance
- ☒ Bid Form #9: Certification of Restrictions on Lobbying
- ☒ Exhibit A Pricing Page

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

DOCUMENTATION TO BE SUBMITTED WITH BID:

Section
Referenced

- ✓ 3.1.11 Provide details of water testing procedures.
- ✓ 3.2 Chassis: provide product description, warranty information and product literature.
- ✓ 3.2 Wheelbase: provide length of proposed wheelbase.
- ✓ 3.3 Engine: gasoline: provide product description, warranty information and product literature.
- ✓ 3.5 Radiator and Cooling System: provide product description, warranty information and product literature.
- ✓ 3.6 High Idle System, provide product description, warranty information and product literature.
- ✓ 3.8 Transmission: provide product description, warranty information and product literature.
- ✓ 3.10.4 Rear View Back-Up Camera: provide product description, warranty information and literature.
- ✓ 3.11.4 Tilt Wheel, Cruise Control and Power Steering: provide product description.
- ✓ 3.13 Brakes: provide product description, warranty information and product literature.
- ✓ 3.14 Wheels: provide product description, warranty information and product literature.
- ✓ 3.15 Tires: provide product description, warranty information and product literature.
- ✓ 3.16.5 Alternator: provide product description, warranty information and product literature.
- ✓ 3.16.6 Battery: provide product description, warranty information and product literature.
- ✓ 3.17.1 Radio/AM/FM/USB/MP3: provide product description, warranty information and product literature.
- ✓ 3.19 Body Structure/Roof Specifications: provide a description of how construction/ conversion will take place and meet the specification requirements. Provide actual interior height and body length of proposed vehicle.
- ✓ 3.19.15 Stepwell: provide a description of construction.
- ✓ 3.22 Entrance, Exit, Lift and Emergency Exit Doors: Provide product description, dimensions, description of connection with interlock system, and locks to be provided.

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

- ✓ 3.23 Rear Bumper: provide product description, warranty information and product literature.
- ✓ 3.24 Wheelchair Lift: provide product description, warranty information and product literature.
- ✓ 3.24.9 Interlock System: provide product description, warranty information and product literature.
- ✓ 3.26 Front and Rear Heating and Air Conditioning: provide product description, warranty information, product literature.
- ✓ 3.29 Flooring: provide a description of product to be used, samples of floor covering, colors to be used and assembly process.
- ✓ 3.30.1 Passenger Seats and Restraints: provide product description, warranty information and product literature.
- ✓ 3.30.2 Padded Grab Handle: provide product description.
- ✓ 3.30.11 Driver's Seat: provide product description, warranty information and product literature.
- ✓ 3.31 Wheelchair Securement System: provide product description, warranty information and product literature.
- ✓ 3.32 Mobility Aid/ Occupant Restraint Systems: provide product description, warranty information and product literature.
- ✓ 3.33.1 Exterior Mirrors: provide product description, warranty information and product literature.
- ✓ 3.37 Digital Destination Signs: provide product description, warranty information and product literature.
- ✓ 3.38 Passenger Signaling System: provide product description, warranty information and product literature.
- ✓ 3.39 Mobile PA System: provide product description, warranty information and product literature.
- ✓ 3.40 Fare Box Provision: provide description of provision.
- ✓ 3.41 Strobe Light: provide product description, warranty information and product literature.
- ✓ 3.42 Radio Install Prep: provide description of process.
- ✓ 3.44 Security Camera System Including Playback: provide product description, warranty information and product literature.

REQUEST FOR QUOTATION
176" – 190" Wheelbase Cutaway Vehicle

- ✓ 3.45 Dual Purpose Safety Vent: provide product description, warranty information and product literature.
- ✓ 3.46 Storage Compartment: provide information on proposed location.
- ✓ 3.51 Training: submit letter of understanding to the terms in this Section.
- ✓ 4.0.5 Overhead Luggage Rack: provide product description and product literature.
- 4.0.6 Classes E & F
- ✓ 4.0.5 High Back Passenger Seating: provide product description, warranty information and product literature. Classes E & F
- 4.0.6
- ✓ 6.1.7.4 Warranty Provider Locations: provide names of providers in WV.
- ✓ 6.1.7.5 Warranties: provide information on warranties to be provided.
- ✓ 9.3 Complete two (2) bids in binder form –one (1) marked for DPT.
- ✓ 11.1.1 Complete mechanical description of vehicle, its construction and equipment including manufacturer's model name and/or number.
- ✓ 11.1.2 Proposed interior floor plans, showing detailed dimensions including the location of the wheelchair securement system.
- ✓ 11.1.3 Curb weight (empty weight) and gross vehicle weight rating (GVWR) of vehicle.
- ✓ 11.1.6 Rustproofing and Undercoating: provide product description, warranty information and product literature.
- ✓ 11.1.8 A list of five (5) users names, addresses, emails and telephone numbers who have been provided similar equipment.
- ✓ No Debt Affidavit
- ✓ Addendum Acknowledgement



Creative Bus Sales

Training

Creative Bus Sales understands and is prepared to meet the training requirements as outlined in section 3.45.

If any further information is needed, please contact Mike Wilson at mikew@creativebussales.com.



Creative Bus Sales

11.1.8 References

Tri River Transit
753 Marconi Drive
Hamlin, WV 25523
(304) 824-2944

Buckwheat Express
108 Senior Center Drive
Kingwood, WV 26357
(304) 329-0464

Berkeley Senior Services
217 North High Street
Martinsburg, WV 25404
(304) 263-8873

Heart 2 Heart Volunteers Inc.
667 Stone Shannon Road
Wheeling, WV 26003
(304) 277-4657

Logan-Mingo Area Mental Health Inc.
300 Prosperity Lane
Logan, WV 25601
(304) 792-7130



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote

Proc Folder: 1137853

Doc Description: 176" - 190" Wheelbase Cutaway Vehicle

Reason for Modification:

Addendum No. 1 to correct error of incorrect date entered in the terms and conditions. The correct See Page 2 for complete info

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2022-12-08	2022-12-29 13:30	CRFQ 0810 DMT2300000009	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: VS0000011255

Vendor Name : Creative Bus Sales, Inc.

Address : 9365 Counselors Row, Suite 112

Street :

City : Indianapolis

State : Indiana

Country : U.S.A.

Zip : 46240

Principal Contact : Matthew Mashuda, Transit Bus Sales

Vendor Contact Phone: 422-992-0184

Extension:

FOR INFORMATION CONTACT THE BUYER

David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X

FEIN# 33-0388707

DATE 1-11-2023

All offers subject to all terms and conditions contained in this solicitation

Reason for Modification:

Addendum No. 1 to correct error of incorrect date entered in the terms and conditions. The correct bid opening date is December 29, 2022 at 1:30 pm est.

ADDITIONAL INFORMATION

Addendum No. 1

To to correct error of incorrect date entered in the terms and conditions. The correct bid opening date is December 29, 2022 at 1:30 pm est. as listed on the cover page of the solicitation documents., see attached.

No other changes.

INVOICE TO		SHIP TO	
PUBLIC TRANSIT DIVISION OF BLDG 5 RM 663 1900 KANAWHA BLVD E CHARLESTON WV US		PUBLIC TRANSIT DIVISION OF KANAWHA VALLEY REGIONAL TRANSPORTATION AUTHORITY 1550 FOURTH AVE CHARLESTON WV US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	173" - 190" WB Cutaway Vehicles	0.00000	EA	Please see Exhibit A - Pricing Page	

Comm Code	Manufacturer	Specification	Model #
25101502	Glaval	Classes A, B, C, D, E, F	Universal

Extended Description:

To establish an open ended contract for 176" - 190" WB Cutaway Vehicles to provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

SCHEDULE OF EVENTS

<u>Line</u>	<u>Event</u>	<u>Event Date</u>
1	Vendor Technical Questions Due 11:00 am est.	2022-12-15

	Document Phase	Document Description	Page 3
DMT2300000009	Draft	176" - 190" Wheelbase Cutaway Vehicle	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFQ DMT2300000009

Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as CRFQ DMT2300000009 to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☒ Modify bid opening date and time
- ☐ Modify specifications of product or service being sought
- ☐ To respond to technical questions
- ☐ Attachment of pre-bid sign-in sheet
- ☒ Correction of error
- ☐ Other

Additional Documentation:

1. To correct bid opening date and time that was inadvertently input into the Terms and Conditions incorrectly. The correct bid opening date and time is December 29, 2022, at 1:30 pm est.
2. No other changes.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DMT2300000009

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Creative Bus Sales, Inc.

Company



Authorized Signature

1-11-2023

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.



Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote

Proc Folder: 1137853			Reason for Modification: Addendum No. 2 To move bid opening to January 12, 2023 at 1:30 pm est., to change specifications and..... See Page 2 for complete info
Doc Description: 176" - 190" Wheelbase Cutaway Vehicle			
Proc Type: Central Master Agreement			
Date Issued	Solicitation Closes	Solicitation No	Version
2022-12-16	2023-01-12 13:30	CRFQ 0810 DMT2300000009	3

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: VS0000011255
Vendor Name : Creative Bus Sales, Inc.
Address : 9365 Counselors Row, Suite 112
Street :
City : Indianapolis
State : Indiana **Country :** U.S.A **Zip :** 46240
Principal Contact : Matthew Mashuda, Transit Bus Sales
Vendor Contact Phone: 412-992-0184 **Extension:**

FOR INFORMATION CONTACT THE BUYER

David H Pauline
304-558-0067
david.h.pauline@wv.gov

Vendor
Signature X

FEIN# 33-0388707

DATE 1-11-2023

All offers subject to all terms and conditions contained in this solicitation

Reason for Modification:

Addendum No. 2

To move bid opening to January 12, 2023 at 1:30 pm est., to change specifications and respond to vendor questions.

ADDITIONAL INFORMATION

Addendum No. 2

To move bid opening date and time to January 12, 2023 at 1:30 pm est.

To change specifications as per attached.

To respond to vendor technical questions, see attached.

No other changes.

INVOICE TOPUBLIC TRANSIT DIVISION
OF
BLDG 5 RM 6631900 KANAWHA BLVD E
CHARLESTON
US

WV

SHIP TOPUBLIC TRANSIT DIVISION
OF
KANAWHA VALLEY
REGIONAL
TRANSPORTATION
AUTHORITY1550 FOURTH AVE
CHARLESTON
US

WV

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	173" - 190" WB Cutaway Vehicles	0.00000	EA	Please see Exhibit A - Pricing Page	

Comm Code	Manufacturer	Specification	Model #
25101502	Glaval	Classes, A, B, C, D, E, F	Universal

Extended Description:

To establish an open ended contract for 176"-190" WB Cutaway Vehicles to provide specialized transportation services in an urban and suburban-rural environment including hilly terrain and a severe operating climate suited to stop-start duty cycles.

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Vendor Technical Questions Due 11:00 am est.	2022-12-15

	Document Phase	Document Description	Page 3
DMT2300000009	Final	176" - 190" Wheelbase Cutaway Vehicle	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFQ DMT2300000009

Addendum Number: 2

The purpose of this addendum is to modify the solicitation identified as CRFQ DMT2300000009 to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☒ Modify bid opening date and time
- ☒ Modify specifications of product or service being sought
- ☒ To respond to technical questions
- ☐ Attachment of pre-bid sign-in sheet
- ☐ Correction of error
- ☐ Other

Additional Documentation:

1. To move bid opening date and time January 12, 2023, at 1:30 pm est.
2. To respond to vendor technical questions, see attached.
3. To change specifications, see attached.
4. No other changes.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

CRFQ DMT 23*09

Vendor Questions and Responses

Question: Will the Division consider moving the Bid Opening date?

Answer: The Division will move the Bid Opening date to January 12, 2023.

Question: Section 3.2 Chassis: please accept that the wheelbase available from Ford as OEM, either are not available 190" WB or will cause chassis delays due to needing to be a special order as 176" WB. Please accept that the wheelbase will be modified to meet specifications.

Answer: The Division understands that the OEM 190" WB are not available and will accept the vehicle as the chassis being modified for this vehicle.

Question: Section 3.3 Engine, Exhaust: please accept that the 7.3: engine from Ford is rated at 325 HP at 3750 RPM.

Answer: The Division will accept the 7.3L engine with 325HP at 3750 RPM.

Question: Section 3.3 Engine, Exhaust: the Ford OEM exhaust is primarily aluminumized steel, not stainless.

Answer: The Division understands this and is acceptable.

Question: Section 3.4.1, please accept that the fueling nozzle is only on the street side and is not possible for it to be set for both sides.

Answer: The Division understands that the fuel nozzle is only on the street side and is acceptable.

Question: Section 3.8.4: please accept that the gear ratio is pre-set by Ford and isn't adjustable.

Answer: The Division understands the gear ratio is pre-set and is not adjustable and is acceptable.

Question: Section 3.10.4, Back up camera, will the Division accept the viewing screen located in the interior rear-view mirror?

Answer: The Division will accept this request.

Question: Ford does not provide an OEM backup camera on their E Series chassis. Please accept Rosco STSK4750 Back up camera with the camera in the rear-view mirror system with monitor as an approved equal.

Answer: The Division will accept the Rosco STSK4750 Back Up Camera System as approved equal.

Question: Section 3.16.1 Please accept that all wiring schematics on a flash drive in lieu of paper copies as an approved equal.

Answer: The Division will accept all wiring diagrams on a flash drive in lieu of paper copies.

Question: Section 3.17.22, please accept that the Ford OEM glove box does not have a light inside.

Answer: The Division accepts that the Ford OEM glove box does not have a light inside.

Question: Section 3.19.1 , Body Construction Please approve the body construction method Universal Body Frame Construction as approved equal.

Answer: The Division will accept the Universal Body Frame Construction as approved equal.

Question: 3.19.7 The specifications request that two-sided tape is not acceptable. Some panels are bonded with adhesive so no unsightly mechanical fasters are seen, is this method of attaching the panels acceptable?

Answer: The Division will accept this type of panel attachment.

Question: Section 3.19.6: please approve T-140 Aluminized Steel cage as approve equal.

Answer: The Division will accept T-140 Aluminized Steel cage as equal.

Question: Section 3.19.11 and Section 3.19.14, These two section are conflicting, one says aluminum skirts and the other fiberglass?

Answer: The Division will accept Aluminum skirts or fiberglass.

Question: Section 3.19.15 Anti-corrosion, please approve ZPG-99025 as approved equal?

Answer: The Division will accept ZPG-99025 as approved equal.

Question: Please accept Gerflor vinyl composite floor covering throughout the entire stepwell with the Gerflor Step bus safety nosing with yellow abrasive strip.

Answer: The Division will accept this request.

Question: Section 3.21.1, Please approve the undercoating method used by Forest River, description provided.

Answer: The Division has reviewed and will approve the undercoating process used by Forest River for each vehicle.

Question: Section 3.22.3 Dimensions: due to geometry limitations of the chassis & body relationship, the ground height of 12" and 1st step to ground cannot be met. Will the Division accept 12" 1st step height with 9" or 9.5" risers as approved equal?

Answer: The Division will accept this as approved equal.

Question: Section 3.22.7 Will the Division accept Cole Hersee key in lieu of the Kubota?

Answer: The Division will accept Cole Hersee key in lieu of the Kubota.

Question: Section 3.22.10 on the Ford E450 chassis a running board at the driver's door will yield a measurement of 14" to the round, will this be acceptable?

Answer: The Division will accept this request.

Question: Section 3.22.11, please verify that this section pertains to the wheelchair doors only?

Answer: Section 3.22.11 refers to wheelchair doors only.

Question: Section 3.24.7 calls for the platform in stored position shall not intrude into vehicle body more than 14 inches. Given the lift model requested in the specification, please allow up to 18" intrusion as approved equal.

Answer: The Division will allow up to 18" intrusion in Section 3.24.7.

Question: Section 3.24.9 refers to an Intelligent Lift Interlock System Model#ILIS501, this model is obsolete, please remove and replace with Intermotive Gateway, ILIS.

Answer: The Division will remove the obsolete model and replace with Intermotive Gateway ILIS.

Question: Section 3.30.1 please remove the requirements for AbS Knee Saver seat backs for Class E and Class F as this option is not available on high back Seats.

Answer: The Division will allow this request.

Question: Section 3.30.11 Please remove the request for a seat belt extender for the driver's sea, as no such product is available for the Ford OEM Driver seat.

Answer: The Division will remove this requirement.

Question: Section 3.30.12 please remove the requirements for a headrest, Freedman does not offer a headrest on a 3_PT fold down seat.

Answer: The Division will remove the requirement for a headrest on a 3-PT fold down seat.

Question: Section 25.6 Please accept a manual controlled roll down window for this requirement.

Answer: The Division will accept a manual roll down window for the driver's door.

Question: Section 3.26.2.4 please accept a 10" fan, minimum, instead of the 12" required.

Answer : The Division will accept the 10" fan.

Question: Section 3.32:8 please remove the requirement for contrasting colors in this section. The Q'Straint 360 tie downs specified only come in black.

Answer: The Division will remove the requirements for contrasting colors and accept the black tie downs.

Question: Section 3.32:15 this section requires the L Track to run the full length of the vehicle, please clarify?

Answer: The Division is asking that on the front lift floor plan, the L Track is to run the full length of the vehicle. For the other floor plans, the L Track is to be only in the wheelchair area.

Question: Section 3.34.5 Please specify where additional stanchions are required “elsewhere withing the vehicle”?

Answer: The Division will remove the “elsewhere within the vehicle”.

Question: Section 3.345 Does the State require a stanchion and modesty panel to be installed behind the front lift for Class C, D,E and F?

Answer: The Division does not require a stanchion and modesty panel to be installed behind the front lift for Class C, D,E and F.

Question: Section 3.36.1 Please clarify where the reflective tape is required?

Answer: The Division is asking that the reflective tape to be around the egress windows.

Question: Section 3.43 Bike Rack Mount, please accept that the bike rack mounting is only available on the front of the vehicle.

Answer: The Division accepts that the bike rack will only be on the front of the vehicle.

Question: Section 3.46.2 Please accept a top hinged door with a device that holds the door in the upright position

Answer The Division will accept this type of storage box.

Question: Section 3.49.10 Where does the Division want the wheel chocks to be stored?

Answer: Normally the wheel chocks are shipped loosely in the rear of the vehicle and the receiving agency determines where they will store them.

Question; Section 4.0.2.1 For Classes E and F, does the State want overhead luggage to be placed over the wheelchair positions?

Answer: The Division does not want the overhead luggage storage to be over the wheelchair position.

Question: Section 3.29.3 conflicts with Section 3.19.15, which calls for Gerflor yellow abrasive insert?

Answer: Section 3.19.15 refers to the undercoating of the stepwell, not the floor covering.

Question: Section 3.25.2, please accept that our window in the passenger door will be AS-2, not AS-3 as an approved equal.

Answer: The Division will accept AS-2 as an equal.

Question: Section 3.26.1.2 please accept an electrically heated first entry step as equal.

Answer: The Division will accept an electrically heated first entry step as equal.

Question: Section 3.37.5.1 would the Division specify what model or System is required as an option, in this section?

Answer: The Division is asking for the destination sign to be Transign LED Designator Series.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DMT2300000009

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

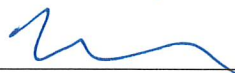
(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Creative Bus Sales, Inc.

Company



Authorized Signature

1-11-2023

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

(Printed Name and Title) Matt Mashuda - Transit Bus Sales

(Address) 9365 Counselors Row, Suite 112, Indianapolis, Indiana, 46240

(Phone Number) / (Fax Number) 412-992-0184 / 909-465-5529

(Email address) MattM@CreativeBusSales.com

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that: I have reviewed this Solicitation/Contract in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation/Contract for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that this bid or offer was made without prior understanding, agreement, or connection with any entity submitting a bid or offer for the same material, supplies, equipment or services; that this bid or offer is in all respects fair and without collusion or fraud; that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; that I am authorized by the Vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on Vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand this Contract is subject to the provisions of West Virginia Code § 5A-3-62, which automatically voids certain contract clauses that violate State law; and that pursuant to W. Va. Code 5A-3-63, the entity entering into this contract is prohibited from engaging in a boycott against Israel.

Creative Bus Sales, Inc.

(Company) •

(Signature of Authorized Representative)

Nick Corley - Sales Operations Manager - 1/11/2023

(Printed Name and Title of Authorized Representative) (Date)

888-633-8380 / 909-465-5529

(Phone Number) (Fax Number)

BidDepartment@CreativeBusSales.com

(Email Address)

State of West Virginia



Certificate

I, Mac Warner, Secretary of State of the State of West Virginia, hereby certify that

CREATIVE BUS SALES, INC.

a corporation formed under the laws of California filed an application to be registered as a foreign corporation authorizing it to transact business in West Virginia. The application was found to conform to law and a "Certificate of Authority" was issued by the West Virginia Secretary of State on December 01, 2016.

I further certify that the corporation has not been revoked by the State of West Virginia nor has a Certificate of Withdrawal been issued to the corporation by the West Virginia Secretary of State.

Accordingly, I hereby issue this Certificate of Authorization

CERTIFICATE OF AUTHORIZATION

Validation ID:5WV55_S32CW



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
September 23, 2020*

Mac Warner

Secretary of State

REQUEST FOR QUOTATION – CRFQ DMT23*09
176" – 190" Wheelbase Cutaway Vehicle

18.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.

18.1.4 Failure to remedy deficient performance upon request.

18.2 The Following remedies shall be available to Agency upon default.

18.2.1 Immediate cancellation of the Contract.

18.2.2 Immediate cancellation of one or more release orders issued under this Contract.

18.2.3 Any other remedies available in law or equity.

21. MISCELLANEOUS:

19.1 No Substitutions: Vendor shall supply only Vehicles as submitted in response to the Solicitation unless a contract modification is approved in accordance with the provisions contained in this Contract.

19.2 Vendor Supply: Vendor must carry sufficient inventory of the Contract Items being offered to fulfill its obligations under this Contract. By signing its bid, Vendor certifies that it can supply the Contract Items contained in its bid response.

19.3 Contract Manager: During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: Matt Mashuda - Transit Bus Sales

Telephone Number: 412-992-0184

Fax Number: 909-465-5529

Email Address: MattM@CreativeBusSales.com

19.4 NOTIFICATION OF FEDERAL PARTICIPATION



Creative Bus Sales
THE NATION'S LARGEST BUS DEALER SINCE 1980



Creative Care Owner's Guide

Department Overview

Creative Bus Sales would like to thank you and congratulate you on the purchase of your recent vehicle. We value your trust in our company and we will do our best to meet your expectations. With nearly 40 years of listening to our customers' needs and delivering vehicles within their budget, we are the nation's largest bus dealership. We have a dedicated nationwide network of Parts, Service, Warranty, and Customer Care departments to ensure that we continue to meet your expectations!

Below you will find an overview of your Creative Bus Sales support team in the event any issues or concerns arise.

Creative Care

Our customer care department is here to respond to your inquiries or concerns about your vehicle purchase. Customer care is available to help resolve any issue that may arise over the serviceable life of your vehicle. Customer care is also your primary resource to assist you in reaching the correct department or individual that you desire to speak with. To reach our Creative Care department call 1.844.374.8915 or email CreativeCare@CreativeBusSales.com

Service Department

Our service department will work diligently to ensure that your vehicles are maintained to the highest standard. Creative Bus Sales service departments welcome our customers' vehicles for any maintenance or service-related concerns. With an appointment, our service team will make sure to get your vehicle back on the road as quickly as possible. To reach our service department call 1.800.326.2877 or email Service@CreativeBusSales.com

Parts Department

Creative Bus Sales stocks a large variety of parts to ensure we have what you need to keep your vehicles operational. The parts department staff includes experienced parts sales associates, shipping and receiving associates, inventory specialists, and delivery drivers where applicable. To reach our parts department, call 1.888.993.5040 or email Parts@CreativeBusSales.com

Warranty

Our warranty department will work for you to address any warranty concerns that you have with your vehicle. Creative Bus Sales warranty department will act as liaison between the customer and chassis manufacturer to expedite a satisfactory resolution for your concerns. Our warranty department will ensure that all your warrantable concerns are corrected to the manufacturer standards. To reach your warranty department please call 1.800.326.2877 or email Warranty@CreativeBusSales.com

Our staff is standing by, please do not hesitate to contact us!

Warranty Procedure

Dealer Warranty Statement

Warranty restitution can only be applied to repairs made if proper procedures are followed and it is determined that the issue is covered under the chassis, body, or component warranty.

Before any work is performed on your vehicle, please contact our warranty department at Warranty@CreativeBusSales.com so that they can assist. The following information will be needed in order to determine warranty coverage.

- Make
- Model
- VIN Number
- Mileage

Chassis Warranty Items

Contact your local chassis dealer and/or contact Creative Bus Sales for assistance in locating your local chassis dealer.

Bus Warranty Items

Contact Creative Bus Sales

Note: Failure to follow this procedure may result in the denial of any future vehicle warranty claims.

About Your Warranty — FAQs

If you are near a Creative Bus Sales location, we invite you to come and visit us for all warranty repairs. We do realize that you may not be close to any of our service locations. If that is the case, our warranty team will assist in locating a repair facility that can complete the needed warranty repairs. After determining where the repairs will be completed, a repair estimate must be provided to the Creative warranty team. No repairs are authorized to be completed for warranty purposes until the warranty team has approved the estimate provided.

Below you will find a list of FAQs regarding the warranty process. If there are still questions, please do not hesitate to reach out to Warranty@CreativeBusSales.com and someone will respond promptly.

How long does it take for someone to respond after I contact Warranty@CreativeBusSales.com?

Our targeted response time is within 24 hours however, we strive to achieve a quicker response time when possible.

Where can I go for warranty service?

Depending on the warrantable concern, your Warranty Administrator will discuss with you the best way to get you bus repaired. We invite you to come into any of our Creative Bus Sales service locations for any repair issues. If you are not close to our facility please contact Warranty@CreativeBusSales.com and our team will be happy to assist you in locating a authorized warranty repair facility near your area.

If the issue you are experiencing is OEM (Ford, Chevy, Dodge) related such as engine, transmission or a check engine light, the bus must be taken to the appropriate manufacturer dealership in your area. Creative Bus Sales is not authorized to complete warranty repairs on any OEM related failure.

What procedure do I follow when warranty repairs are made at my own facility?

Warranty repairs should not be performed without contacting Warranty@CreativeBusSales.com for prior authorization. Once Creative is contacted we will acquire authorization from the manufacturer and provide you with a claim number so you can receive a credit/payment for the warranty repairs that you performed. Failure to get prior authorization before repairs are completed may result in claim denial.

How do I get parts for warranty repairs performed at my own facility?

Please contact Warranty@CreativeBusSales.com and your warranty administrator will acquire the authorizations needed and arrange for parts to be shipped to your location at no charge. However, it is imperative that all defective parts be kept until up to 90 days after repair has been completed or otherwise notified. Neglecting to do so can result in claim denial.

About Your Warranty — FAQs (Continued)

Does warranty cover the cost of transporting the bus to and from authorized warranty repair centers?

No, you are responsible for the cost of transporting the bus to and from the authorized warranty service center.

Is towing covered under warranty?

If the failure is OEM related (engine, transmission, check engine light, etc.) the tow will be covered under warranty through Ford, Chevy or Dodge roadside. Again, the tow must be set up through the perspective roadside customer service line. If you need OEM roadside assistance please reach out to Warranty@CreativeBusSales.com and a warranty administrator can assist.

- Ford roadside: 1.800.241.3673
- Chevy roadside: 1.888.899.1327
- Freightliner: 1.800.385.4357

If the failure is related to the after market body side of the bus, towing is not covered.

What should I do when I have problems with the bus while under warranty but cannot get it in for repairs right away?

If you have a warranty concern that you are unable to address at the time please contact Warranty@CreativeBusSales.com so we can document the complaint with the manufacturer.

How long does it take to receive credit for my warranty claims?

We want to expedite the processing of your warranty claims. We are committed to crediting you within thirty days after receipt of all the paperwork and failed parts.

Note: It is extremely important to file your warranty claim within 30 days of the repair, or your claim could be subject to disapproval.

Service Department



With numerous service locations across the U.S., Creative Bus Sales is equipped to accommodate all your bus servicing needs rapidly and efficiently. Our bus service bays are equipped with the newest state-of-the-art equipment to service your light, medium, and heavy-duty vehicles. Combined with our extensively trained and certified service technicians, you can count on Creative Bus Sales to provide the highest level of service and reliability.

Creative Bus Sales offers:

- OEM Factory Trained Technicians / ASE Certified
 - Ford / GM / IC / ARBOC / Starcraft / ENC
 - Braun & Ricon Lift
 - TransAir / Valeo / ACT
- Preventive Maintenance / Warranty / Advanced Repairs
 - Preventive Maintenance
 - State and Federal Inspections
 - Warranty Services
 - A/C Service & Repairs
 - Alignment
 - Engine Overhaul
- Remote & Onsite Service & Warranty Repairs
- Maintenance Plans
 - Monthly / Annual Plans Available
 - Parts Delivery & Mobile Service

Service Department — FAQs

Who do I call if one of my buses needs maintenance, repair, an option installed, or some other service?

Call our toll-free Customer Care number at 1.844.374.8915

What kinds of service work can I expect Creative Bus Sales Service Facility to perform?

We are fully prepared to meet your bus service needs. We are experts in installing special options like wheelchair lifts, wheelchair securement, air conditioners, and roof vents. We can, also, provide service as it relates to chassis and body repair.

Our service facility can meet your extremely important routine maintenance functions, ensuring all warranty prerequisites are met.

If you need major repairs, like engine work, transmission or brake repairs, we will make sure your bus is operational as soon as possible.

How long will it take to get my bus repaired?

Of course, the length of time necessary to repair your bus will depend on the type of repair necessary, its severity, and the availability of parts.

It is the goal of Creative Bus Sales to expedite repairs. Once an assessment has been made, we will be able to give a more accurate estimate of repair time.

What can I expect to pay?

Our service department rates are both reasonable and competitive. Each job will be evaluated so that you receive the level of service needed to best accommodate the repair. We provide written estimates upon request.

What kind of warranty do I receive on the service work performed?

Our standard policy is to provide a 30-day warranty covering parts and labor on any service work we perform. Any other arrangements for specialized services need to be agreed upon in writing prior to the work being performed.

Don't Forget

Creative Bus Sales has a wide range of offerings to help you in all stages of bus ownership. Please contact Creative Care (1.844.374.8915 | CreativeCare@CreativeBusSales.com) if you're interested in any of the additional services listed below.

Mobile Repair Team Service

Our mobile service is available through most of our full service locations. Our quick mobile response vehicles are fully equipped for on-site repairs. This new service provides the same reliable maintenance service currently offered by Creative Bus Sales but at your location.

Graphics Packages

Wrap your bus in custom graphics and promote your brand's visibility. Creative Bus Sales can coordinate the work to your exact needs and specifications. Your bus will leave our facility completely decked out with your logo and branding.

Graphics Services Available:

- New Vehicle Graphics
- Re-branding Current Vehicles
- Graphic Design / Installation / Project Management

Green Alternative Systems

Green Alternative Systems is the largest Ford Recognized Qualified Vehicle Modifier (QVM) Alternative Fuel Program Installer in North America, with multiple dedicated facilities that focus on the installation and up-fitting of Compressed Natural Gas (CNG) and Propane fuel conversion systems for fleet customers.

Why Green Alternative Systems?

- Over 10,000 vehicles converted to alternative fuels
- Ford QVM's Largest Alternative Fuel Participant
- Propane, Natural Gas, and Electric
- Tier One Supplier to Multiple OEM's
- CNG Fuel System Inspections
- Certified Alternative Fuel Technicians
- Natural Gas / Propane / Bi-Fuel / Electric

Contact Information

Creative Bus Sales (Chino, CA Corporate Headquarters)	Phone	909.465.5528
	Fax	909.465.5529
	Website	CreativeBusSales.com
Creative Care	Phone	1.844.374.8915
	Fax	909.465.5529
	Email	CreativeCare@CreativeBusSales.com
Service Department	Phone	1.800.326.2877
	Fax	909.465.5529
	Email	Service@CreativeBusSales.com
Parts Department	Phone	888.993.5040
	Fax	909.993.5766
	Email	Parts@CreativeBusSales.com
Warranty	Phone	1.800.326.2877
	Fax	909.465.5529
	Email	Warranty@CreativeBusSales.com
Corporate Management Team	Toll Free	800.326.2877

Our staff is standing by, please do not hesitate to contact us!



Creative Bus Sales
THE NATION'S LARGEST BUS DEALER SINCE 1980



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Experience and Qualifications

Responder Information

Creative Bus Sales, Inc.
9365 Counselors Row, Suite 112
Indianapolis, Indiana

Mike Wilson | Director of Sales
Phone: 800.326.2877
Email: MikeW@CreativeBusSales.com

1. Background and Experience

Operating 23 full-service locations, Creative Bus Sales is the largest bus dealership in the United States representing over 20 major vehicle manufacturers. The Company's team of vehicle sales representatives possess over 560 years of cumulative vehicles sales experience, resulting in 5,000+ vehicles sold nationwide every year.

Creative Bus Sales is dedicated to servicing its customers at the highest possible level. Nationwide, the Company has in excess of 270 company operated service bays dedicated to pre-delivery inspections, warranty and service work. Green Alternative Systems (GAS), a division of Creative Bus Sales, has performed over 10,000 alternative fuel conversions (CNG, Propane, and Electric). Additionally, the Company is the only dealership in the nation to possess multiple Ford-certified, Qualified Vehicle Modifier (QVM) dealership locations.

Creative Bus Sales houses a dedicated customer service department to handle all pre- and post-sales needs of its customers. The Company has a team of 25+ dedicated outside and inside parts sales representatives responsible for handling all customer parts needs. Creative Bus Sales currently holds multiple State Purchasing Contracts, a partial listing of contracts is shown below.

Nationwide Transit Contract Experience (a partial listing of significant projects)

• Orange County Transit (OCTA)	Over 950 Paratransit Buses & Vans
• City of Los Angeles (LADOT)	Over 500 Paratransit Buses
• Caltrans/DGS	Over 5,000 Paratransit Buses & Vans
• RTC Las Vegas	Over 400 Paratransit & Transit Buses
• Access Services	Over 1,000 Paratransit Mini Vans
• Dallas DART	Over 400 Paratransit Buses
• Florida (FDOT)	Over 600 Paratransit Buses & Vans
• GSA	Over 350 Paratransit Buses
• Arizona Dept of Trans (ADOT)	Over 600 Paratransit Buses & Vans
• North Carolina (NCDOT)	Over 600 Paratransit Buses & Vans
• Texas (Multiple Contracts)	Over 1,200 Paratransit Buses & Vans
• Washington (WSDOT)	Over 650 Paratransit Buses & Vans
• Oregon (ODOT)	Over 300 Paratransit Buses & Vans
• Oklahoma (Multiple Contracts)	Over 400 Paratransit Buses & Vans
• New Mexico (NMDOT)	Over 450 Paratransit Buses & Vans



Creative Bus Sales

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Creative Bus Sales currently holds transit contracts and/or services customers in the following states: WA, OR, CA, NV, ID, MT, WY, UT, CO, AZ, NM, KS, OK, TX, IL, IN, AR, LA, MS, AL, GA, FL, NC, SC, PA, TN, MD, and MA.

Customer Service Capabilities

Creative Bus Sales' service locations are located within the contract requirements of all recipient's locations. The Creative Care and Technical team are available to assist immediately as needed. The Company has the authority to deploy internal and factory personnel from any discipline including engineering, manufacturing, parts, service and management in response to a customer's needs. No delay in problem resolution due to out of state factory personnel availability is experienced. Swift and accurate resolutions to issues and needs are achieved through factory personnel directly reviewing issues, "first hand", as they are presented.

Creative Bus Sales has excellent relations with all major component manufacturers. The Company's Service Technicians and supervisory team are certified by John Deere, Cummins, A/C Carrier, MCC, Trans Air, Thermo King, Freedman Seating, Ricon, and Braun amongst many others. Service Technicians are graduates of the Automotive Technical College and many are Automotive Service Excellence (ASE) Master Technicians.

Creative Bus Sales' Parts and Service Department is dedicated solely to the service and support of commercial and transit buses and does not service any other type of equipment, school buses or trucks. Such focus ensures an unmatched level of competency in the industry. Technical assistance can be provided immediately during business hours by contacting Creative Bus Sales service technicians. Complete description of warranty policy and procedures can be provided upon award.

With over 5,000 units sold annually, Creative Bus Sales has the largest "fleet" of vehicles in service in the nation. This gives the Company the most vehicle performance data in the industry. The Company is exposed to issues with vehicles across the country in a variety of operating conditions. This data allows the Company to recognize issues well in advance of smaller dealers that do not service the volume of vehicles Creative Bus Sales does. This translates to quicker warranty approvals and repair execution for customers, as many times the Company has already seen the issue prior to receiving the call. Additionally, our technical support team has an information sharing process that communicates common issues and repairs, resulting in reduced troubleshooting times frames and quicker repairs. All of this allows the Company to get customer vehicles back up and running in the quickest manner possible, minimizing downtime for Kanawha Valley customers.

List of Centers

One call to our dedicated Creative Care team will initiate immediate warranty service and technical response. Creative Bus Sales is an authorized repair facility for all products represented. The Company has the authority to make on the spot decisions regarding warranty repairs and approvals. In addition to the Company operated facilities, local warranty repair facilities will be authorized to perform the required repair on an as needed basis. Our intent is to make all warranty and service as



Creative Bus Sales

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local as possible while providing the customer with the best possible service. Our team of certified technical advisors are available to assist with any necessary troubleshooting efforts. This ensures less downtime and a better overall experience to the KVRTA end users.

Spare Parts and Inventory Levels

A critical part of the project is a quick response time to service assistance and parts supply. Creative Bus Sales operates dedicated parts warehousing operations with over 60,000 square feet of capacity and \$10,000,000 worth of inventory. The Company stocks significant parts supply at all its locations. In addition, the Company operates dedicated parts warehouses in Arizona, California, Florida, Indiana, Georgia, Pennsylvania, and Texas.

One call to our Parts Department will facilitate the end user's needs. With 25+ dedicated employees, Creative Bus Sales' Parts Department has over sixty years of cumulative experience in this field. Most parts can be shipped within twenty-four hours of order. Complete description of parts policy and procedures can be provided upon award.

Inspection procedures

Due to Creative Bus Sales' proximity to manufacturers locations, the Company has inspectors on site during vehicle builds. The Company has a team of inspectors located in Elkhart, Indiana that visits manufacturer facilities on an ongoing basis. This allows the Company to catch any potential issues during the build process, prior to customer receipt. Once completed at the manufacturer, vehicles are delivered to a Company location for additional inspection. In many cases these vehicles flow through Creative Bus Sales' Elkhart inspection facility immediately following completion. The Elkhart facility is over 50,000 square feet and processes deliveries of approximately 1,500 vehicles yearly. Any issues identified can be repaired in house or sent back to the manufacturer for repair. Next, vehicles are shipped to one of the Company's local facilities for final PDI (Pre-Delivery Inspection). This additional inspection allows the Company to catch any issues that may have occurred during the initial driving period of the vehicle. Any deficiency noted shall be repaired before delivery. All documents required under the contract shall be provided upon delivery or pickup. The Company inspection processes mentioned above are all in addition to any inspections performed by the manufacturer and/or line inspectors hired by the end user.

2. Key Personnel and Experience

Contract Management Team

- Tony Matijevich | President
- TJ Matijevich | Vice President Sales
- JR Sauder | Senior Vice President
- Mike Wilson | Director of Sales
- **Matthew Mashuda | Sales Executive, Project Manager**
- Nick Corley | Sales Operations Manager
- Carl Henderson | Senior Director of Service
- Jamie Greenlaw | Fleet Warranty Administrator



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

3. Fiscal Responsibility

With a 40 year history, 23 locations nationwide, and 350+ employees, Creative Bus Sales has the necessary longevity and financial stability to service any contract of any size. Since 1980, the Company has grown to service customers in nearly every state in the U.S. More than 50% of the Company's facilities are owned facilities, not leased properties, with significant investment in renovations, equipment, and employees.

Creative Bus Sales has long standing relationships with vehicle floorplan providers and banking partners. Floorplan relationships go back 20+ years and the same goes for its banking relationships. The Company has achieved increased revenue, sales, and transaction growth year over year for the past 10+ years.

4. Delivery Performance

Creative Bus Sales prides itself on delivering vehicles on time with all specifications met. The Company has not paid liquidated damages on any transit contract in the past five (5) years.

5. Ownership History and Statement Regarding Judgements and Violations

Originally founded in 1980 as Creative Transportation Systems (CTS), the Company was later renamed Creative Bus Sales in 1990. The current owner, Tony Matijevich, purchased the Company in 1993 and it has been family-owned and operated since. Prior to purchasing Creative Bus Sales, Tony was the President of ElDorado National, the largest manufacturer of small and mid-size buses in the nation at the time. Under the current leadership and vision, Creative Bus Sales has become the largest-volume small, mid and large-size bus and van dealership in the United States. Over the past 40 years, the Company has expanded its scope through a combination of dealer acquisitions and organic growth.

Creative Bus Sales was incorporated in the State of California in 1993 under the current ownership. Creative Bus Sales has had no judgments, litigation, licensing violations or other violations outstanding or resolved against it within the past five (5) years.

6. Additional Information

Creative Bus Sales Nationwide Locations:

- | | |
|-------------------------|----------------------|
| 1. Chino, CA | 11. Rogers, AR |
| 2. Sacramento, CA | 12. Slidell, LA |
| 3. Canby, OR | 13. Jackson, MS |
| 4. Mukilteo, WA | 14. Elkhart, IN |
| 5. Phoenix, AZ | 15. Buffalo, NY |
| 6. Albuquerque, NM | 16. Canonsburg, PA |
| 7. Colorado Springs, CO | 17. Carlsbad, NJ |
| 8. Irving, TX | 18. Hudson, NH |
| 9. Lewisville, TX | 19. Jacksonville, FL |
| 10. Tyler, TX | 20. Davie, FL |



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

21. Orlando, FL
22. Charlotte, NC

23. College Park, GA

Notices should be sent c/o

Mike Wilson Creative Bus Sales, Inc. 9365 Counselors Row, Ste. 112, Indianapolis, IN, 46240
Phone: 800.326.2877 Fax: 909-465-5529 Email: MikeW@CreativeBusSales.com

Preparer

Nick Corley, Sales Operations Manager for Creative Bus Sales, is the preparer of this proposal.

Flexible Scope

Creative Bus Sales is committed to flexibility in the products and services offered in the contract upon request by the State.

Independent Pricing

Creative Bus Sales certifies that in connection with this Contract the prices proposed have been arrived at without consultation, communication or agreement for the purpose of restricting competition.

Signer(s)

Each person signing this proposal and/or addenda is the person responsible for or authorized to make decisions as to the prices quoted in the cost proposal and has not participated and will not participate in any action contrary to those stated above.

Consent

If awarded a contract, Creative Bus Sales will not assign any part of its interest in the agreement without prior consent of the State.

Acceptance of Terms

Creative Bus Sales accepts the Contract Terms and Conditions.

Cutoff Dates

Creative Bus Sales agrees to comply with this section. Model year cutoffs are well communicated by the OEM's and chassis dealers alike. We generally receive 60 – 90 day notice and will notify the agency promptly.

Sincerely,

Nick Corley | Sales Operations Manager

Creative Bus Sales, Inc.

STATE OF WEST VIRGINIA

Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Creative Bus Sales, Inc.

Authorized Signature:  - Nick Corley Date: 1-11-2023

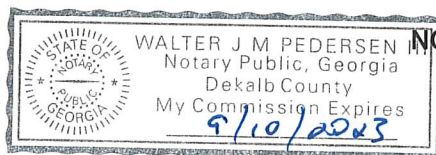
State of Georgia

County of Clayton, to-wit:

Taken, subscribed, and sworn to before me this 11 day of January, 2023.

My Commission expires September 10, 2023.

AFFIX SEAL HERE



NOTARY PUBLIC



Purchasing Affidavit (Revised 01/19/2018)

DOCUMENTATION TO BE SUBMITTED WITH BID SUMMARY:

3.1.11 Water Test: Please find attachment provided labeled “Water Test Procedure”

3.2 Chassis :

Description : Ford E450 Gasoline chassis 14,500 GVWR

Warranty: 3 years/36,000 bumper to bumper and 5 years/60,000 powertrain

Literature: See Ford E450 Technical Specs

3.2 Wheelbase: Per the bid specs, Class A and B will be 176” and Classes C, D, E, and F will be 190”

3.3 Engine

Description: 7.3L V8

Warranty: See document labeled “6.1.7.5 Ford Warranty”

Literature: See Ford E450 Technical Specs

3.5 Radiator and Cooling System:

Description: OEM

Warranty: See document labeled “6.1.7.5 Ford Warranty”

Literature: See Ford E450 Technical Specs

3.6 High Idle System:

Description: Intermotive Gateway High Idle and Interlock System

Warranty: 2 Years/24,000 miles

Literature: See attachment document labeled “3.6 High Idle System”

3.8 Transmission:

Description: OEM Electric 6 Speed Automatic

Warranty: See document labeled “6.1.7.5 Ford Warranty”

Literature: See Ford E450 Technical Specs

3.10.4 Rear View Back-Up Camera:

Description: Rosco STSK4750B

Warranty: 2 Years/24,000 miles

Literature: Please attachment labeled “3.10.4 Back Up Camera”

3.11.4 Tilt Wheel, Cruise Control and Power Steering:

Description: OEM

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.13 Brakes:

Description: OEM

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.14 Wheels:

Description: 16" Steel Wheel painted white on both sides

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.15 Tires:

Description: Tires will be LT 225/75R16 E All Weather tires

Warranty: Tire warranty varies depending on the brand supplied from the factory

Literature: See Ford E450 Technical Specs

3.16.5 Alternator:

Description: 225 amp alternator

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.16.6 Battery:

Description: OEM

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.17.1 Radio/AM/FM/USB/MP3:

Description: OEM AM/FM/USB/MP3

Warranty: See document labeled "6.1.7.5 Ford Warranty"

Literature: See Ford E450 Technical Specs

3.19 Body Structure: Please see the attachment titled "3.19.1 Body Construction"

Proposed Length Class A and B: 25 feet

Proposed Length Class C, D, E, and F: 26 feet

Proposed Actual interior Height for all Classes: 80"

3.19.15 Stepwell

Description: Stainless Steel Entry Step Assembly - Includes Sides & Header

Literature: See attachment labeled "3.19.15 Step Well"

3.22 Entrance, Exit, Lift and Emergency Exit Doors:

Description: A+M Door systems-Dual leaf entry door, single panel rear door, dual leaf lift doors

Dimensions: Rear door 38 ½" X 59"- Entry Door 31" Clear opening X 76"-Extra wide dual lift

Doors due to platform width chosen in the specifications.

Interlock Connectivity: Industry standard interlocking to be used except when call out in this bid

Door Locks type: Standard key lock with ¼ turn handles

3.23 Rear Bumper:

Description: Transpec or Romeo Rim energy absorbing rear bumper (lead time dependent)

Warranty: 1 year/unlimited

Literature: See literature labeled "3.23 Energy Absorbing Bumper"

3.24 Wheelchair Lift:

Description: Braun NL10003754 HB2 lift

Warranty: 3 years 10,000 cycles

Literature: See brochure labeled "3.24 Wheelchair lift"

3.24.9 Interlock System:

Description: Intermotive Gateway High Idle and Interlock System

Warranty: 2 Years/24,000 miles

Literature: See attachment document labeled "3.24.9 Interlock"

3.26 Front and Rear Heating and Air Conditioning:

Description: Trans Air TA773 Super 13 Air Conditioning

ProAir 435 Dual 35,000 BTU 3 speed Floor Heaters

Warranty: Three years unlimited miles A/C ----- 3 Year Heater with lifelong motor coverage

Literature: Please see multiple attachments labeled "3.26...."

3.29 Flooring:

Description: Gerflor Sirius NT #6801

Sample: Due to it being an electronic bid, a sample of the flooring can be mailed upon request

Color to be used: Gerflor #6801 Graphite is a black color

Assembly process: Please see provided document labeled "3.29 Flooring"

3.30.1 Passengers Seats and Restraints:

Description: Freedman Feather weight Mid-Hi fixed seat (A, B, C, D) High Backs Classes E and F

Freedman Double Fold Way seats, Freedman USR under seat retractable belts

Warranty: 2 year/24,000 miles

Literature: See multiple documents labeled "3.30.1....."

3.30.2 Padded Grab Handle:

Description: Freedman Anti-Vandal Grab Handles

3.30.11 Driver's Seat

Description: Freedman Shield High Back Driver Seat

Warranty: 2 years/24,000 miles

Literature: See attached document labeled "3.30.11 Driver's Seat"

3.31 Wheelchair Securement System:

Description: Anodized L Track will be provided-Medium Duty Series

Warranty: 2 year/24,000

3.32 Mobility Aid/Occupant Restraint Systems:

Description: Q'Straint 360 Tie Downs and Quick Straps

Warranty: One year

Literature: See document provided labeled "3.32 QRT 360"

3.33.1 Exterior Mirrors:

Description: Accu Style 815 Series exterior heated and remote controlled mirrors

Warranty: 2 years/24,000 miles

Literature: See provided document labeled "Accu Style mirrors"

3.37 Digital Destination Signs:

Description: Transign LED Destinator Front and Side Signs

Warranty: 100,000 hours of full brightness

Literature: See provided document labeled "3.37 LED Destinator"

3.38 Passenger Signaling System:

Description: ADA Stop Request, Pull Cord, Dual Auditory Tones, Dual Face Sign w/LED for ADA Request

Warranty: 2 years, 24,000

Literature: See provided document labeled "Passenger Signaling System"

3.39 Mobile PA System:

Description: Voyager PA 500

Warranty: 2 years/24,000 miles

Literature: See document attached labeled "Mobile PA system"

3.40 Fare Box Provision:

Description: We will Pre-wire for a farebox (ignition hot and ground) to be run to behind the driver's seat for future farebox mounting. 8' of coil will be provided.

3.41 Strobe Light:

Description: Beacons 3000 Series Strobe Light with Branch Guard

Warranty: 2 Years

Literature: See the attachment labeled "3.41 Sound Off Strobe Light"

3.42 Radio Install Prep:

Description: Pre-wire (battery hot and Ground) for 2 way radio. Run to the doghouse area and provide 6' of coiled wire. See document labeled "radio install prep" for guidelines on how to install.

3.44 Security Camera System Including Playback:

Description:

Angel Trax Vulcan 12 System with 6 cameras. 1TB Harddrive. SD card back up. Secured box with 2 keys. Location is open
VULCANV12 - Vulcan Series 12-Channel HD/IP Mobile Digital Video Recorder • 12 Channels with 8 Channels D1, WD1, 720P, or up to 1080P + 4 Channels IP up to 1080P
SSD500G-UPGRADE - 500GB Solid-State Hard Drive
MSD512GB - 512GB microSD Solid-State Memory Card
VULPBH - Vulcan Series Panic Button Housing PC color
DMB100-V12 - L-Shaped Vertical Mounting Bracket for Vulcan V12 MDVR
HD1700V - Vulcan Series 170-Degree HD 1080P Low Profile Camera-overhang, facing towards the rear, Above the drivers left shoulder facing the door, Above the driver, to see the drivers operations

HD2500V - Vulcan Series 2500 HD Low Profile Camera- facing the wheelchair lift • 2.5mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation
HD2500WS - Vulcan Series 2500 HD Windshield Camera- Out the Windshield • 2.5mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation
HD3600V - Vulcan Series 3600 HD Low Profile Camera- rear of the bus • 3.6mm Lens with Fully Articulating Lens Casing, Adjustable Vertically and Horizontally at Installation
HD4CBL - 13.12 ft. HD Camera Cable
HD9CBL - 29.53 ft. HD Camera Cable
ADJBRWS - Adjustable Mounting Bracket for Vulcan Series HD-WS Starlight Camera Capturing Windshield View
WC4G - Vulcan Series Wi-Fi Cellular GPS Tri-Mode Antenna
V12SECKEY - Security Key USB 3.0 for Vulcan V12 MDVR

Warranty: 2 year/24,000 mile

Literature: See provided document labeled “Security Camera System”

3.45 Dual Purpose Safety Vent:

Description: Transpec 1070 Series Roof Hatch

Warranty: 2 years/24,000 miles

Literature: See attachment labeled “3.45 Dual Purpose Safety Vent”

3.46 Storage Compartment:

Description: Overhead Storage box

Warranty: 2 years/24,000

Literature: The storage compartment is made in factory. Not literature exists for it. See document 3.46 Storage Compartment note.

3.51 Training: Please see the attachment labeled “Training Acknowledgment”

4.0.5 Overhead Luggage Racks For Classes E and F:

Description: Overhead parcel racks produced in house at the factory

Warranty: 2 years/24,000 miles

Literature: See the provided document labeled “4.0.5 Overhead luggage racks”

4.0.5 High Back Passenger Seats for Classes E and F:

Description: Freedman Featherweight High Back Seats

Warranty: 2 years/24,000 miles

Literature: See provided document labeled "4.0.5 High Back Seats"

6.1.7.4 Warranty Providers Locations:

Please find the attached document labeled "6.1.7.4 Warranty Providers Locations"

6.1.7.5 Warranties:

Please see attached document labeled "6.1.7.5 Warranty Synopsis" and "6.1.7.5 Ford Warranty"

9.3 Complete two of bid in binder: This is an electronic submittal

11.1.1 Complete mechanical description of vehicle, its construction, and equipment including manufacturer's model name: GLAVAL UNIVERSAL

Please find the provided document labeled

"11.1.1 Complete Mechanical Description"

"11.1.1 Glaval Universal Construction Specs"

"11.1.1 Detail on Body Materials"

11.1.2 Proposed Floor Plans: Please see attachments labeled:

"Floor Plan Classes A+B"

"Floor Plan Classes C, D, E, F"

11.1.3 Curb weight: Please see attachments labeled:

"Weight Calc Classes A+B"

"Weight Calc Classes C, D, E, F"

*We have provided the weight calculation sheets in lieu of the empty weight, as they calculate using the GVWR of 14500 pounds, use the FTA approved passenger weight per seat, and they check the vehicle for 4 corner weight compliance if all seats were used.

11.1.6 Rustproofing and Undercoating: See attached documents labeled "Rustproofing and Undercoating 1" and "2"

11.1.8 List of 5 Users of similar equipment-see provided document labeled "11.1.8 References"



Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

Letter of Transmittal

Dear Bid Clerk,

Thank you and The State of West Virginia for the opportunity to submit a response to CRFQ 0810 DMT2300000009, 176"-190" Wheelbase Cutaway Vehicle.

Our understanding of the scope of work pertaining to this Request for Quote is to provide the State of West Virginia proposals for the manufacture and delivery of products in accordance with the terms and conditions set forth in this solicitation, meeting all specifications and FMVSS laws.

CBS's proposal may include manufacturer's brochures, standard warranty information, and additional technical information within our bid submittal. Information shown on these documents indicates our manufacturer's standard equipment or specifications and does not necessarily reflect the exact equipment to be utilized or included with the bid vehicle(s). Our vehicles are built to meet all bid specifications and amendments unless otherwise noted in our exceptions list. Our submittal takes no exceptions to the solicitation terms and conditions.

The resulting contract will be for up to thirty (30) 176"-190" wheelbase cutaway vehicles with related necessary components, and selected options. The contract shall be a one (1) year plus one (1) year extension term. The enclosed offer, specifications and statements are valid for ninety (90) days after bid opening January 12, 2023.

The information contained in our proposal contains our qualifications to perform the required work, detailed specifications, warranties, and descriptions of our facilities and staff. Your expected delivery will be within one-hundred fifty (150) days after we receive a purchase order.

Included are all the required documentation and general forms. If you need more information or clarification, please give us a call at 800.326.2877 with any inquiries.

Sincerely,

Nick Corley | Sales Operations Manager

Creative Bus Sales, Inc.

800-326-2877

ncorley@creativebussales.com



2024 E-Series

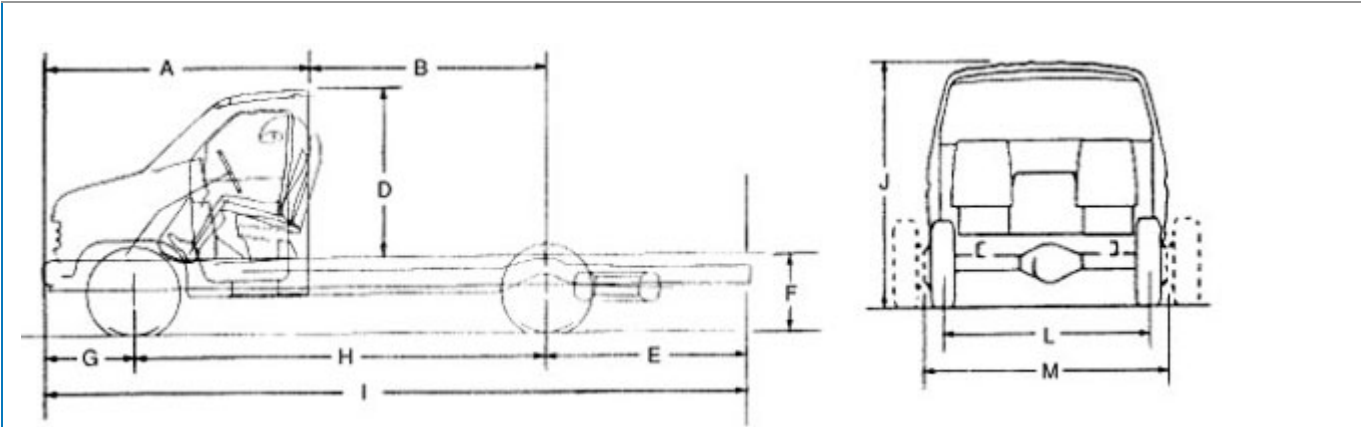
Specs

Key product specifications include vehicle dimensions and capacities, detailed powertrain information, transmission gear ratios and more.



2024 E-Series > Specs > Dimensions/Weights/Capacities

Body Dimensions — E-350/E-450 Cutaway



Series		E-350			E-450	
Model		Cutaway			Cutaway	
		SRW/DRW	SRW/DRW	DRW	DRW	DRW
Code	Description					
A	Cab Length	92.5	92.5	92.5	92.5	92.5
B	Cab Rear to Rear Axle	80.0	100.0	118.0	100.0	118.0
D	Top of Frame to Top of Cab	58.4	58.4	58.4	58.4	58.4
E	Rear Overhang	68.5	68.5	68.5	68.5	68.5
F	Load Height (Loaded)	25.9/26.2	25.9/26.2	26.2	26.0	26.0
G	Front Overhang	34.6	34.6	34.6	34.6	34.6
H	Wheelbase	138.0	158.0	176.0	158.0	176.0
I	Overall Length	241.1	261.1	261.1	261.1	261.1

J	Cab Height (Curb)	80.3/80.3	80.3/80.4	80.0	80.5	80.4
L	Front Track	69.4	69.4	69.4	69.4	69.4
M	Rear Track Dual — Rear	72.1/75.4	72.1/75.4	75.4	77.7	77.7

NOTE: Front jacking point — located under the front radius arm rearward of the sloped section (use flat space provided).

NOTE: Rear jacking point — located under rear axle between U-bolts.

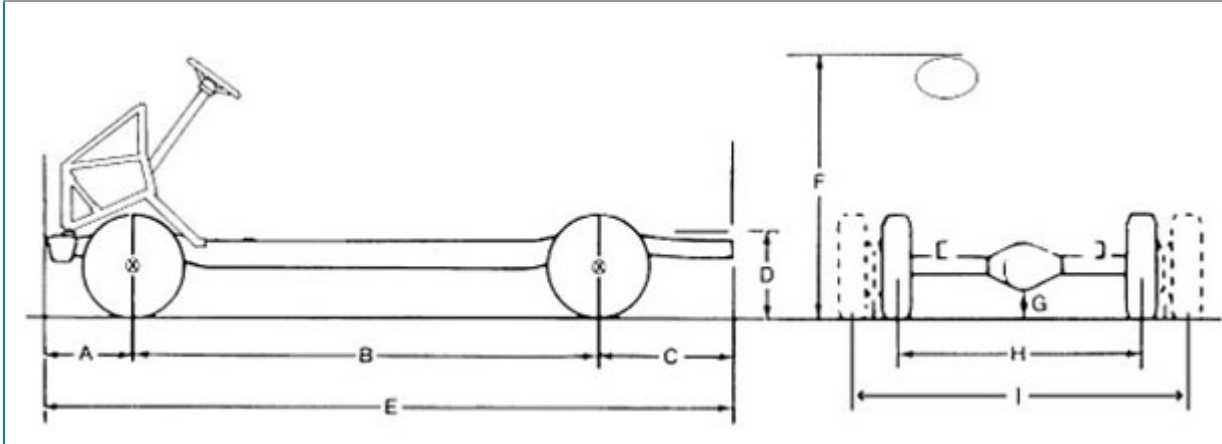
2024 E-Series > Specs > Dimensions/Weights/Capacities

Interior Dimensions — E-350/E-450 Cutaway

Series	E-350			E-450	
Model	Cutaway			Cutaway	
	SRW/DRW	SRW/DRW	DRW	DRW	DRW
Description					
Head Room (in.)	42.0	42.0	42.0	42.0	42.0
Max. Leg Room (in.)	42.1	42.1	42.1	42.1	42.1
Hip Room (in.)	65.6	65.6	65.6	65.6	65.6
Shoulder Room (in.)	68.1	68.1	68.1	68.1	68.1

2024 E-Series > Specs > Dimensions/Weights/Capacities

Body Dimensions — E-350/E-450 Stripped Chassis



Model		Stripped Chassis		
Series		E-350	E-350/E-450	E-350/E-450
		DRW	DRW	DRW
Code	Description			
A	Frame to Front Axle	26.2	26.2	26.2
B	Wheelbase	138.0	158.0	176.0

C	Rear Overhang	68.5	68.5	50.5
D	Load Height (Loaded)	26.2	26.2/26.0	26.2/26.0
E	Overall Length	232.7	252.7	252.7
F	Height at Top of Steering Wheel (Loaded)	71.9	71.9/71.7	71.8/71.7
G	Rear Axle Clearance, Loaded	7.0	7.0	7.0
H	Front Track	69.4	69.4	69.4
I	Rear Track	75.4	75.4/77.7	75.4/77.7

NOTE: Front jacking point — located under the front radius arm rearward of the sloped section (use flat space provided).

NOTE: Rear jacking point — located under rear axle between U-bolts.

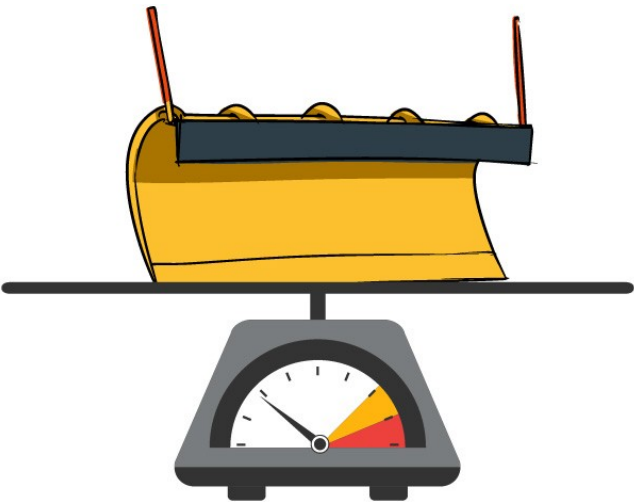
2024 E-Series > **Specs** > Dimensions/Weights/Capacities > General Truck Payload Information

Accessory Reserve Capacity (ARC) Calculation

This section provides the information needed to calculate the effect that vehicle options have on the payload capacity of Ford commercial vehicles.

This information is useful when the plan is to add aftermarket accessories or haul cargo at or near the vehicle's maximum capacity.

This section includes charts for each series, listing the maximum allowable weights for each GVWR.



ACCESSORY RESERVE CAPACITY

You can help prospective buyers estimate the total weight of accessories, equipment and modifications that may be added to the completed vehicle.

Ford vehicles are certified for compliance with the following FMVSS (Federal Motor Vehicle Safety Standards) or CMVSS (Canadian Motor Vehicle Safety Standards):⁽¹⁾

- 204 — Steering Column Rearward Displacement
- 208 — Occupant Crash Protection
- 212 — Windshield Mounting
- 219 — Windshield Zone Intrusion
- 301 — Fuel System Integrity
- 303 — CNG Fuel System Integrity (Canadian Standard 301.2)

The total added accessory weight must not exceed the allowable weight shown in the tables. Awareness is critical if the vehicle is going to be modified or have accessories installed.

If the modification or installation of accessories or equipment causes the unloaded weight of the vehicle, as revised with the added equipment, to exceed the test vehicle weight, the U.S. vehicle alterer⁽²⁾ may be responsible to certify the altered vehicle according to Title 49, Code of Federal Regulations 567.7 and 568.8. A Canadian vehicle alterer may be responsible to certify the altered vehicle according to Section 6 of the Canadian Motor Vehicle Safety Regulations.

In this section, each vehicle has a worksheet that addresses Total Accessory Reserve Capacity only. It does not consider Front Axle Accessory Reserve Capacity and does not include DSO option weights in the calculations.

To approximate the amount of accessory equipment or modification weight that can be added to a Ford light truck without exceeding the test vehicle weight, calculate an estimated Total Accessory Reserve Capacity as follows:

1. Determine the "Total Actual Regular Production Option Content Weight" of the desired regular production options from the corresponding Accessory Reserve Capacity Calculation/Worksheet on the following page
2. Subtract the "Total Actual Regular Production Option Content Weight" from the "Maximum Allowable Weight (Regular Production Options & Aftermarket Equipment)" for the appropriate model. The difference is the estimated "Total Accessory Reserve Capacity"

	Maximum Allowable Weight (Regular Production Options & Aftermarket Equipment)
–	Total Actual Regular Production Option Content Weight
=	Total Accessory Reserve Capacity

Warning: The Accessory Reserve Capacity weight information addresses FMVSS and CMVSS Nos. 204, 208, 212, 219, 301 and 303 compliance only. For all light-duty trucks with a GVW rating under 8,500 lbs., federally certified trucks with a GVW rating of 8,500 to 10,000 lbs. that are optionally emissions certified to light-duty standards and all California complete vehicles with a GVW rating of 14,000 lbs. or less, if more than 500 lbs. is added to the vehicle's "maximum vehicle weight,"⁽³⁾ the modifier may be responsible for recertification to the applicable EPA or CARB emissions standards.

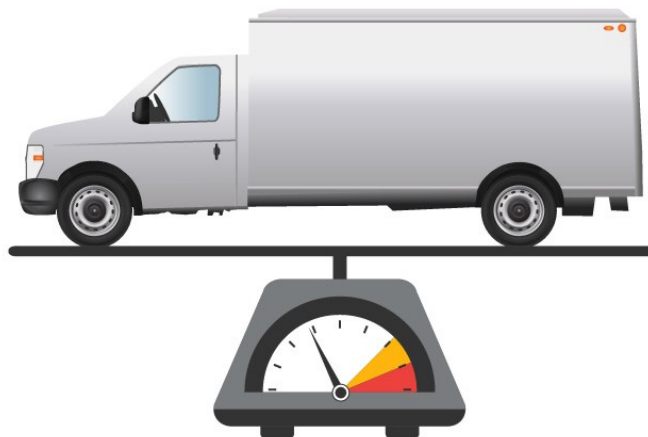
(1) Ford Motor Company's certification of compliance with FMVSS/CMVSS is based on specific vehicle test weights. These standards are applicable to completed vehicles of 10,000-lb. GVWR or less. Maximum allowable weights shown in the tables for vehicles above 10,000-lb. GVWR are maximum recommended values for optimum performance, durability and customer satisfaction.

(2) The same procedure to estimate the "Total Accessory Reserve Capacity" is recommended to completed vehicle alterers in Canada.

(3) **Important:** "Maximum vehicle weight" is calculated in accordance with the definition provided in an EPA guidance letter dated July 13, 1979, from C.N. Freed of the EPA to M.H. McBride, legal counsel of the Recreation Vehicle Industry Association. The preceding conditions are based on that letter and on EPA Advisory Circular No. 64 — a March 7, 1977, publication that provides guidance on the need for separate certification of vehicles modified after original manufacture, but prior to sale and delivery to the ultimate purchaser. Additional guidance or questions concerning EPA's policies with respect to alterers of completed vehicles should be directed to legal counsel or the Environmental Protection Agency.

Base Curb Weight

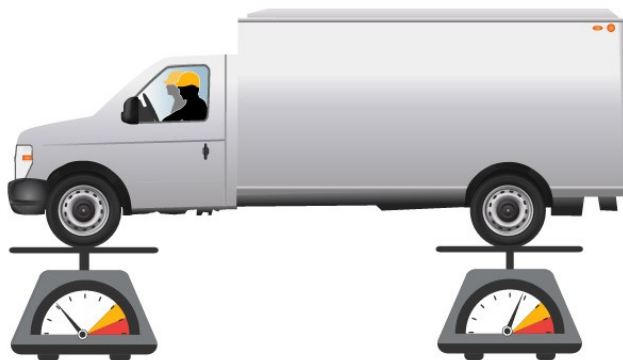
- The weight of the vehicle including standard equipment, oil, lubricants and a full tank of fuel. It does not include the weight of driver, passengers, cargo or any optional or aftermarket equipment
- **Base curb weights for each engine/standard equipment transmission combination are listed in the Weight Ratings pages of each vehicle section (see Maximum Payload Weight Ratings for reference)**
- Actual Regular Production Option Content Weights can be found in the charts under Actual Regular Production Option Content Weights



2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Gross Axle Weight

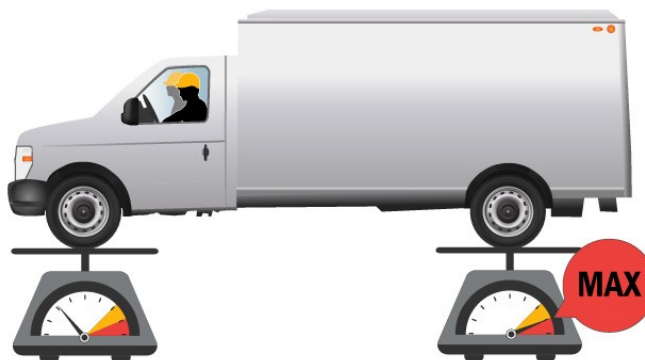
The total weight placed on each axle of the vehicle (front and rear).



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Gross Axle Weight Rating (GAWR)

The maximum allowable weight to be placed on an individual axle (front or rear). Gross Axle Weight Ratings are provided for both front and rear axles.



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Gross Combination Weight (GCW)

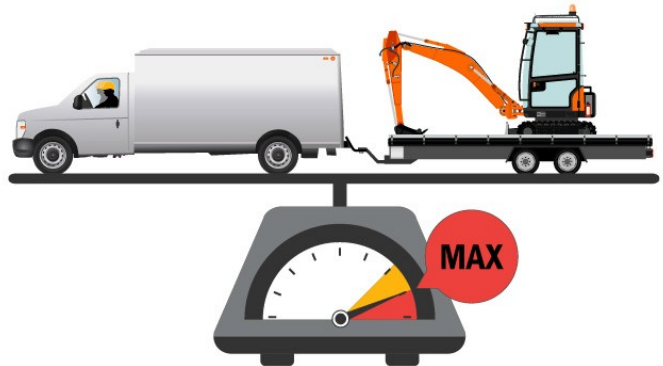
Gross vehicle weight plus the trailer weight.

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Gross Combination Weight Rating (GCWR)

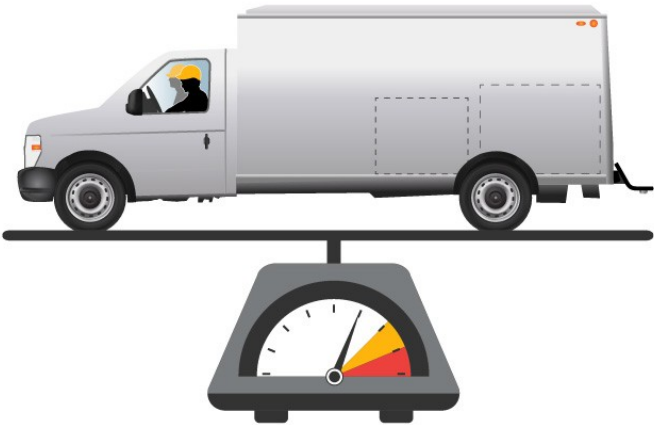
The maximum allowable weight of the towing vehicle, the trailer and all associated passengers, cargo and equipment.

The point to remember is that the actual weights should never exceed the listed weight ratings. If recommended weight ratings are exceeded, the vehicle could be disqualified for warranty coverage.

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Gross Vehicle Weight (GVW)

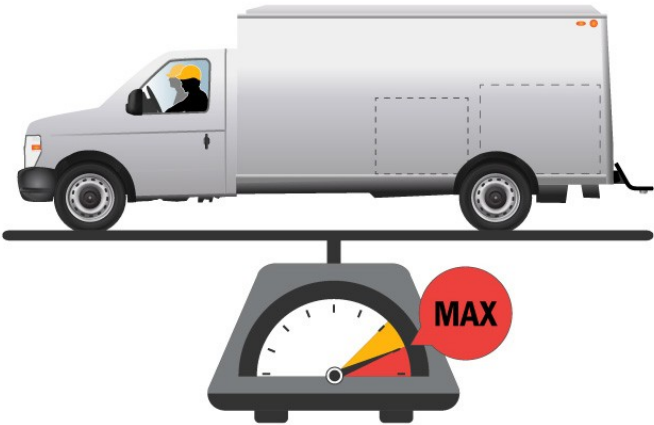
The weight of the vehicle including driver, passengers, optional and aftermarket equipment, and all cargo.



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Gross Vehicle Weight Rating (GVWR)

The maximum allowable weight of the fully loaded vehicle (including passengers and cargo).



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Maximum Payload Weight Rating

This is the advertised payload rating. It is the maximum allowable payload for the truck, including driver, passengers, optional and aftermarket equipment, and cargo. The weight of the engine and its standard transmission is already factored into the Maximum Payload Weight Rating. If the engine is also available with an optional transmission, that engine/transmission weight can be found in the Actual Regular Production Option Content Weight charts.

Vehicle Payload Calculation	Front/Total (lbs.)
Maximum Payload Weight Rating ⁽¹⁾	___ / ___
Less Total Actual Regular Production Option Content Weight (from Line A, Payload/GVWR Worksheet)	___ / ___
Equals Net Total Vehicle Payload (Front and rear axles and spring capacities will be sufficient to carry this payload uniformly distributed in vehicle cargo area)	___ / ___

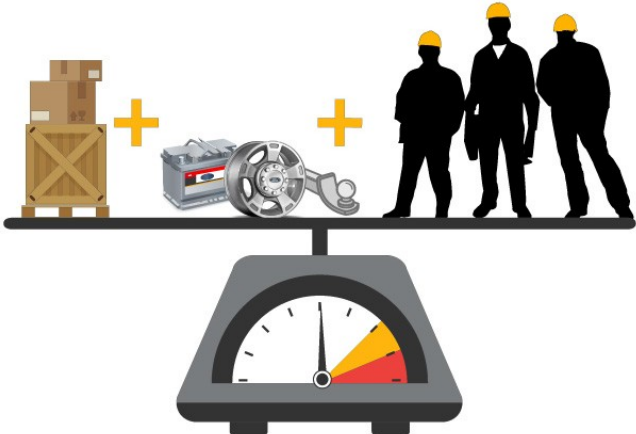
(1) Weight for driver and passengers must be deducted. Refer to the individual vehicle weight rating pages for maximum payload weight ratings. Refer to Regular Production Option Content Weight.

NOTE: Front springs are computer selected to meet specific option requirements for each vehicle; HD front springs are standard if vehicle option weights require.

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Maximum Payload Weight Ratings

The Payload Weight Ratings and the Max. Option Weight/Max. Total Accessory Reserve Capacity (ARC) Weight Charts⁽¹⁾ are published and can be found in the weight ratings pages of the individual vehicle sections. This information is grouped together with other model, engine/ transmission and maximum gross vehicle weight rating (GVWR) data for ease of use.

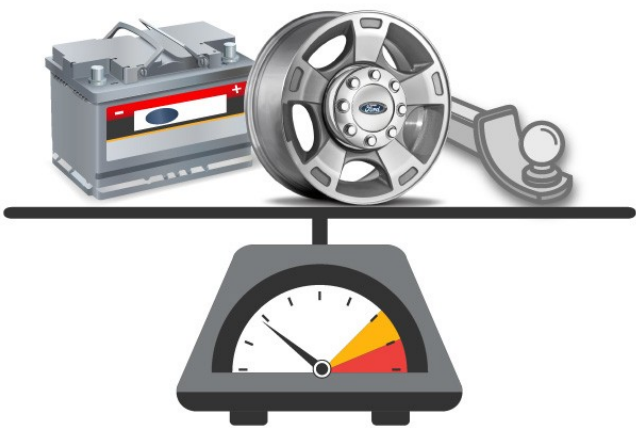
An illustration of a large industrial scale. On the flat top of the scale, from left to right, are a stack of cardboard boxes, a yellow plus sign, a car battery, a wheel, another yellow plus sign, and three silhouettes of workers wearing hard hats. The scale's dial is visible, showing a needle pointing towards the yellow and red zones.

(1) OPT/ARC Weight is the maximum allowable weight for regular production options (OPT) and aftermarket equipment. Accessory Reserve Capacity (ARC) for models with standard equipment and the engine/transmission combination indicated.

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Option Weights

The weight of any added equipment that is not included in the base curb weight.

An illustration of a large industrial scale. On the flat top of the scale, from left to right, are a car battery and a wheel. The scale's dial is visible, showing a needle pointing towards the yellow and red zones.

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Passenger Weight

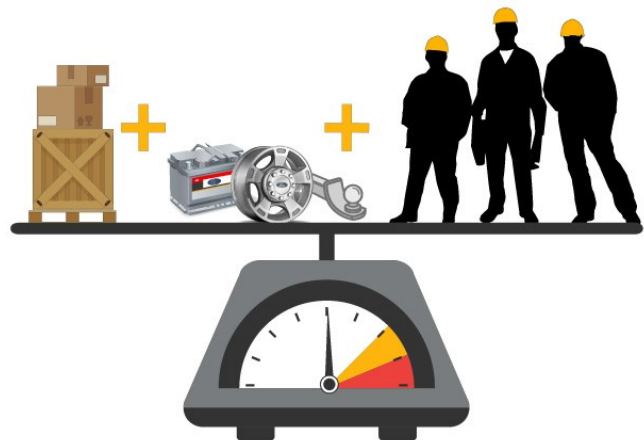
Defined as 150 lbs. multiplied by the number of safety-belted seating positions, including the driver, that the vehicle can carry.



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Payload

- Maximum payload is defined as the weight of all passengers, optional and aftermarket equipment, and cargo
- Net payload is defined as the weight that can be placed in the truck after subtracting for driver, passengers, and optional and aftermarket equipment



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Tongue Weight

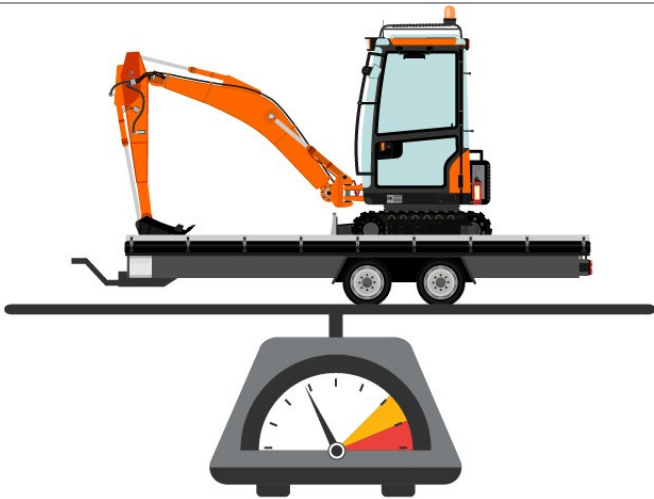
The amount of the trailer's weight that bears down on the trailer hitch (10% to 15% of the total loaded conventional trailer weight or 15% to 25% of the total loaded 5th-wheel trailer weight).



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Trailer Weight

The weight of a fully loaded trailer, including all attachments, lights, etc.



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Truck “Nominal Tonnage”

“Nominal Tonnage” is a term that Ford and other manufacturers have historically used to **generally categorize** the load capacity of a vehicle series; it is not a term defined by federal or state law.

Our COV (Certificate of Origin for a Vehicle) includes each particular vehicle’s shipping weight, as well as the vehicle’s gross vehicle weight rating or GVWR (from which one can determine the particular vehicle’s rated carrying capacity, including driver, passengers, fluids, body upfit [if applicable] and aftermarket accessories). The COV also includes the vehicle’s “Nominal Tonnage.”

“Nominal Tonnage” provides the **general** usable cargo capability that most (but not all) of the vehicles with the designated nominal tonnage can expect to handle. That is, nominal tonnage states the general load capacity for each vehicle series, although particular vehicles may have a higher (or in some circumstances, lower) load capacity based on the specifications of the particular vehicle.

Relevant Vehicle Series/Nominal Tonnage Relationship Categories	
Nominal Tonnage	Vehicle
½	Ranger, F-150, Transit Connect, Transit Passenger Van
¾	E-350 Cutaway/Stripped Chassis, Transit-150 Cargo Van/Crew Van/Passenger Van, Transit-250 Cargo Van/Crew Van, Transit-350 Cargo Van/Crew Van/Passenger Van (GVWR 9,499 lbs.), Transit-250 Cutaway/Chassis Cab, F-250 Pickup
1	E-450 Cutaway/Stripped Chassis, Transit-350 Cargo Van/Crew Van/Passenger Van (GVWR 9,500 lbs.), Transit-350 Cutaway/Chassis Cab, F-350 Pickup, F-350 Chassis Cab
1½	F-450 Pickup, F-450 Chassis Cab
2	F-550 Chassis Cab

2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Vehicle Class Ratings by GVWR

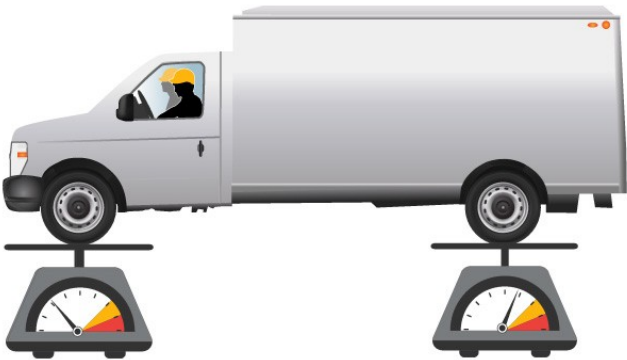
Weight Class	GVWR Range (lbs.)	Vehicle/Model
1	Up to 6,000	Transit Connect Cargo Van (5,110–5,302 lbs.) Transit Connect Passenger Wagon (5,302–5,420 lbs.)
2	6,001 to 10,000	Ranger (6,050 lbs.) Transit-150 Cargo Van/Passenger Van (8,670/8,550 lbs.) Transit-250 Cargo Van/Crew Van (9,070 lbs.) Transit-350 Cargo Van/Crew Van (9,250–9,950 lbs.) Transit-350 Passenger Van (9,250–9,550 lbs.) Transit-250 Cutaway/Chassis Cabs (9,070 lbs.) Transit-350 Cutaway/Chassis Cabs (9,500 and 9,950 lbs.) E-Transit T350 Cargo Van, Chassis Cab and Cutaway (9,500 lbs.) F-150 (6,070–7,850 lbs.) F-250 Pickup (9,900–10,000 lbs.) F-350 Pickup (10,000 lbs.) F-350 Chassis Cab SRW (9,800–10,000 lbs.)
3	10,001 to 14,000	E-350 Cutaway (10,050–12,500 lbs.) E-350 Stripped Chassis (11,500–12,500 lbs.) Transit-350 Cargo Van/Crew Van/Passenger Van (10,360 lbs.; 11,000 lbs. [Cargo Van only]) Transit-350 Cutaway/Chassis Cab (10,360 and 11,000 lbs.) F-250 Pickup (10,400–10,800 lbs.) F-350 SRW Pickup (10,100–12,400 lbs.) F-350 DRW Pickup (13,000 ⁽¹⁾ –14,000 lbs.) F-350 Chassis Cab SRW (10,500–11,500 lbs.) F-350 DRW Chassis Cab (14,000 lbs.) E-450 Cutaway (14,000 lbs.) E-450 Stripped Chassis (14,000 lbs.) F-450 Pickup (14,000 lbs.)
4	14,001 to 16,000	E-450 Cutaway (14,200–14,500 lbs.) E-450 Stripped Chassis (14,200–14,500 lbs.) F-450 Chassis (15,000–16,000 lbs.) F59 Commercial Stripped Chassis (16,000 lbs.) F53 Motorhome Chassis (16,000 lbs.)
5	16,001 to 19,500	F-450 Chassis Cab (16,500 lbs.) F-550 (17,500–19,500 lbs.) F59 Commercial Stripped Chassis (19,500 lbs.) F53 Motorhome Chassis (18,000 lbs.)
6	19,501 to 26,000	F-600 (22,000 lbs.) F-650 Gasoline (22,000–26,000 lbs.)/Diesel (22,000–26,000 lbs.) F59 Commercial Stripped Chassis (22,000 lbs.) F53 Motorhome Chassis (20,500–26,000 lbs.)
7	26,001 to 33,000	F-650 (27,500–29,000 lbs. Gas and Diesel) F-750 (31,000–33,000 lbs. Gas and Diesel)
8	33,001 and above	F-750 (34,200–37,000 lbs. Diesel)

(1) 13,000 lbs. Pickup Box Delete only.

2024 E-Series > Specs > Dimensions/Weights/Capacities > General Truck Payload Information

Weight Distribution

That portion of a vehicle's total weight that will be supported by each axle and each tire. Proper distribution of vehicle weight is critical to braking, handling and to the service life of components such as axles, springs, bearings and tires.



2024 E-Series > Specs > Dimensions/Weights/Capacities

GVWR/Payload/Spring & GAWR/Base Curb Weight

Model	WB (in.)	Engine/Trans.	Maximum GVWR (lbs.)	Maximum Payload ⁽¹⁾ (lbs.)	Spring/GAWR ⁽¹⁾ (lbs.)		Base Curb Weight (lbs.)		
					Front Range Min.-Max.	Rear	Front	Rear	Total
E-350 Cutaway	138 SRW	7.3L PFI V8 Premium/6R140	10,050	5,100	4,200	6,084	2,958	1,992	4,950
	138 DRW	7.3L PFI V8 Premium/6R140	11,500	6,270	4,050-4,600	7,800	3,001	2,224	5,225
	158 SRW	7.3L PFI V8 Premium/6R140	10,050	5,030	4,200	6,084	3,039	1,973	5,012
E-350 Cutaway	158 DRW	7.3L PFI V8 Premium/6R140	11,500	6,210	4,200-4,600	7,800	3,082	2,205	5,287
		7.3L PFI V8 Premium/6R140	12,500	7,210	4,200-5,000	8,500	3,082	2,205	5,287
	176 DRW	7.3L PFI V8 Premium/6R140	12,500	7,200	4,200-5,000	8,500	3,148	2,149	5,297
E-350 Stripped Chassis	138 DRW	7.3L PFI V8 Premium/6R140	11,500	6,870	4,400-4,600	7,800	2,421	2,204	4,625
	158 DRW	7.3L PFI V8 Premium/6R140	12,500	7,820	4,600-5,000	8,500	2,480	2,198	4,678
	176 DRW	7.3L PFI V8 Premium/6R140	12,500	7,760	4,600-5,000	8,500	2,535	2,197	4,732
E-450 Cutaway	158 DRW	7.3L PFI V8 Premium/6R140	14,200	8,680	4,600	9,600	3,078	2,434	5,512
		7.3L PFI V8 Premium/6R140	14,500	8,980	5,000	9,600	3,078	2,434	5,512
	176 DRW	7.3L PFI V8 Premium/6R140	14,200	8,680	4,600	9,600	3,161	2,358	5,519
		7.3L PFI V8 Premium/6R140	14,500	8,980	5,000	9,600	3,161	2,358	5,519
E-450 Stripped Chassis	158 DRW	7.3L PFI V8 Premium/6R140	14,500	9,690	5,000	9,600	2,531	2,274	4,805
	176	7.3L PFI V8	14,500	9,640	5,000	9,600	2,566	2,292	4,858

	DRW	Premium/6R140						
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(1) Gross Axle Weight Rating is determined by the rated capacity of the minimum component of the axle system (axle, wheels, tires) of a specific vehicle. Front and rear GAWRs will, in all cases, sum to a number equal to or greater than the GVWR for the particular vehicle. Maximum loaded vehicle (including passengers, equipment and payload) cannot exceed the GVWR or GAWR (front or rear).

2024 E-Series > Specs > Dimensions/Weights/Capacities > Option Content Weight

Cutaway — Actual Regular Production Option Content Weight

Option Weight	(Front/Total) (lbs.)
REAR DIFFERENTIAL	
Limited-slip rear axle (E-350 SRW)	(0/7)
Limited-slip rear axle (E-350/E-450 DRW)	(0/4)
TIRES (add tire weight even if specified as standard equipment)	
LT225/75R16E (DRW)	(0/0)
LT245/75R16E (SRW)	(0/0)
TIRE EQUIPMENT	
Spare Tire (LT225/75R16E)	(-5/37)
Spare Tire (LT245/75R16E)	(-6/43)
Spare Wheel	(-5/35)
PACKAGES	
Auxiliary Heater Prep Package	(5/9)
Heater & A/C Prep Package	(18/21)
Heater & A/C Prep Package w/Rear Controls	(17/22)
Insulation Package	(1/1)
Power Windows/Locks Group	(9/13)
Seat Prep Package — Driver Only	(-27/-44)
Seat Prep Package — Driver and Passenger	(-57/-95)
Trailer Tow (Class I)	(1/2)
Upgraded Trailer Tow (Class I)	(1/2)
OPTIONS	
A/C – delete	(-51/-49)
Airbag, passenger cutoff switch	(1/1)
Airbag, passenger delete	(-9/-11)
Alternator, extra-heavy-duty	(3/3)
Backup alarm, electric (102 dBA)	Not available
Battery, heavy-duty/auxiliary	(29/67)
Bumper, chrome front	(5/4)
Captain's chairs, without trim	(-3/-5)
Carpeting — front	(5/8)
Console, engine cover delete	(-9/-11)

Cruise control	(2/2)
Daytime running lamps, non-configurable	Not available
Door delete, RH (138" WB)	(-58/-82)
Door delete, RH (158" WB)	(-61/-82)
Door delete, RH (176" WB)	(-63/-82)
Floor covering delete	(-6/-9)
Fuel tank, 40-gallon	(18/-107)
Fuel tank, 55-gallon	(-18/107)
Headlamps, halogen aerodynamic	(4/3)
Headliner delete	(-2/-4)
Heater, engine block	(1/1)
Jack, 2-ton mechanical (SRW)	(-1/6)
Jack, 4-ton hydraulic (DRW)	(-2/13)
License plate bracket, front	(1/1)
Mirror, exterior delete	(0/0)
Mirror, interior day/night	(1/1)
Mirrors, trailer tow — manual	(16/20)
Mirrors, trailer tow — power	(17/21)
Radio Prep Package with 2 speakers	Not available
Radio Prep Package with 4 speakers	Not available
Radio, delete	(-3/-4)
Rear View Camera Kit	(1/1)
Rear View Video Camera Kit	Not available
Remote Keyless Entry System	(1/1)
Running boards	(13/27)
Seat, power driver's	(6/10)
Seat delete, passenger	(-47/-77)
Spacers, alternate pattern frame (138" WB)	(-2/165)
Spacers, alternate pattern frame (158" WB)	(25/165)
Spacers, alternate pattern frame (176" WB)	(42/165)
Spacers, standard pattern frame, not included (138" WB)	(8/129)
Spacers, standard pattern frame, not included (158" WB)	(8/129)
Spacers, standard pattern frame, not included (176" WB)	(44/147)
Speakers, 4	(3/4)
Sun visor delete	(-1/-2)
Trailer brake controller	(2/2)
Upfitter switch pack	(2/2)
Wheels, 16" x 7" forged aluminum	(-26/-52)
Wheels, aluminum hubcaps	(2/4)
Wheels, sport wheel covers	(2/4)
Line A) Total Actual Option Content Weight: (Front/Total)	____/____

2024 E-Series > Specs > Dimensions/Weights/Capacities > Option Content Weight

Stripped Chassis — Actual Regular Production Option Content Weight

Option Weight	(Front/Total) (lbs.)
REAR DIFFERENTIAL	
Limited-slip rear axle (E-350/E-450 DRW)	(0/4)
TIRE EQUIPMENT	
Spare tire (LT225/75R16E)	(-5/37)
Spare tire (LT245/75R16E)	(-6/43)
Spare wheel	(-5/35)
PACKAGES	
A/C Prep	(24/25)
OPTIONS	
Alternator, extra-heavy-duty	(3/3)
Daytime running lamps, non-configurable	(TBA/TBA)
Fuel tank, 40-gallon	(18/-107)
Fuel tank, 55-gallon	(18/-107)
Heater, engine block	(1/1)
Jack, 2-ton mechanical (SRW)	(-1/6)
Jack, 4-ton hydraulic (DRW)	(-2/13)
Upfitter switch pack	(2/2)
Wheels, sport wheel covers	(2/4)
Line A) Total Actual Option Content Weight: (Front/Total)	____/____

2024 E-Series > Specs > Standard Equipment

E-350 Cutaway Standard Equipment

REAR WHEELS		SRW	DRW	SRW	DRW	DRW
WHEELBASE (in.)		138	138	158	158	176
POWERTRAIN						
Engine	Application	Refer to order guide				
	Type	7.3L PFI V8 premium-rated				
Transmission	Type	6-speed TorqShift auto				
AXLES						

Front Axle	Type	Twin I-beam IFS	
	Capacity (Rating @ Ground)	5,000 lbs.	
Rear Axle	Type	Full-floating, Dana 10.5"	
	Capacity (Rating @ Ground)	7,800 lbs.	8,500 lbs.

BRAKES

Front Disc	Type	Dual-piston caliper (2.36" diameter piston)	
	Size (in.)	13.58 diameter rotor	
Rear Disc	Type	Dual-piston caliper (1.89" diameter piston)	
	Size (in.)	13.58 diameter rotor	
Power-Assist Unit	Type	Vacuum-boost (SRW)/Hydro-boost (DRW)	
	Boost Ratio	13.46"	7.5:1 (SRW), 6.76:1 (DRW)
Anti-Lock System	Type	Dual diaphragm (SRW), Hydro-boost (DRW)	
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever to disengage	

ELECTRICAL

Alternator	Rating	210 amperes, 2,835 watts ⁽¹⁾	
Battery	Type	Maintenance-free	
	Rating	78-AH	
Kit		Modified vehicle wiring	
FUEL TANK	Capacity ⁽²⁾	40-gallon aft-of-rear-axle	
JACK	Capacity	2.0-ton (SRW), 4.0-ton (DRW)	
STEERING	Type	Gear assembly power steering	
	Ratio	17.0:1	

SUSPENSION

Frame	Type	Single-channel, 6 crossmembers, 36,000-psi steel (includes 2 lateral spacers, 4 longitudinal spacers and 12 body mounts with 138" and 158" WB. or, 4 lateral spacers, 2 longitudinal spacers and 12 body mounts with 176" WB.)		
	Section Modulus	5.73 cu. in.		
Springs, Front	Type	Coil, computer-selected		
	Rating @ Ground (min.)	3,199 lbs.	3,100 lbs.	3,100 lbs.
Springs, Rear	Type	Multi-leaf, single-stage		
	Rating @ Ground (min.)	7,310 lbs.	8,500 lbs.	
Shock Absorbers	Gas-type	35 mm		
Stabilizer Bar	Front/Rear—Diameter	Front — 25.4 mm (SRW)/23 mm (DRW); rear — 28.6 mm (DRW)		
TIRES	Type	Four, truck-type steel-belted radial, all-season (six with DRW)		
	Size	LT245/75R16E	LT225/75R16E	
WHEELS	Type & Size	Four, 8-hole disc, 16" x 7.0" K steel (six, 16" x 6.0" K with DRW)		

(1) Rated current (@ 6,000 rpm) per ISO 8854:1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application-dependent.

(2) Also includes 7.5-gallon plastic transit fuel tank (may be deleted), Auxiliary Fuel Port and Fuel System Conversion Kit.

2024 E-Series > Specs > Standard Equipment

E-350 Stripped Chassis Standard Equipment

REAR WHEELS	DRW	DRW	DRW	DRW	DRW
WHEELBASE (in.)	138	158	176	158	176

POWERTRAIN

Engine	Application	Refer to order guide			
	Type	7.3L PFI V8 premium-rated			
Transmission	Type	6-speed TorqShift auto			

AXLES

Front Axle	Type	Twin I-beam IFS			
	Capacity (Rating @ Ground)	5,000 lbs.			
Rear Axle	Type	Full-floating, Dana 10.5"			
	Capacity (Rating @ Ground)	6,340 lbs.	8,500 lbs.	7,800 lbs.	

BRAKES

Front Disc	Type	Dual piston caliper (2.36" diameter piston)			
	Size (in.)	13.58 diameter rotor			
Rear Disc	Type	Dual piston caliper (1.89" diameter piston)			
	Size (in.)	13.58 diameter rotor			
Power-Assist Unit	Boost Ratio	Hydro-Boost 6.76:1 (DRW)			
	Effective Diameter	13.46"			
Anti-Lock System		4-wheel			
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever to disengage			

ELECTRICAL

Alternator	Rating	210 amperes, 2,835 watts ⁽¹⁾			
Battery	Type	Maintenance-free			
	Rating	78-AH			
Kit		Modified vehicle wiring			

FUEL TANK	Capacity	40-gallon aft-of-rear-axle			
STEERING	Type	Gear assembly power steering			
	Ratio	17.0:1			

SUSPENSION

Frame	Type	Single-channel, 6 crossmembers, 36,000-psi steel			
	Section Modulus	5.73 cu. in.			
Springs, Front	Type	Coil, computer-selected			

	Rating @ Ground (min.)	3,100 lbs.	3,550 lbs.	3,800 lbs.	4,050 lbs.
Springs, Rear	Type	Multi-leaf, single-stage			
	Rating @ Ground (min.)	8,500 lbs. (DRW)			
Shock Absorbers	Gas-type	35 mm			
Stabilizer Bar	Front — Diameter	23 mm (DRW)			
	Rear — Diameter	28.6 mm (DRW)			
TIRES	Type	Truck-type steel-belted radial, all-season			
	Size	Six, LT225/75R16E ⁽²⁾			
	Spare tire carrier	None			
WHEELS	Type & Size	Six, 8-hole disc, 16" x 6.0" K steel ⁽²⁾			

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUNI999. Actual output is temperature- and application-dependent.

(2) Spare tire and wheel are shipped temporarily mounted to the top of the frame.

2024 E-Series > Specs > Standard Equipment

E-450 Cutaway Standard Equipment

REAR WHEELS		DRW	DRW
WHEELBASE (in.)		158	176
POWERTRAIN			
Engine	Application	Refer to order guide	
	Type	7.3L PFI V8 premium-rated	
Transmission	Type	6-speed TorqShift auto	
AXLES			
Front Axle	Type	Twin I-beam IFS	
	Capacity (Rating @ Ground)	4,600 lbs.	
Rear Axle	Type	Full-floating, Dana 10.75" HD	
	Capacity (Rating @ Ground)	9,600 lbs.	
BRAKES			
Front Disc	Type	Dual piston caliper (2.36" diameter piston)	
	Size (in.)	13.58 diameter rotor	
Rear Disc	Type	Dual piston caliper (2.12" diameter piston)	
	Size (in.)	13.58 diameter rotor	
Power-Assist Unit	Boost Ratio	Hydro-Boost, 6.76:1	
Anti-Lock System		4-wheel	
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever to disengage	
ELECTRICAL			
Alternator	Rating	210 amperes, 2,835 watts ⁽¹⁾	

Battery	Type	Maintenance-free
	Rating	78-AH
Kit		Modified vehicle wiring
FUEL TANK	Capacity ⁽²⁾	55-gallon, aft-of-rear-axle
STEERING	Type	Gear assembly power steering
	Ratio	17.0:1
SUSPENSION		
Frame	Type	Single-channel, 6 crossmembers, 36,000-psi steel
	Section Modulus	6.40 cu. in.
Springs, Front	Type	Coil
	Rating @ Ground (min.)	4,600 lbs.
Springs, Rear	Type	Multi-leaf, single-stage
	Rating @ Ground (min.)	9,600 lbs.
Shock Absorbers	Gas-type	35 mm
Stabilizer Bar	Front — Diameter	23 mm
	Rear — Diameter (DRW only)	28.6 mm
TIRES	Type	Six truck-type steel-belted radial, all-season
	Size	LT225/75R16E
WHEELS	Type & Size	Six, 8-hole disc, 16" x 6.0" K steel

(1) Rated current (@ 6,000 rpm) per ISO 8854: 1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application-dependent.

(2) Also includes 7.5-gallon plastic transit fuel tank (may be deleted), Auxiliary Fuel Port and Fuel System Conversion Kit.

2024 E-Series > Specs > Standard Equipment

E-450 Stripped Chassis Standard Equipment

REAR WHEELS		DRW	DRW
WHEELBASE (in.)		158	176
POWERTRAIN			
Engine	Application	Refer to order guide	
	Type	7.3L PFI V8 premium-rated	
Transmission	Type	6-speed TorqShift auto	
AXLES			
Front Axle	Type	Twin I-beam IFS	
	Capacity (Rating @ Ground)	5,000 lbs.	
Rear Axle	Type	Full-floating, Dana 10.75" HD	
	Capacity (Rating @ Ground)	9,600 lbs.	
BRAKES			
Front Disc	Type	Dual piston caliper (2.36" diameter piston)	
	Size (in.)	13.58 diameter rotor	

Rear Disc	Type	Dual piston caliper (2.12" diameter piston)	
	Size (in.)	13.58 diameter rotor	
Power-Assist Unit	Type	Hydro-Boost	
	Boost Ratio	6.76:1	
Anti-Lock System		4-wheel	
Parking Brake	Rear brake drum-in-hat	Foot-operated, push to apply/pull release lever to disengage	
ELECTRICAL			
Alternator	Rating	210 amperes, 2,835 watts ⁽¹⁾	
Battery	Type	Maintenance-free	
	Rating	78-AH	
Kit		Modified vehicle wiring	
FUEL TANK	Capacity	55-gallon	
STEERING	Type	Gear assembly power steering	
	Ratio	17.0:1	
SUSPENSION			
Frame	Type	Single-channel, 6 crossmembers, 36,000-psi steel	
	Section Modulus	5.730 cu. in.	
Springs, Front	Type	Coil, computer-selected	
	Rating @ Ground (min.)	5,000 lbs.	
Springs, Rear	Type	Multi-leaf, single-stage	
	Rating @ Ground (min.)	9,600 lbs.	
Shock Absorbers	Gas-type	35 mm	
Stabilizer Bar	Front — Diameter	Front — 23 mm	Rear — 28.6 mm
TIRES	Type	Truck-type steel-belted radial, all-season	
	Size	Six, LT225/75R16E	
	Spare tire carrier	None	
WHEELS	Type & Size	Six, 8-hole disc, 16" x 6.0" K steel ⁽²⁾	

(1) Rated current (@ 6,000 rpm) per ISO 8854:1988 (E) and SAE J56 JUN1999. Actual output is temperature- and application- dependent.

(2) Spare tire and wheel are shipped temporarily mounted to the top of the frame.

2024 E-Series > Specs > Powertrain

Auxiliary Automatic Transmission Oil Cooler Applications

Model/Series	Engine	Transmission	Standard No. of Plates	Air Conditioning No. of Plates	Trailer Towing No. of Plates
E-350/E-450	7.3L PFI V8 Premium-rated	TorqShift	20 — 1/2" Ports	20 — 1/2" Ports	24 — 1/2" Ports

2024 E-Series > Specs > Powertrain

Cooling System Specifications

Engine	Cooling	Trans. Usage	Frontal Area (sq. in.)	Core Size (in.)			Rows of Tubes	Fins per Inch	Cooling System Capacity (approx. quarts)	Fan Specifications		
				Height	Width	Thick.				Type	No. of Blades	Blade Dia. (in.)
7.3L PFI V8 Premium-rated	All	Auto	708	23.6	30.0	1.4	1	16.5	30.4	Plastic	8	20.0

2024 E-Series > Specs > Powertrain

Engine

Driveline Layout	Front Engine, Rear Wheel (RWD)
Engine Type	7.3L PFI V8 Premium-Rated
Displacement (liters/cu. in.)	7.3/445
Horsepower @ rpm	325 @ 3,750
Torque (lb.-ft.) @ rpm	450 @ 3,750
Compression Ratio	10.5:1
Valvetrain	SOHC
Valve Operation	Push rod
Bore & Stroke (in.)	4.21 x 3.98
Main Bearings	5
Induction	Naturally aspirated
Fuel System	Sequential Multiport
Fuel Requirement (octane)	87 (min.)

PERFORMANCE NOTE: Horsepower and torque are independent attributes and may not be achieved simultaneously.

2024 E-Series > Specs > Powertrain

Fuel System Data

Electronic Fuel Injection	7.3L PFI V8 Premium-rated	Sequential Multiport Fuel Injection
Fuel Pump	7.3L PFI V8 Premium-rated	Electric-in-Tank High Pressure
Fuel Filter	7.3L PFI V8 Premium-rated	In-line Large Capacity (One)
Air Cleaner	7.3L PFI V8 Premium-rated	Dry Element, Replaceable

2024 E-Series > Specs > Powertrain

Transmission Specifications

Make/Type	Ford 6-Speed TorqShift Automatic
Engine	7.3L PFI V8
Ratios (to 1)	
1st	3.97
2nd	2.31
3rd	1.51
4th	1.14
5th — OD	0.85
6th — OD	0.67
Reverse	3.12
Converter Size & Type	305 mm, 3 Plate, 2 Stage
Converter Torque Ratio @ WOT Stall	1.9
Lubricant Capacity (pt.)	17.4
Gearset	Double Ravigneaux
Oil Cooler	Oil to Air and In-Tank

2024 E-Series > Specs > Chassis

Front Axle Specifications

Model/Series		E-350/E-450
Max. Rating @ Ground (lbs.)		5,000
Type		Twin-I-beam spindle with ball joints
Axle	Material	Nodular cast iron
	Spring Centers (in.)	47.0
Radius Arms	No.	2
	Material	High-strength low-alloy steel
Ball Joint		Lubed-for-life ball joints
Spindle	Material	Nodular cast iron body with forged steel stem
Wheel Bearings	Type	Tapered roller

2024 E-Series > Specs > Chassis

Rear Axle Specifications

Model/Series		E-350	E-450
Make		Dana 10.5"	Dana 10.75" HD
Rating @ Ground (lbs.)		7,800/8,500	9,600
Type		Full-floating	Full-floating
Driveline Attachment, Circular Flange		4.25"	4.75"
Housing	Type	Cast center	Cast center
	Cover Attachment	Bolted	Bolted
Section	Tube Diameter (in.)	3.50	4.00
	Thickness (in.)	0.39/0.56	0.625
Lubricant Capacity (pt.)		6.6	9.6
Spring Centers (in.)		48.92	48.92
Wheel Bearings	Type	Tapered roller, 2 opposed	
Gears	Type	Hypoid	Hypoid
	Material	Alloy steel	Alloy steel
Ring Gear	Pitch Diameter (in.)	10.50	10.75
	Mounting	Overhung	Overhung
Differential	Type	2-pinion ⁽¹⁾	2-pinion ⁽¹⁾
	L/S Type	Traction-Lok	Traction-Lok
Axle Shaft	Spline — Minor Dia. (in.)	1.268	1.268
	Spline — Major Dia. (in.)	1.375	1.375
	Number of Splines	32	35

(1) 4-pinion for limited-slip.

2024 E-Series > Specs > Chassis

Brake Equipment Specifications — Front/Rear

Type	Model/Series	Rotor Dia. (in.)		Brake Lining Segment	Area (sq. in.)/ Width (in.)/ Thickness (in.)	Caliper Piston Dia. (in.)	Gross Lining Area Per Axle (sq. in.)	Total Swept Area Per Axle (sq. in.)
		OD	ID					
Disc	All (Front)	13.58	8.70	Outboard	7.16/2.34/0.489	2.36	47.8	341.6
				Inboard	—			
	E-450 (Rear)	13.58	9.88	Outboard	5.96/1.74/0.51	2.12	43.65	272.70
				Inboard	—			
	E-350 (Rear)	13.58	9.88	Outboard	6.65/2.33/0.346	1.89	39.50	272.70
				Inboard	5.31/2.03/0.413			

Brake Master Cylinder Specifications

Type	Model/Series	Bore Diameter (in.)
Dual System, Dash-mounted	E-350 SRW	1.31
	E-350/E-450 DRW	1.38

2024 E-Series > Specs > Chassis

Power Brakes Hydraulic Booster Specifications

Type	Model/Series	Ratio
Hydro-Boost	E-350 (DRW)/E-450	6.76:1

2024 E-Series > Specs > Chassis

Power Brakes Vacuum Booster Specifications

Type	Model/Series	Ratio	Diaphragm Type
Bendix, [®] Dash-mounted	E-350 (SRW)	7.5:1	Dual

2024 E-Series > Specs > Chassis

Frame Specifications

Model/Series	Wheelbase (in.)	Maximum Side Rail Section (in.)	Section Modulus (cu. in.)	Yield Strength (psi)
E-350/E-450 Cutaway/Stripped Chassis	138, 158, 176	7.69 x 3.18 x 0.228	5.73	36,000
E-450 Cutaway	158, 176	7.69 x 3.18 x 0.248	6.40	36,000

2024 E-Series > Specs > Chassis

Shock Absorber Specifications

Front & Rear				
Model/Series	Usage	Number	Piston Diameter (mm)	Type
E-350/E-450	Standard	4	35 mm	Gas-pressurized

2024 E-Series > Specs > Chassis

Spring Specifications — Front Coil

Model/Series	GVWR (lbs.)	Combined Rating @ Ground (lbs.)	Normal Working Height of Spring (in.)	Wire Diameter (in.)	Deflection Rate @ Ground (lbs. per in. each)	Inside Diameter (in.)	Rating Each @ Pad (lbs. per spring)
E-350 Cutaway	10,050 (SRW), 11,500, 12,500	3,800	12.0	0.72	328	4.0	2,165
		3,900	12.0	0.73	341	4.0	2,224
		4,050	12.0	0.74	354	4.0	2,318
		4,200	12.0	0.74	354	4.0	2,414
		4,400	12.0	0.76	366	4.0	2,542
		4,600	12.0	0.78	366	4.0	2,670
		5,000	12.0	0.79	418	4.0	2,900
E-350 Stripped Chassis	11,500, 12,500	3,800	12.0	0.72	328	4.0	2,165
		3,900	12.0	0.73	341	4.0	2,229
		4,050	12.0	0.74	354	4.0	2,318
		4,200	12.0	0.74	354	4.0	2,414
		4,400	12.0	0.76	366	4.0	2,542
		4,600	12.0	0.78	366	4.0	2,670
		5,000	12.0	0.79	418	4.0	2,900
E-450 Cutaway/ Stripped Chassis	14,200	4,600	12.0	0.78	366	4.0	2,670
	14,500	5,000	12.0	0.79	418	4.0	2,900

2024 E-Series > Specs > Chassis

Spring Specifications — Rear Main Leaf

Model/Series	Combined Rating @ Ground (lbs.)	Number of Leaves	Total Thickness @ Pad (in.)	Length (in.)	Width (in.)	Deflection Rear (lbs. per in. per spring) ⁽¹⁾	Rating Each @ Pad (lbs. per spring)
E-350 Extended Cutaway	6,195	4	1.99	55.0	3.00	373.0/699.0	2,772
E-350 Cutaway/ Stripped Chassis SRW	7,310	9	3.59	55.0	3.00	924.7	3,296
E-350 Cutaway/ Stripped Chassis DRW	8,500	9	3.79	58.5	3.00	1,087	3,790
E-450 Cutaway/ Stripped Chassis	9,600	11	4.66	58.5	3.00	1,138	4,288

(1) Dual numbers indicate two-stage spring.

2024 E-Series > Specs > Chassis

Steering Specifications

Model/Series	Wheelbase (in.)	Power Steering ⁽¹⁾		Turning Diameter (ft.) ⁽²⁾	
		Gear Ratio	Overall Ratio	Curb-to-Curb	Wall-to-Wall
E-350 SRW	138	17:1	21.2:1	48.6	50.0/50.0 ⁽³⁾
E-350 DRW	138	17:1	21.2:1	48.6	50.0/50.1 ⁽³⁾
E-350 SRW	158	17:1	21.2:1	54.9	56.2 ⁽³⁾
E-350 DRW/ E-450	158	17:1	21.2:1	54.8	56.2 ⁽³⁾
	176	17:1	21.2:1	60.3	61.8 ⁽³⁾

(1) 15 1/2" diameter steering wheel. Cutaway and Stripped Chassis models include HD steering gear.

(2) Average of left and right turns with standard tires.

(3) Cutaway only.

2024 E-Series > Specs > Chassis

Tire Specifications

Type/Size	SRW/ DRW	Rim Width (in.)	Section Width (in.)	Ply Rating	Load Rating	Maximum Inflation Pressure (psi)	Load Limits @ Maximum Inflation Pressure (lbs.)	Static Loaded Radius (in.)	Revolutions Per Mile @ 45 mph
LT225/75Rx16	DRW	6.0	9.60	10	E	80	2,680/2,470 ⁽¹⁾	14.60	709
LT245/75Rx16	SRW	7.0	10.20	10	E	80	3,042	14.10	677

(1) Tire rating when in the front single position/rating when in the dual position.

2024 E-Series > Specs > Chassis

Wheel Specifications

Wheel Type	Wheel Size	Nominal Offset (mm)	No. of Studs	Bolt Circle (in.)	Max. Wheel Capacity Load (lbs. @ ground)
Steel	16" x 7.0" K	0.25	8	6.5	2,300 Front 3,045 Rear
	16" x 6.0" K (Dual)	5.15	8	6.5	2,500 Front 2,500 Rear
Aluminum	16" x 7.0" J	0.25	8	6.5	3,045

2024 E-Series > Specs > Special Applications

Trailer Towing Information

For additional towing information, refer to the RV & Trailer Towing Guide, available as a printable PDF on **eSourceBook**, or the vehicle Owner's Manual.



2024 E-Series > Specs > Special Applications

Snow Plow Applications

Not recommended for Snow Plow Applications.



2024 E-Series > Specs > Electrical

Alternator Specifications

Output ⁽¹⁾ (amperes)	210	240	240/157
Output (watts)	2,835	3,240	5,360

(1) Actual output is temperature- and application-dependent.

2024 E-Series > Specs > Electrical > Alternator Performance Curves

210-Ampere Alternator

Engine	Pulley Ratio	Model Application
7.3L PFI V8	3.03:1	E-Series Cutaway and Stripped Chassis

2024 E-Series > Specs > Electrical > Alternator Performance Curves

240-Ampere Alternator

Engine	Pulley Ratio	Model Application
7.3L PFI V8	3.03:1	E-Series Cutaway and Stripped Chassis (optional)

2024 E-Series > Specs > Electrical > Alternator Performance Curves

240-/157-Ampere Alternator

Engine	Pulley Ratio	Model Application
7.3L PFI V8 (Premium-rated)	3.03:1/2.80:1	E-Series Cutaway and Stripped Chassis (optional)

2024 E-Series > Specs > Electrical

Battery Applications

Ampere-Hour Rating	78	Dual 78
Cold-Cranking Amps at 0°F	750	1,500
E-Series		
7.3L PFI V8 Premium-rated	Std.	Opt.

2024 E-Series > Specs > Electrical

Cold Weather Recommendations

Minimum Temperature	Equipment	
	Dual 78 Amp-Hr Batteries (opt.)	Engine Block Heater
0° F	Suggested	Not Needed
-10° F	Recommended	Suggested
-20° F	Recommended	Recommended

Below -20° F	Strongly Recommended	Strongly Recommended
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DEFINITIONS

- Suggested:** Helpful, but not needed.
- Recommended:** Could improve reliability in less-than-ideal conditions.
- Strongly Recommended:** Will give definite improvement over the standard components.
- Dual Batteries:** Higher-capacity batteries available. (Usage varies by model.)
- Engine Block Heater:** Available equipment for all engines. (Usage and heater capacity vary with engine requirements.)

2024 E-Series > Specs > Electrical

Standard Lighting/Reflector Equipment

Light Reflector	Application
Headlamps (Halogen)	All Series — Two replaceable bulbs with all models
Parking Lamps	All Series — Integral with turn signals
Front/Rear Turn Signals	All Series
Front Side Marker Lamps	All Series
Front Side Reflectors	All Series
Rear Side Reflectors	All Series
Rear Side Marker Lamps	All Series — Integral with taillamps
License Plate Lamps	All Series
Two Combination Taillamps with Integral Stop, Turn Signal and Backup Lamps and Reflective Surface	All Series
Rear Reflectors	All Series
Front Daytime Running Lamps	All Vehicles Registered in Canada

2024 E-Series > Specs > Electrical

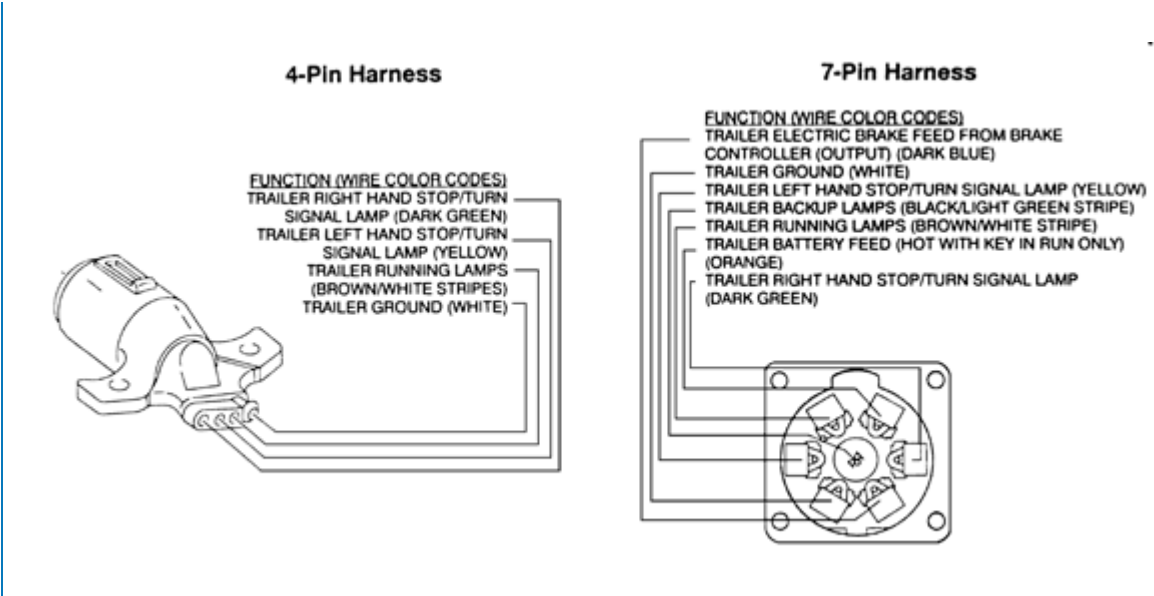
Light Specifications and Usage

Lamp	Code	Description	Usage
Daytime Running Lamps — Configurable	STD	(2) Replaceable Bulbs, Halogen	All Vehicles Registered in Canada
Headlamps	STD	(2) Replaceable Bulbs, Halogen	All Vehicles Registered in U.S. and Canada

2024 E-Series > Specs > Electrical

Trailer Towing Wiring Harness

Circuit Number	Circuit Description	Color Code
RAT08	Ground	White
CAT17	Parking Lamps	Brown
CAT14	Trailer Battery Feed	Orange
CAT19	To Electric Brakes	Dark Blue
CAT09	RH Turn Signal and Stop Lamps	Dark Green
CAT06	LH Turn Signal and Stop Lamps	Yellow
CAT03/CAT16	Trailer Backup Lamps	Gray with Brown Stripe
CBP30	Front Brake Controller Running Lamp Feed/Park Lamp Feed	Yellow with Blue Stripe
CBP40	Rear Brake Controller Running Lamp Feed/Park Lamp Feed	Yellow with Green Stripe
CLS30	Brake Controller Running Lamp Feed/Park Lamp Feed	Violet with White Stripe
CCB08	Vehicle Stop Lamps	Violet with White Stripe
SBB18/SBB17	B+ to Electric Brake Controller	Yellow with Red Stripe



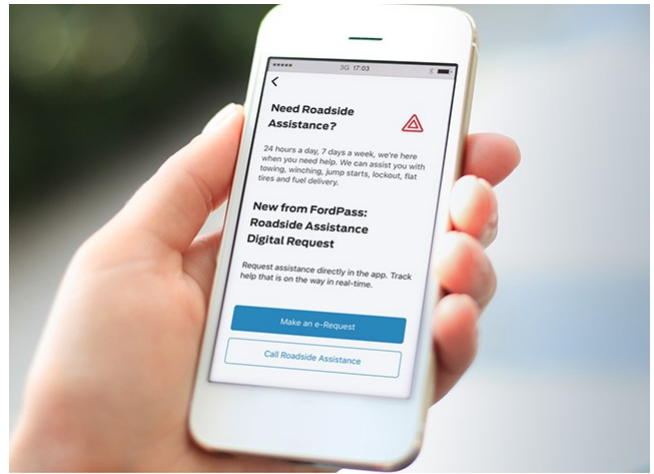
2024 E-Series > Specs

Warranties

24-HOUR ROADSIDE ASSISTANCE⁽¹⁾

- Owners can call the toll-free number (1-800-241-3673) 24 hours a day
- FordPass⁽²⁾ App key functionality
 - Tap the Service symbol on the bottom menu
 - Tap on 24/7 Assistance to make a request
 - Follow the prompts, which allow owners to identify the type of service they need

- Owners can follow real-time progress of their request on the FordPass map
- Services available include flat tire change, towing to the nearest Ford dealership, fuel delivery, jump start and lockout assistance
- The FordPass App also offers a link to Accident Assistance under Vehicle Details/Vehicle Support
 - Accident Assistance includes information on what to do in an accident and about collision repairs
 - It also provides a collision shop locator that identifies the nearest Ford Certified Collision Center



POWERTRAIN LIMITED WARRANTY

- Powertrain Limited Warranty for Ford vehicles is 5 years or 100,000 miles, whichever comes first
- That's an additional 2 years/64,000 miles (whichever comes first) of coverage for components such as the engine, transmission and rear-wheel-drive parts (refer to the vehicle Owner's Manual for a more comprehensive list of all the parts covered) beyond the vehicle's 3-year/36,000-mile (whichever comes first) bumper-to-bumper limited warranty

NEW VEHICLE LIMITED WARRANTIES

- 3-year/36,000-mile (whichever comes first) bumper-to-bumper; no deductible
- 5-year/unlimited-mileage (whichever comes first) Corrosion Perforation (aluminum panels don't require perforation)
- 5-year/60,000-mile (whichever comes first) Safety Restraint Warranty

(1) Roadside Assistance is included for certain owners and available to everyone for a per-service fee. Ford reserves the right to change program details without obligations. Ford Roadside Assistance is a complimentary offering to all Ford owners for up to 5 years or 60,000 miles (from the date of sale), whichever occurs first. Ford reserves the right to change program details without obligations.

(2) FordPass App, compatible with select smartphone platforms, is available via a download. Message and data rates may apply.

NOTE: See dealer for limited warranty details.

NOTE: See www.motorcraftservice.com for a link to a printable PDF of the Warranty Guide.

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FEATHER WEIGHT

FOLDAWAY BV & AM STYLES

Freedman Seating gives you the largest selection of Foldaways in the industry. Whether you need space for luggage or wheel chairs, we have the right seat. Easy to install and easier to operate, our Foldaways will provide you with miles and miles of happy riders and drivers. Maybe we should say, "smiles and smiles". Freedman Seating, "Not just seats — seating solutions."



Notch-Back, standard Bench-Back and High-Back are shown.

Not Just Seats



THE FEATHER WEIGHT SERIES BY

FREEDMAN

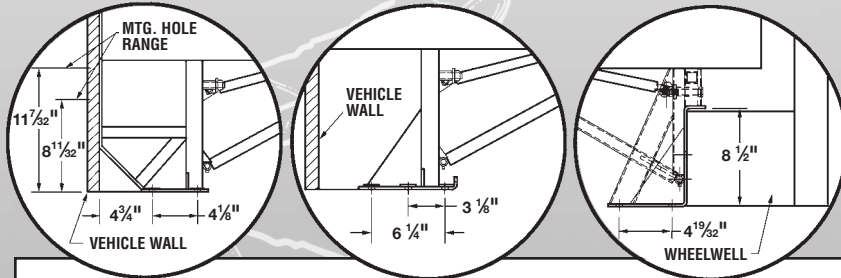
SEATING COMPANY

an ISO 9001:2000 certified company

Seating Solutions™

FEATHER

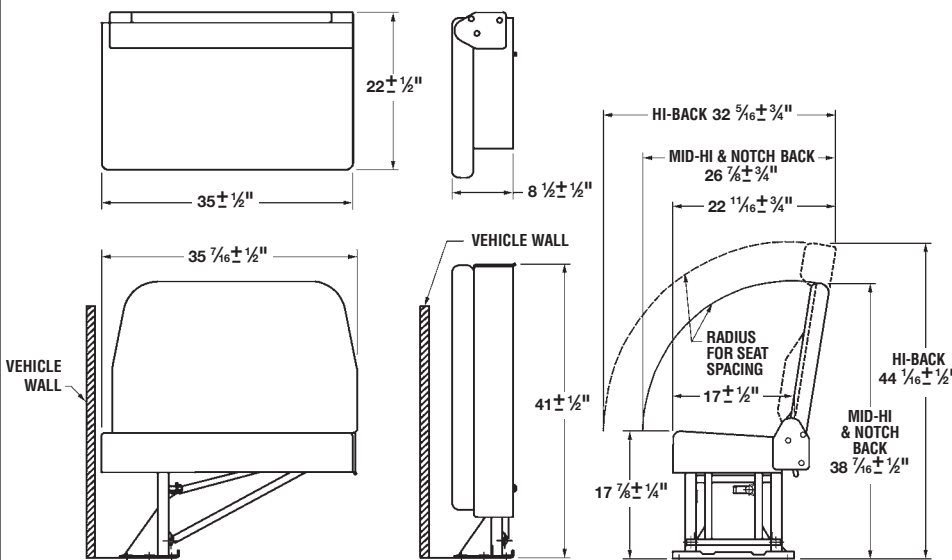
Foldaway BV & AM STYLES



AM2 Floor/Wall Mount

BV Floor Mount

BVWW3 Floor Mount



Corner Grabs

TDSS with belts

TDSS without belts



Belts not included.

Standard Features:

- BV Foldaways mount to the vehicle with four bolts to the floor (no wall mount)
- AM Foldaways mount to the vehicle with four bolts to the floor and two to the wall mount
- Seat belt ready (FMVSS 210 compliant with no leg or tether)
- Ultra-thin backrest for added hip-to-knee room and lumbar support
- High quality molded polyurethane seat and back cushions

- Folds up to less than 10" thick when in the stowed position
- Cantilever design provides reduced installation time; no floor cutting for aisle leg and easy vehicle clean up
- Wire mesh grid seat springs for even support
- 2 locking mechanisms to hold seat in stowed position

Options:

- Single or double seats
- Bench back, notch back or high back
- Wheel well seats
- Wide variety of vinyl's or cloths
- Molded U.S. arms or upholstered arms
- Black or yellow top grabs (not on high backs)
- Black or yellow corner grabs (black only on high back)
- Vertical stitching
- FTA foam
- ABS backs (Notchback only)
- Adjustable headrests (Single and Notchback only)
- Shrouds to cover the Foldaway when stowed
- USR seat belts (Under Seat Retractors)
- CRS-225 hooks and tethers
- TDSS (Tie Down Storage System)

Not Just Seats



THE FEATHER WEIGHT SERIES BY

FREEDMAN
SEATING COMPANY

an ISO 9001:2000 certified company

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(773) 524-2440 (800) 443-4540 Fax: (773) 252-7450
WWW.FREEDMANSEATING.COM
e-mail: sales@freedmanseat.com

We are constantly updating and improving our seats; therefore we reserve the right to change or modify specifications or materials without notice. All Freedman Seating Company seats meet or exceed FMVS standards.

Seating Solutions™

FEATHER WEIGHT

**MID-HI SEAT
"ROCK SOLID"**



Sustainable Seating Solutions

Freedman Seating Company's Feather Weight seats are designed to be like feathers on a bird: light and airy to satisfy weight restrictions and ensure a smooth ride, yet durable for years of service and low maintenance.

Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts).

Less weight means one thing to bus builders and operators: they can get more passengers per bus.

And when we say more passengers, ***we mean more happy passengers.***



Not Just Seats



Seating Solutions™

THE FEATHER WEIGHT SERIES BY

FREEDMAN
SEATING COMPANY

an ISO 9001:2000 certified company

FEATHER WEIGHT

MID-HI SEAT "ROCK SOLID"



Sustainable Seating Solutions

Whether your bus is for tour/charter, para-transit, or shuttle, Feather Weight Mid-Hi works for you. Optional adjustable headrests and reclining back-rests give you luxuries for long journeys, while grab rails and ABS plastic backs provide the function and safety required for shorter trips. The ultra-thin backrest gives outstanding support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight Mid-Hi features include:

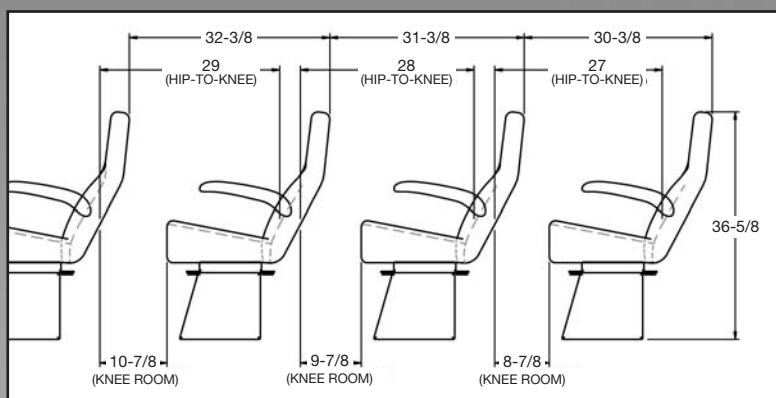
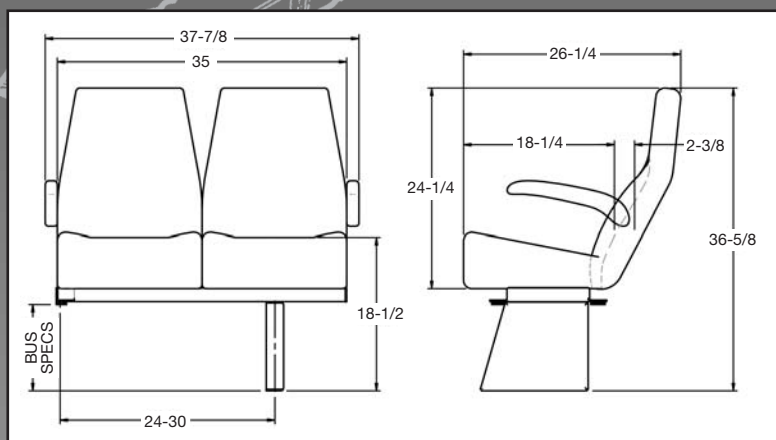
- An ultra-thin *Knee-Saver* type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17½" wide seat cushions
- 22½" back height off the seat cushion, 37" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance—all *Feather Weight* seats are seat belt ready
- Transit style—rigid backrests (starting weight without options—43 lbs.)
- Touring style—reclining backrests (starting weight without options—47 lbs.)
- Covers that can be removed and replaced easily and without the use of special tools

Feather Weight Mid-Hi options include:

- Black molded *U.S. Arms* or upholstered flip-up armrests
- Adjustable headrests
- Black or yellow corner AV grab rails
- Black or yellow top AV grab rails
- ABS plastic backs
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Rear row quick disconnect
- Side sliders
- 16", 18" or 19" wide seats available
- Rigid or reclining backrests
- Seat belts
 - Non-retracting seat belts
 - Retracting seat belts
 - USR (Under Seat Retractors)
- S3 Bio-Cushions (Made with vegetable oil)
- A wide variety of cloths and vinyls
- S3 cloths (Made with recycled yarn)

We are constantly updating and improving our seats; therefore we reserve the right to change or modify specifications or materials without notice. All Freedman Seating Company seats meet or exceed FMVS standards.

ISO 9001:2000 registered



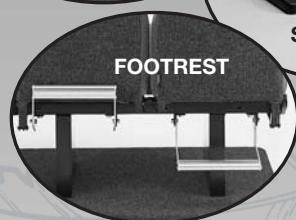
OPTIONS



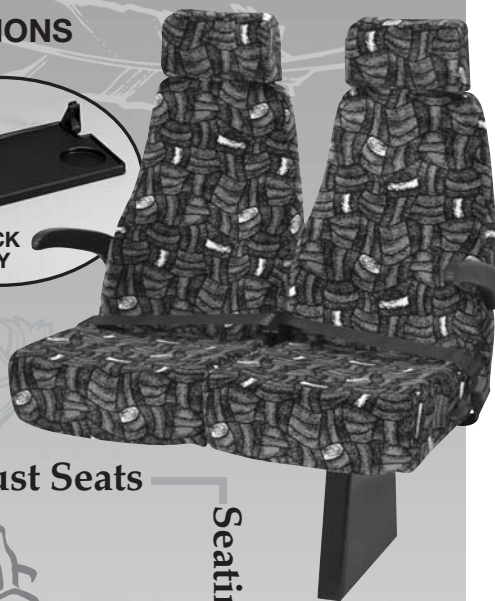
PILLOW SEAT



SNACK TRAY



FOOTREST



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FREEDMAN SHIELD DRIVER SEATS

Shield
Rigid
Seat



**NOW
AVAILABLE**

Sport Seat
Upgrade



Shield
Recliner
Seat



LeMans Adjustable Arm



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Freedman Seating Company

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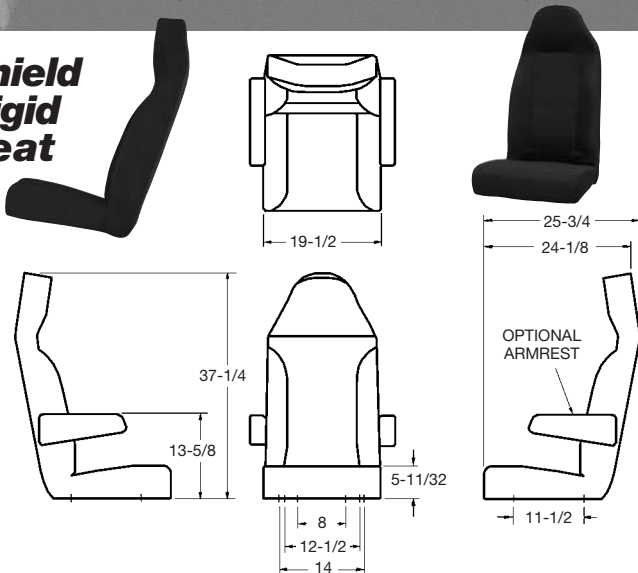


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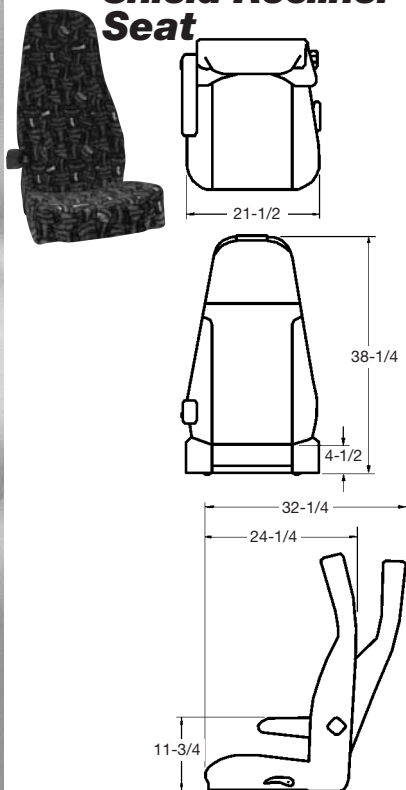
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SEATING COMPANY

FREEDMAN SHIELD DRIVER SEATS

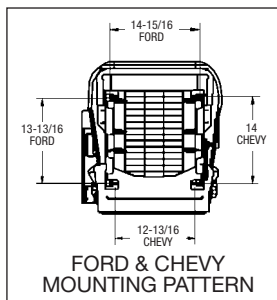
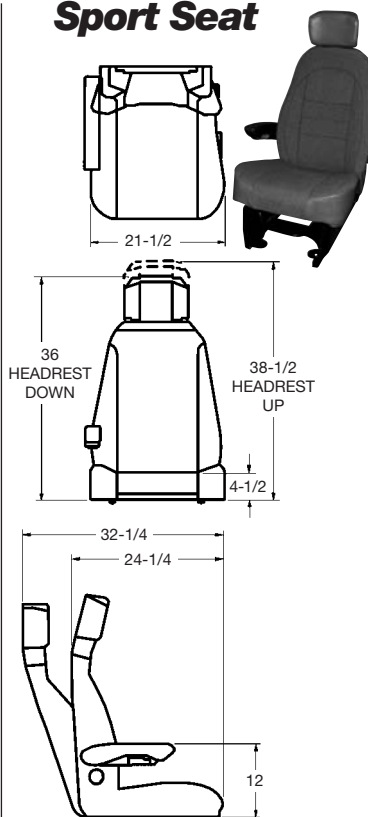
Shield Rigid Seat



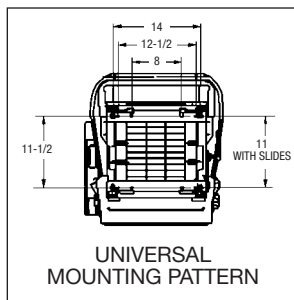
Shield Recliner Seat



Sport Seat



FORD & CHEVY MOUNTING PATTERN



UNIVERSAL MOUNTING PATTERN

MARKETS



DELIVERY TRUCK



BUS



VAN



MARINE



SPECIALTY

We are constantly updating and improving our seats; therefore we reserve the right to change or modify specifications or materials without notice. All Freedman Seating Company seats meet or exceed FMVSS standards.

Shield Rigid Seat

Standard features:

- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard
- Taller and wider headrest with decreased backset
- "Cushier" headrest for dynamic impact headrest absorption
- Automotive grade 4-spring seat flex-o-later for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions
- Universal mounting holes to fit Freedman Seating pedestals and most aftermarket bases

Rigid Seat optional features:

- Flip arms: US Arm, AMA upholstered or wide upholstered
- Mesh map pocket
- Vertical stitching
- Wide array of fabrics and vinyls
- 4-position adjustable lumbar support
- S3 Bio Cushions
- Fore/Aft slide tracks

Shield Recliner and Sport Seats

Standard features:

- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard
- Taller and wider headrest with decreased backset
- "Cushier" headrest for dynamic impact headrest absorption
- Mesh map pocket
- Automotive grade 4-spring seat flex-o-later for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions

Recliner Seat additional standard features:

- 4-position adjustable lumbar-LH lever (RH lever on copilot)
- RH Shield arm
- Heavy duty recliner mechanism
- Mounting brackets to fit Ford E-Series and Chevy cutaway seat delete bases

Recliner Seat optional features:

- Vertical stitching (not for Sport)
- Wide array of fabrics and vinyls
- FTA foam
- S3 Bio Cushions
- Universal mounting kit to fit Freedman Seating pedestals and aftermarket bases
- Fore/Aft slide tracks (not for Ford or Chevy seats), required for universal mounting

Sport Seat additional standard features:

- Infinitely adjustable 4-way lumbar (up/down and in/out)
- RH LeMans arm



Sustainable Seating Solutions
Freedman Seating Company

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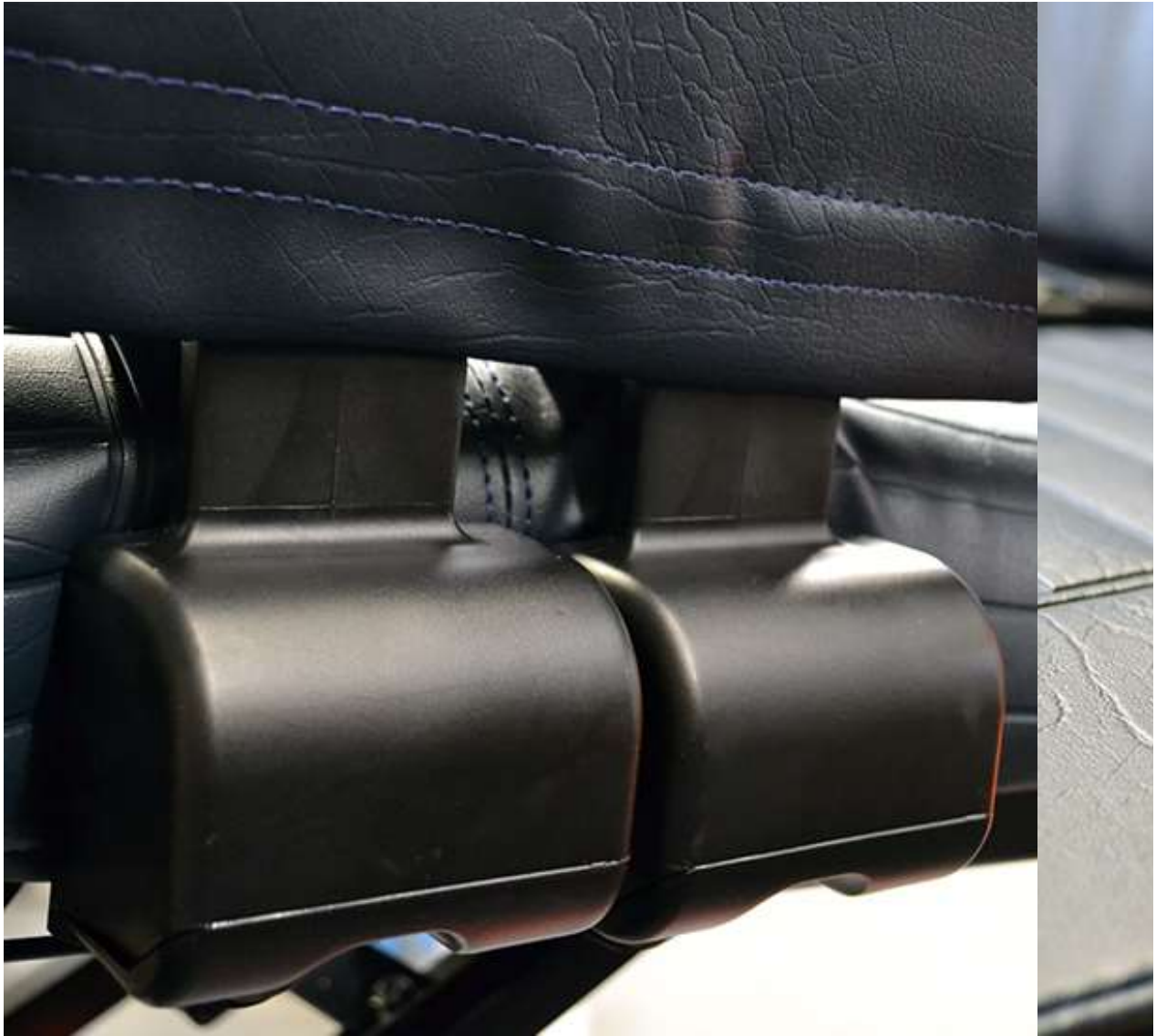
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Product Line: Options/Accessories



HOME / SEAT ITEMS / OPTIONS/ACCESSORIES /

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opt-out if you wish. [Cookie settings](#) [ACCEPT](#)





FREEDMAN®
SEATING COMPANY

PROVEN SAFE FOR PASSENGERS & EASY TO MAINTAIN

The solution to your seat belt needs. Our system places the seat belts right where you expect them. No more belts falling to the floor, safety concerns, or maintenance hassles.

[FMVSS/CMVSS Notice](#)

California residents [see Prop 65 WARNINGS](#).

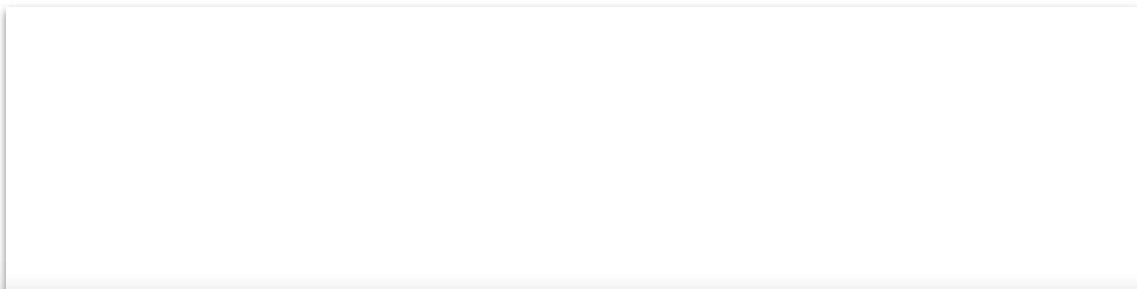
Standard Features

- Designed to be FMVSS 210 compliant
- Works on forward-facing and existing Feather Weight frames
- Light weight and durable
- All belts are permanently kept in the correct position
- Belts stay off the floor

Find Your Local Representative



RELATED SEATS & PRODUCTS



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WARRANTY:

Freedman Seating Company warrants to the original buyer that its Passenger Seats are free from defects in material and workmanship for the following components:

- Metal Components – Five (5) years
- Plastic Components – Three (3) years
- Moving Components – Three (3) years
- Gas Shock Components – One (1) year
- Upholstered Components (foam) – Two (2) years

Cover Warranty is for defects in the material or sewing and is limited to replacement covers. It does not include labor:

- One (1) year for Level #1 in-stock FSC material and perforated vinyl
- Two (2) year for Level #3 in-stock FSC material and higher
- No warranty for COM (Customer Own/ supplied Material)

The warranty period begins at time of sales to customer or 180 days after shipment from the Freedman Seating Company's factory to the customer, whichever occurs first.

NON-PRORATED REPLACEMENT:

In the event that a warranty-covered failure should occur within the warranty period, Freedman Seating Company will repair or replace the seat without charge and without prorating, at Freedman Seating Company's option. This is the sole and exclusive remedy for breach of any warranty. Any replacement seat or part is only covered by this warranty for the remainder of warranty period applicable to the original seat.

EXCLUSIONS:

This warranty specifically excludes foam, upholstery material, belts, and items exposed to normal wear and tear such as metal finish and paint and does not apply to any seat that is damaged as result of accident, derailment, improper installation, structural defects, intentional damage, abuse, vandalism, negligence, misuse, improper operating conditions, lack of maintenance, or extreme natural phenomena. Seats exposed to toxic or corrosive materials are excluded from this warranty. Seats exposed to cleaning solutions that are not listed on the Freedman Seating Company Cleaning Guide are excluded from this warranty. This warranty is provided directly to the purchaser only and does not extend to any subsequent party and is solely for the Freedman Seating Company product as it is originally manufactured.

INCIDENTAL, CONSEQUENTIAL DAMAGES, & LIMITATIONS:

This warranty shall be in lieu of any other warranty or terms, expressed warranty or terms, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. The purchaser's sole and exclusive remedy against Freedman Seating Company shall be for the repair and replacement of the defective product as provided herein. No other remedy; including but not limited to incidental or consequential damages for lost profits, lost sales, injury to person or property, shipping, freight, installation, removal, or any other incidental or consequential loss shall be available to the purchaser.

NOTIFICATION:

All reports, claims, or notices required by the warranty to be provided to Freedman Seating Company must be in writing and delivered to: Attention – Freedman Seating Company, Warranty Claim Department, 4545 W. Augusta Blvd., Chicago, IL 60630. Repairs being claimed for warranty must be sent to Freedman Seating Company for prior approval and warranty acceptance before any warranty claims can be made. Parts are being claimed for warranty must be sent to Freedman Seating Company for prior approval and warranty acceptance before any warranty claims can be made.

INSPECTION AND VERIFICATION:

The owner must provide access to the failed seat so that Freedman Seating Company's authorized representative can perform an onsite inspection. Alternatively, Freedman Seating Company may ask the owner to ship the failed seat to Freedman Seating Company's laboratory for inspection. Within 30 days of the inspection, either on-site or in the laboratory, Freedman Seating Company will render an opinion as to whether or not the claimed failure is covered by the warranty.

GENERAL MAINTENANCE:

Freedman Seating Company provides the proper maintenance instructions, as well as recommended service intervals with each seat. Warranty is contingent upon documented performance of recommended maintenance and service. All replacement parts should be recommended or authorized Freedman Seating Company components. Failure to purchase proper components will null and void the warranty.

DESIGN:

Freedman Seating Company reserves the right to modify parts and design specifications without notice as long as the seats meet general specifications, unless otherwise committed per contract. In case further non-conforming changes have to be incorporated, Freedman Seating Company will submit such changes to customer for prior approval.

OTHER:

The terms and warranty are contingent upon customers meeting agreed upon payment terms as specified in Freedman Seating Company proposals. Terms and warranty supersede any other terms including but not limited to customer terms printed on the back of Purchase Orders, listed on websites, or other sources from customers.

FREEDMAN SEATING ICS

(Integrated Child Seat)

KIDS & SAFETY

**WHAT COULD
BE MORE
IMPORTANT?**

Also available
the ICS-10,
for children
up to 10 years old.



Not Just Seats

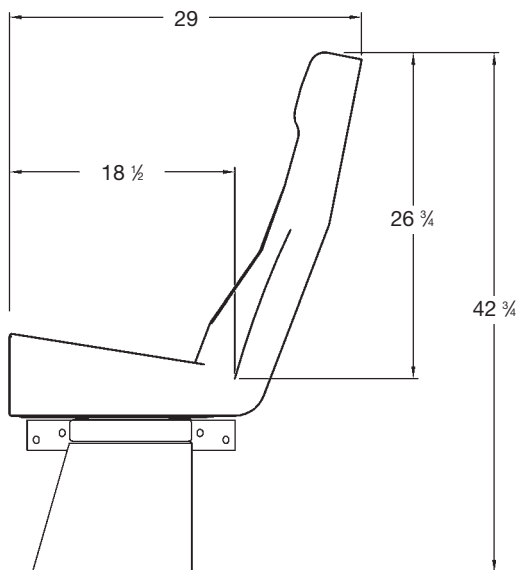
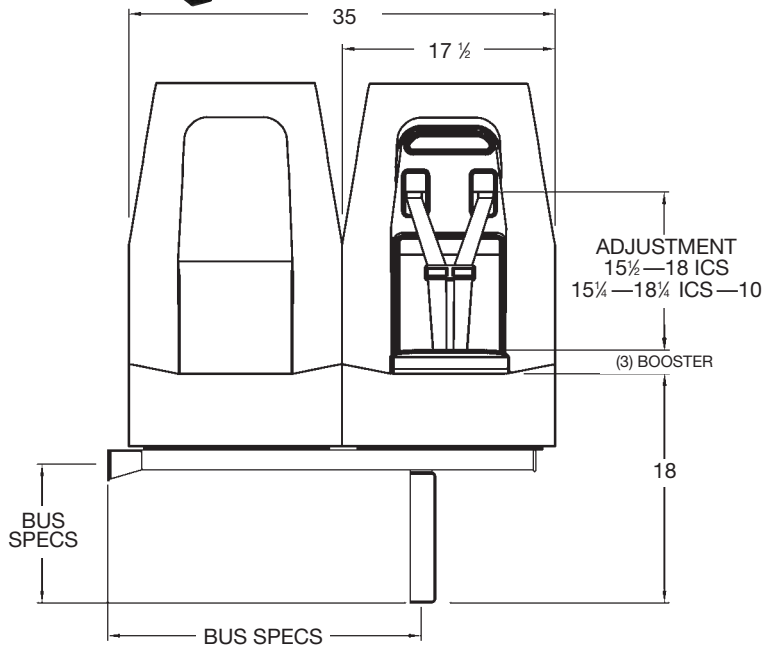


THE FEATHER WEIGHT SERIES BY

FREEDMAN
SEATING COMPANY

Seating Solutions™

FREEDMAN



SEATING ICS

(Integrated Child Seat)

Kids and safety, what could be more important? Nothing!

That's the underlying principle behind the Freedman ICS (Integrated Child Seat) and ICS-10.

The ICS is designed for children from 22–51 lbs. and the ICS-10 can accommodate children up to 10 years old, 22–78 lbs. Both ICS seats are comfortable for adults and safe for children.

A tapered back provides unrestricted viewing for drivers, and best of all, the shoulder belts can be adjusted in seconds without taking the seat apart or clumsy operations.

Standard Features:

- Accommodates children 22–51 lbs. (22–78 lbs for the ICS-10)
- Matching companion seat available
- Fold down tongue can be folded to act as a booster seat
- Easily adjustable shoulder straps
- Standard with FMVSS 213 and 210 seat belt anchorage compliance
- Retrofittable; Fits on most Feather Weight frames!

Options:

- Available in a wide variety of vinyls and cloths
- Upholstered or US Arms
- Adjustable footrests
- Freedman USR (Under Seat Retractor)
- Available as a single or double
- Grab rails

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FEATHER WEIGHT

**MID-HI SEAT
"ROCK SOLID"**



Sustainable Seating Solutions

Freedman Seating Company's Feather Weight seats are designed to be like feathers on a bird: light and airy to satisfy weight restrictions and ensure a smooth ride, yet durable for years of service and low maintenance.

Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts).

Less weight means one thing to bus builders and operators: they can get more passengers per bus.

And when we say more passengers, ***we mean more happy passengers.***



Not Just Seats



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THE FEATHER WEIGHT SERIES BY

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an ISO 9001:2000 certified company

FEATHER WEIGHT

MID-HI SEAT "ROCK SOLID"



Sustainable Seating Solutions

Whether your bus is for tour/charter, para-transit, or shuttle, Feather Weight Mid-Hi works for you. Optional adjustable headrests and reclining back-rests give you luxuries for long journeys, while grab rails and ABS plastic backs provide the function and safety required for shorter trips. The ultra-thin backrest gives outstanding support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight Mid-Hi features include:

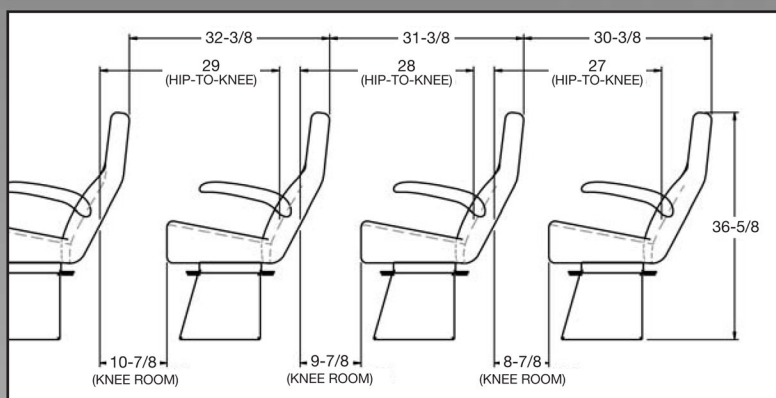
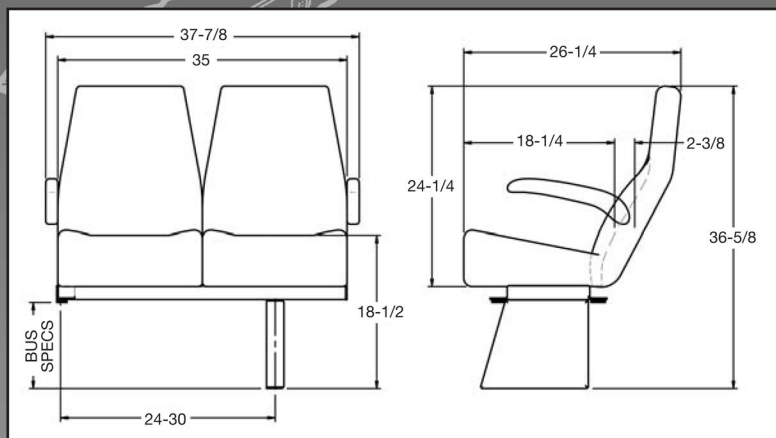
- An ultra-thin *Knee-Saver* type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17½" wide seat cushions
- 22½" back height off the seat cushion, 37" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance—all *Feather Weight* seats are seat belt ready
- Transit style—rigid backrests (starting weight without options—43 lbs.)
- Touring style—reclining backrests (starting weight without options—47 lbs.)
- Covers that can be removed and replaced easily and without the use of special tools

Feather Weight Mid-Hi options include:

- Black molded *U.S. Arms* or upholstered flip-up armrests
- Adjustable headrests
- Black or yellow corner AV grab rails
- Black or yellow top AV grab rails
- ABS plastic backs
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Rear row quick disconnect
- Side sliders
- 16", 18" or 19" wide seats available
- Rigid or reclining backrests
- Seat belts
 - Non-retracting seat belts
 - Retracting seat belts
 - USR (Under Seat Retractors)
- S3 Bio-Cushions (Made with vegetable oil)
- A wide variety of cloths and vinyls
- S3 cloths (Made with recycled yarn)

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ISO 9001:2000 registered



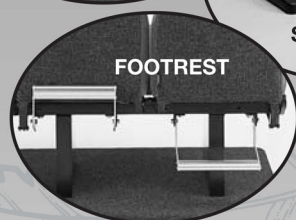
OPTIONS



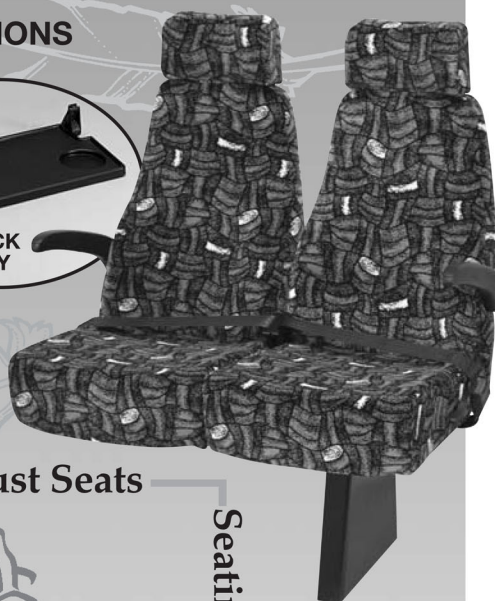
PILLOW SEAT



SNACK TRAY



FOOTREST



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FEATHER WEIGHT

HIGH-BACK SEAT

Freedman Seating Company's Feather Weight seats are designed to be like feathers on a bird: light and airy to satisfy weight restrictions and ensure a smooth ride, yet durable for years of service and low maintenance.

Freedman Seating Feather Weight seats are the most severely tested in the company's history, and meet all applicable federal motor vehicle safety standards for strength and safety (including 210 for seat belts). Less weight means one thing to bus builders and operators: they can get more passengers per bus. And when we say more passengers, ***we mean more happy passengers.***



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THE FEATHER WEIGHT SERIES BY

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SEATING COMPANY

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FEATHER WEIGHT

HIGH-BACK SEAT

Cross-country or cross-town, the Freedman Feather Weight High-Back gets you there in safety and comfort. The headrest actually cradles your head, and provides unrestricted viewing. The ultra-thin backrest gives out-standing support and creates more hip-to-knee room than any other seat in its class. The steel frame system meets or exceeds all applicable government standards for safety and durability. And, it's light as a feather!

Feather Weight High-Back features include:

- An ultra-thin *Knee-Saver* type backrest for added hip-to-knee room and lumbar support
- Molded polyurethane seat and back cushions for comfort and long lasting support
- 17½" wide seat cushions
- 27¼" back height off the seat cushion, 42¼" off the floor
- Wire mesh-grid seat springs for even support
- FMVSS 210 compliance—all *Feather Weight* seats are seat belt ready
- Covers that can be removed and replaced easily and without the use of special tools

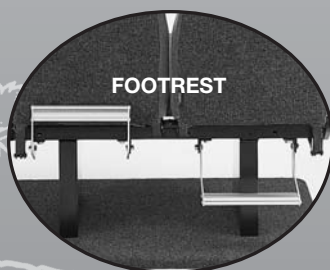
Feather Weight High-Back options include:

- Black molded U.S. Arms or upholstered flip-up armrests
- Mesh map pockets
- Vertical stitching
- FTA foam
- Snack trays
- Aluminum folding footrests
- Pillow seat cushions
- Pillow headrests
- Side grab rail
- U.S.R.—Under Seat Retractors
- 16" or 19" wide seats available
- Rear row quick disconnect
- CRS-225 hooks and tethers
- Side sliders
- Cup holders
- Seat belt loops

OPTIONS



PILLOW SEAT



FOOTREST



PILLOW HEADREST

GRAB RAIL



SNACK TRAY

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Creative Bus Sales

THE NATION'S LARGEST BUS DEALER SINCE 1980

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EXHIBIT A PRICING PAGE - CRFQ DMT23*09
176" - 190" Wheelbase Cutaway Vehicle

VENDOR NAME: Creative Bus Sales
MANUFACTURER/MAKE/MODEL: Forest River Bus, Glaval, Universal

CLASS	VEHICLE DESCRIPTION	UNIT PRICE PER VEHICLE	ESTIMATED QUANTITY	EXTENDED PRICE
A	176" Vehicle, Eight (8) Fixed Double Seats, Two (2) Wheelchair Positions with One (1) Fold Up Seat (Double), Rear Curbside Lift Location, Vinyl Logo and Stripes	\$137997.00	5	\$689985.00
B	176" Vehicle, Eight (8) Fixed Double Seats, Two (2) Wheelchair Positions with One (1) Fold Up Seat (Double), Rear Curbside Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics	\$143247.00	5	\$716235.00
C	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Vinyl Logo and Stripes	\$139297.00	5	\$696485.00
D	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics	\$144547.00	5	\$722735.00
E	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Vinyl Logo and Stripes, Overhead Luggage Racks, High Back Seats	\$132031.00	5	\$660155.00
F	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics Overhead Luggage Racks, High Back Seats	\$137281.00	5	\$686405.00
AA	Option to add On-Board Automatic Audio / Visual LED Display Voice Announcement System	\$6600.00	5	\$33000.00
TOTAL BID FOR EVALUATION				\$4205000.00

*Complete form provided. The DPT may purchase more or less as needed.

Note: These are only estimated quantities and do not reflect any guarantee of purchase. Please do not alter pricing page. Please complete entire form

EXHIBIT A PRICING PAGE - CRFQ DMT23*09
176" - 190" Wheelbase Cutaway Vehicle

VENDOR NAME: Creative Bus Sales

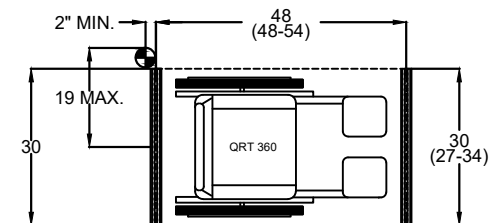
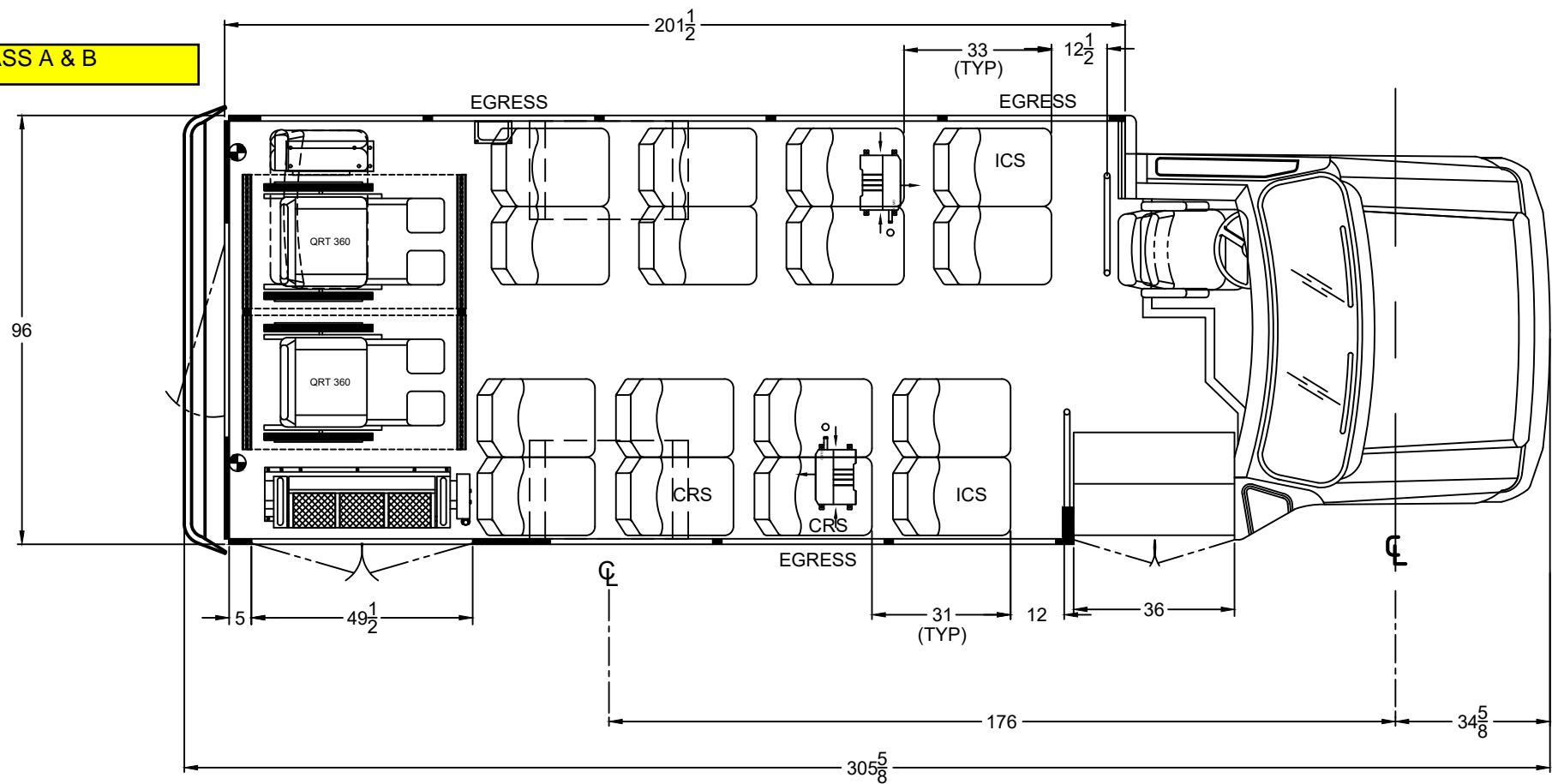
MANUFACTURER/MAKE/MODEL: Forest River Bus, Glaval, Universal

CLASS	VEHICLE DESCRIPTION	UNIT PRICE PER VEHICLE	ESTIMATED QUANTITY	EXTENDED PRICE
A	176" Vehicle, Eight (8) Fixed Double Seats, Two (2) Wheelchair Positions with One (1) Fold Up Seat (Double), Rear Curbside Lift Location, Vinyl Logo and Stripes	\$137997.00	5	\$689985.00
B	176" Vehicle, Eight (8) Fixed Double Seats, Two (2) Wheelchair Positions with One (1) Fold Up Seat (Double), Rear Curbside Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics	\$143247.00	5	\$716235.00
C	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Vinyl Logo and Stripes	\$139297.00	5	\$696485.00
D	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics	\$144547.00	5	\$722735.00
E	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Vinyl Logo and Stripes, Overhead Luggage Racks, High Back Seats	\$132031.00	5	\$660155.00
F	Vehicle, Seven (7) Fixed Double Seats, Two (2) Wheelchair Positions with Two (2) Fold Up Seats (Double), Extended Wheelbase to 190", Front Wheel Chair Lift Location, Full Bus Body Paint or 3/4 Bus Body Paint with Expanded Graphics Overhead Luggage Racks, High Back Seats	\$137281.00	5	\$686405.00
AA	Option to add On-Board Automatic Audio / Visual LED Display Voice Announcement System	\$6600.00	5	\$33000.00
TOTAL BID FOR EVALUATION				\$4205000.00

*Complete form provided. The DPT may purchase more or less as needed.

Note: These are only estimated quantities and do not reflect any guarantee of purchase. Please do not alter pricing page. Please complete entire form

CLASS A & B



DEALER APPROVAL


☐ APPROVED

CUSTOMER SIGNATURE

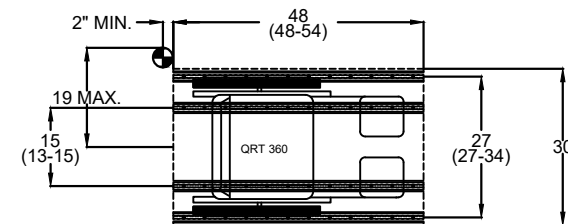
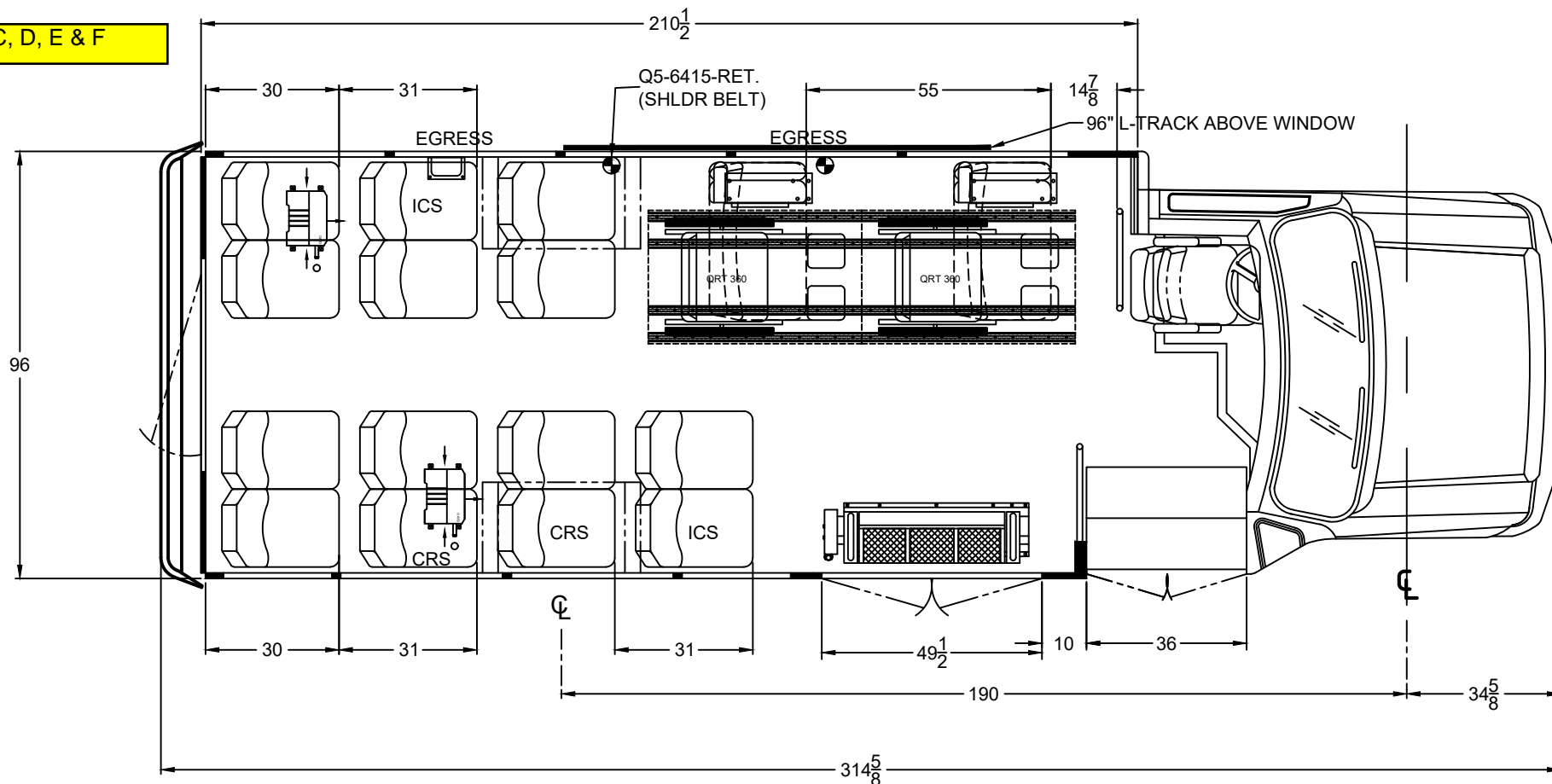
NOTE: SHOWN WITH MID HI FREEDMAN SEATS
E-450 14,500 GVWR
THIS FLOOR PLAN IS FOR ILLUSTRATION PURPOSES ONLY.
A WEIGHT ANALYSIS HAS NOT YET BEEN PERFORMED.
FINAL APPROVAL WITH A WEIGHT ANALYSIS IS REQUIRED UPON RECEIPT OF A
COMPLETED ORDER WITH ALL OPTIONS SHOWN.
OPTIONAL EQUIPMENT MAY BE SHOWN.
THE SALES ORDER PLACED DICTATES ACTUAL OPTION CONTENT.

SCALE
IN INCHES



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								WOOD	OTHER		NAME: DHERNANDEZ DATE: 12/16/22	
REV. LET.	DESCRIPTION OF CHANGE						BY	CHK	DATE	ECN No.	+ 1/8" + 1/16" + 1" + 1/2"	DWG. No. 16 2 WC 1 DB FOLD 176 190-3 FRB

Class C, D, E & F



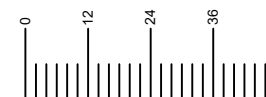
DEALER APPROVAL

☐ APPROVED

CUSTOMER SIGNATURE

NOTE: SHOWN WITH MID HI FREEDMAN SEATS
E-450 14,500 GVWR
THIS FLOOR PLAN IS FOR ILLUSTRATION PURPOSES ONLY.
A WEIGHT ANALYSIS HAS NOT YET BEEN PERFORMED.
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OPTIONAL EQUIPMENT MAY BE SHOWN.
THE SALES ORDER PLACED DICTATES ACTUAL OPTION CONTENT.

SCALE
IN INCHES



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REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.
LET.					

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD	OTHER
+ 1/8"	+ 1/16"
+ 1"	+ 1/2"



FOREST RIVER BUS

TITLE:
14 2 W/C 190" WB 199 BDY
MODEL 26

NAME: CRANS DATE: 01/06/23

DWG. No. 14 2 WC 2 DB FOLDS 190 199-3 FRB

1/5/2023 16 2 WC 1 DB FOLD 176 190-3 FRB WA

109520ST	
NO HEAVY OPTIONS	



1/5/2023 14 2 WC 2 DB FOLDS 190 199-3 FRB WA

104164B	
5/8 PLY, MOR RYDE, H.D. RUN. BOARD	





The following information is submitted for all Glaval Bus products proposed on this bid as supporting documentation of the structural soundness and impact resistance of the bodies manufactured. All vehicles are built using virtually the same materials with some minor differences in the height and width of cross members due to entry floor heights and/or body width variations.

A representative set of construction prints provided by engineering supplements this verbal accounting of our materials and assembly specifications.

If, in the reviewing of these written technical specifications and engineering frame prints submitted any questions arise, please contact us immediately for any clarification or help in interpretation and understanding.

3.0 Body Construction – General Frame Construction

Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral steel frame that is mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

3.0.1 Floor frame construction and assembly –

- 3.0.1.1 Cross Members -- The floor cross members form the base structural support for the rest of the frame components. Our cross members are constructed of 14 gauge aluminized steel, formed to a capital “C” shape. Cross members over the fuel tank are made to provide the clearance needed to conform with FMVSS301, and include formed internal reinforcements welded in place for additional strength. All additional longitudinal and latitudinal structure is flush welded in place to form a one piece floor upon completion.
- 3.0.1.2 Aluminized steel “Hat Posts” – 1”x1”x4” run the length of the floor between cross members and are welded into place. This extremely strong form is used to weld our HSLA steel seat track in place.
- 3.0.1.3 Aluminized steel C Channel – 1”x1.5” C channel is welded in between cross members the full length of the floor in 5 places. Coupled with the Hat Posts this provides a one-piece strong “ladder” type frame for the flooring.
- 3.0.1.4 Seat Track – 12 gauge roll formed high strength/low alloy steel is wire welded in place for seat mounting down each side of the bus, with lengths predicated on the floor plan chosen. This is yet another stiffener in our extensive construction process.



- 3.0.1.5 Wheel Wells -- Constructed of 14 gauge ALUMINIZED steel, wheel wells are also welded in during the floor construction process. All seams in the wheel well are welded to create a one piece water resistant wheel housing structure. The wheel wells also provide additional strength to the body assembly, when welded in place.
- 3.0.1.6 Structural Aluminized steel Angle – 1/8” thick 1.5” x 2.5” structural aluminized steel angle is used the full perimeter length of each floor assembly, welded to the ends of all floor cross members. This provides not only a flat plane for joining the sidewall assembly, but also ties all cross members together and provides additional side impact resistance.
- 3.0.1.7 Additional structure – When adding vertical stanchions, wheel chair lifts and/or tie down options, additional structure is welded into the floor at locations specified by our engineering department on CAD drawings.

3.0.2 Sidewall Construction –

- 3.0.2.1 Sidewall vertical member – The heart of our sidewall is the vertical structure, a roll formed 18 gauge aluminized steel 1.5" x 2" tube that provides strength and rigidity. The vertical member is installed in full lengths and in shorter sections below window frames. Additional vertical structure is used at both ends of the sidewall enabling the structure to withstand the forces applied by the vehicle when in motion.
- 3.0.2.2 Aluminized steel Tubing – 1.5”x1” lower and 1.5”x3” upper 16 gauge aluminized steel tubing is welded in horizontally between vertical members to frame in window openings. This adds front to rear reinforcement as well.
- 3.0.2.3 Seat Track – 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall below the window frame. While serving as a seat attaching device, it adds excellent structure to the sidewall and also adds excellent side impact resistance.
- 3.0.2.4 Wheelchair Options – Add another layer of metal. Depending on track locations, another structure of 11 gauge thick aluminized steel is welded in place between each vertical member for attaching a shoulder belt mount. Also, additional structure is added to accommodate wheelchair door frames – either 1.5”x1” or 1.5”x2” 16 gauge wall aluinizd steel tubing..
- 3.0.2.5 Full length glavanized steel tubing – 1.5”x1” 16 gauge aluinizd steel tubing is stitch welded to the sidewall bottom and top at each vertical member for attaching to the floor and roof sections, respectively.

3.0.3 Rear Wall Construction –

- 3.0.3.1 Rear wall vertical member – The vertical sidewall 1.5"x 2" aluminized steel tube is also used in the rear wall assembly. Full length structure is used at varying places,



depending on choice of rear window, or rear door. Shorter cut pieces are used above windows and doors. Additional side windows used with the rear door also change the configuration.

3.0.3.2 Aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded horizontally between vertical members to provide a window frame in the standard product, and used as an upper door frame in the optional rear assembly.

3.0.3.3 Full length aluminized steel tubing – 1.5"x1" 16 gauge aluminized steel tubing stitch welded to the rear wall top and bottom as in the sidewall

assembly. **3.0.4 Roof Construction –**

3.0.4.1 Roof Bows – Radius formed one-piece 16 gauge aluminized steel roof bows formed as a modified hat post design with eight bends for exceptional strength and located on 16" centers (the closest in the industry), including 4 bends in the web that allows for the roof structure to be capable of taking severe loads. They are then capped with top flat pieces from flange to flange to provide abundant surface area for securing the exterior roof material.

3.0.4.2 aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" x 3" 16 gauge aluminized steel tubing to all upper window openings as required. A full perimeter is also welded on to mate the roof to the sidewall and rear wall, with short vertical pieces providing support on the front and rear ends. The 3" wide aluminized steel tube supplies a structural mounting surface for shoulder belt attachment and has been pull tested to federal standards.

3.0.5 Driver Compartment Overhead Halo –

3.0.5.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is cut and jig welded into an integrated one piece structure spanning from the front roof bow of the body to the newly cut roof line of the cab. Also created during the structure manufacture is the housing for mounting the electronic circuit board.

3.0.5.2 11 Gauge aluminized steel – formed to make brackets used to mount to the chassis roof.

3.0.6 False Floor (Cab to body transition) –

3.0.6.1 aluminized steel Tubing – 2" x 2" 16 gauge aluminized steel tubing is welded together forming a flat body floor transition from the step area back to the actual body area. An overhang on the curbside provides a secure attach point frontally for the entry door frame added later.

3.0.6.2 Structural aluminized steel angle – 11 gauge 1.5"x1.5" structural angle is added in

short lengths five places to provide attachment points to the chassis floor.



3.0.7 Interior Vertical Transition Frames –

3.0.7.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is used vertically and a ladder type assembly is made welding the 1x 1 tube to .75"x.75" 11 gauge aluminized steel tube that is used horizontally in the assemblies. These pieces transition from the body fronts on each side to the driver halo side assembly and the entry door frame assembly on the curbside.

3.0.8 Entry Door & Step Assembly Frame –

3.0.8.1 aluminized steel Tubing – 1"x1" 16 gauge and .75"x.75" 11 gauge aluminized steel tube is cut to length and welded together in a ladder type construction forming a rigid frame for attaching the entry door/step assembly.

3.0.9 Entry Door/Step Assembly –

3.0.9.1 11 Gauge aluminized steel – The step riser/tread piece is manufactured from one-piece 11 gauge aluminized steel and uses 90° bends at all risers and treads. The bottom tread also adds an additional 90° bend for additional strength and safety. Upper and lower side pieces are then attached and an 11 gauge flat plate with holes is used to bridge the lower and upper side pieces, then is stitch welded and plug welded to form a strong one piece assembly prior to inserting and welding to the entry step framing.

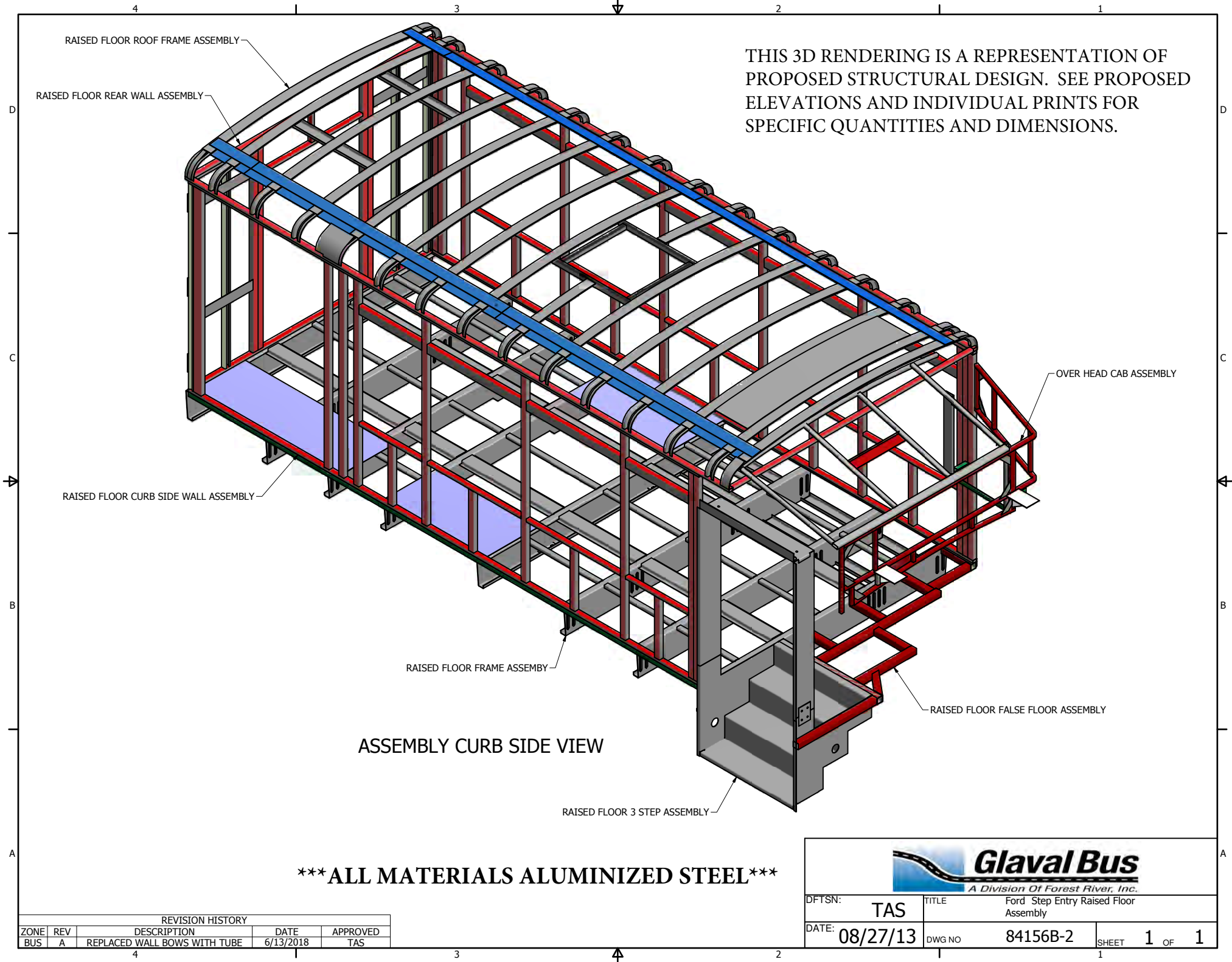
APPLICATION OF EXTERIOR SIDEWALL MATERIAL

GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

The exterior is .024" galvanized steel pre-painted white with an underlayment of 5/32" luan. The interior is 5/32" luan covered with a light gray FRP or padded vinyl. The foam filled aluminized steel cage is placed in the center and all layers are adhered using a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

Composite FRP exterior sidewall panels are installed using the same method.

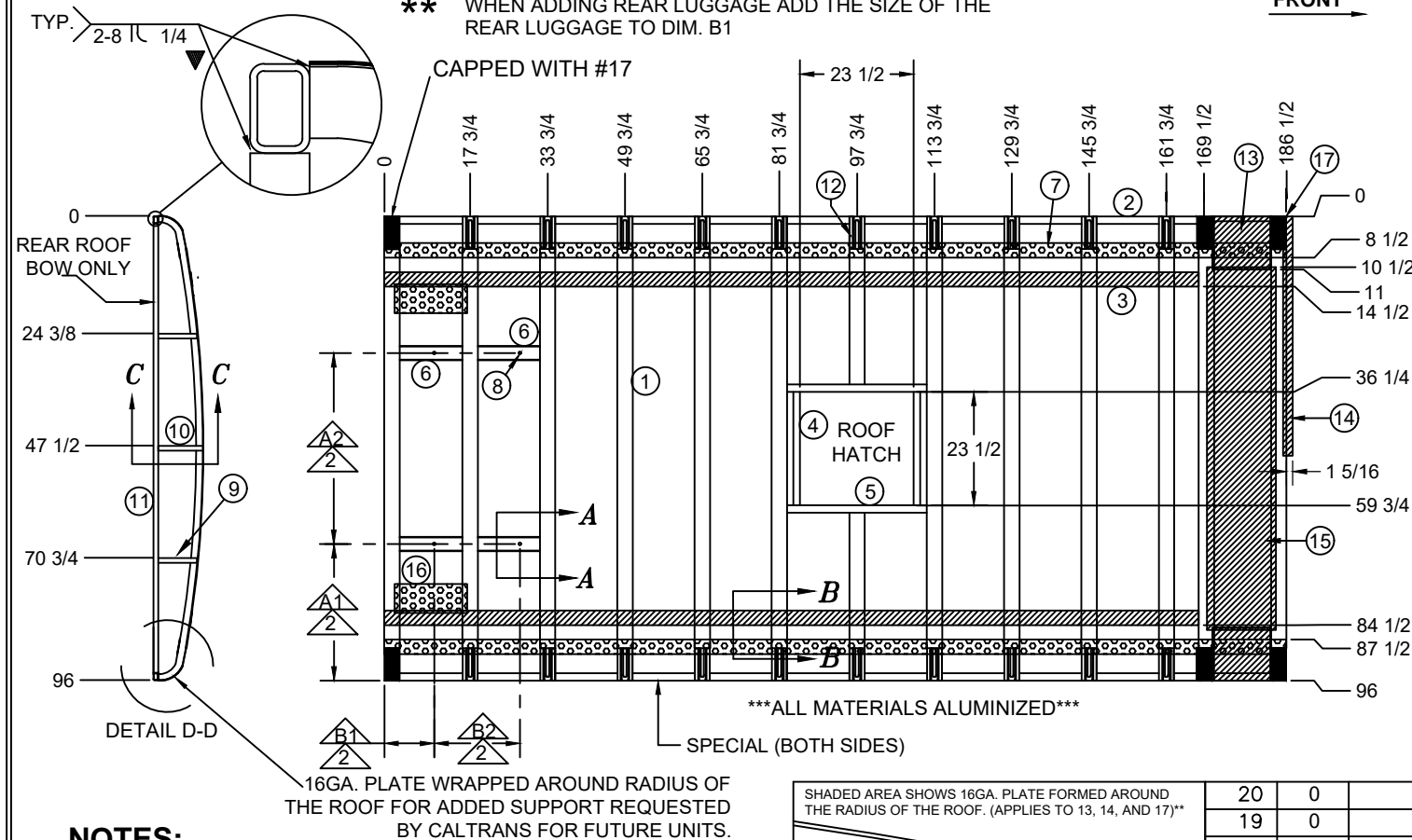
Should any further questions arise, please contact your Glaval Bus representative.



USAGE: FORD MODEL 24

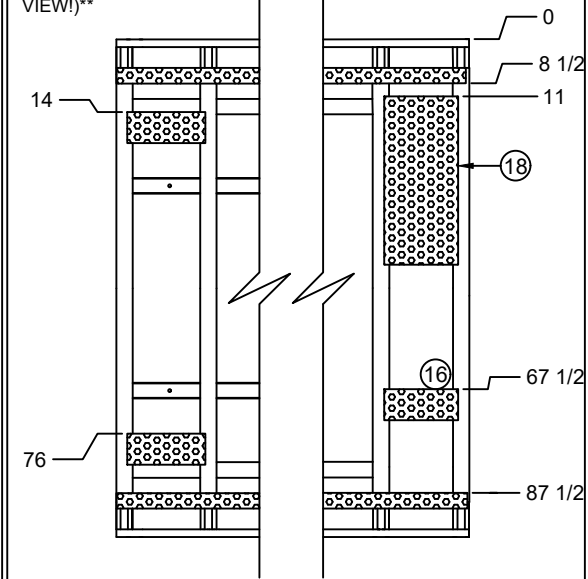
**** WHEN ADDING REAR LUGGAGE ADD THE SIZE OF THE REAR LUGGAGE TO DIM. B1**

FRONT



BOTTOM PLATES FOR FRONT AND REAR IN DRIVER AND PASSENGER INTERIOR STANCHIONS.

****NOTE: THIS IS A TOP VIEW WITH THE BOTTOM PLATES PROJECTED THROUGH THE BEAMS! (THIS IS NOT A BOTTOM VIEW!)****



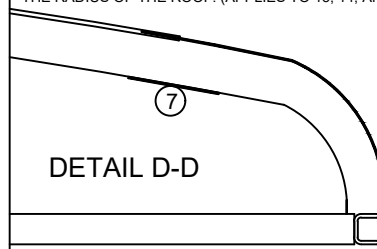
NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- A/C BOLT PATTREN MAY VERY SEE SALES ORDER.
- 3- BEFORE CUT ROOF HATCH SEE SALES ORDER.
- 4- SCREW LOCATION AT SEAMS AND EDGES 8" ON CENTER
ALL OTHER LOCATION 16" ON CENTER.
- 5- SEALANT USAGE: 1/4" MINIMUM 3/8" MAXIMUM BEAD ON ALL
ROOF FRAME TO LUAN SURFACES.

ALL MATERIALS ALUMINIZED

- SPECIAL (BOTH SIDES)

SHADED AREA SHOWS 16GA. PLATE FORMED AROUND THE RADIUS OF THE ROOF. (APPLIES TO 13, 14, AND 17)**



5	2	70009047	"C" CHANNEL: 16ga. x 1-3/8" x 1-3/8" x 30-1/2" Lg.	10	1		TUBE: 16ga. x 1" x 1" x 8-1/2" Lg. A-513
4	2	70009047	"C" CHANNEL: 16ga. x 1-3/8" x 1-3/8" x 24-1/4" Lg.	9	2		TUBE: 16ga. x 1" x 1" x 8" Lg. A-513
3	2		SHEET STEEL: 16ga. x 3" x 168-1/2" Lg.	8	4		BOLT: 3/8-16 x 3" Lg. HEX HEAD
2	2		TUBE: 16ga. x 1" x 1.5" x 186-1/2" Lg. A-513	7	2		SHEET STEEL: 16ga. x 3" x 186-1/2" Lg.
1	12	02062357	ROOF BOW W/CAP 16ga. x 3-3/16 x 96" Lg.	6	4	70009046	"C" CHANNEL: 16ga. x 1" x 3-1/2" x 14-1/2" Lg.
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD	OTHER
$\pm 1/8"$	$\pm 1/16"$
$\pm 1^\circ$	$\pm 1/2^\circ$



a division of Forest River, Inc.

DATE: 06/11/18

TITLE: 158" WHEEL BASE MODEL 24
ROOF FRAME, STD. ROOF, SINGLE HATCH

DWG. No. 32-13-0017-18

DESCRIPTION OF CHANGE

BY

CH

DATE _____

ECN No.

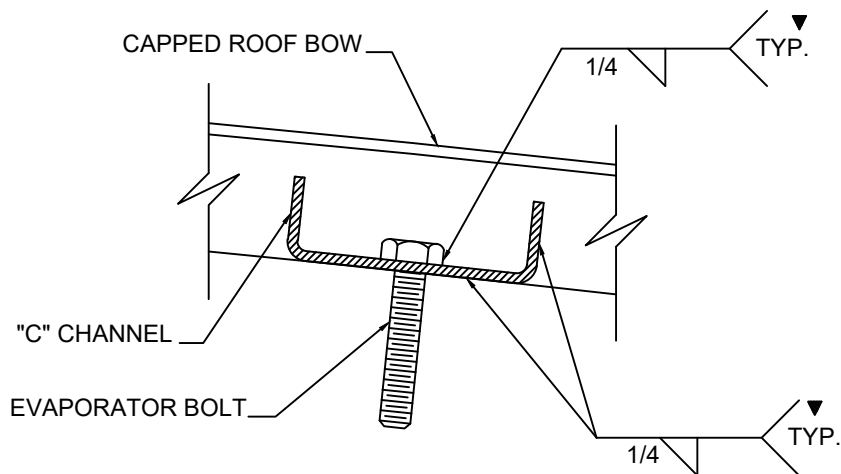
	$+ 1^\circ$
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 $\pm 1/2^\circ$

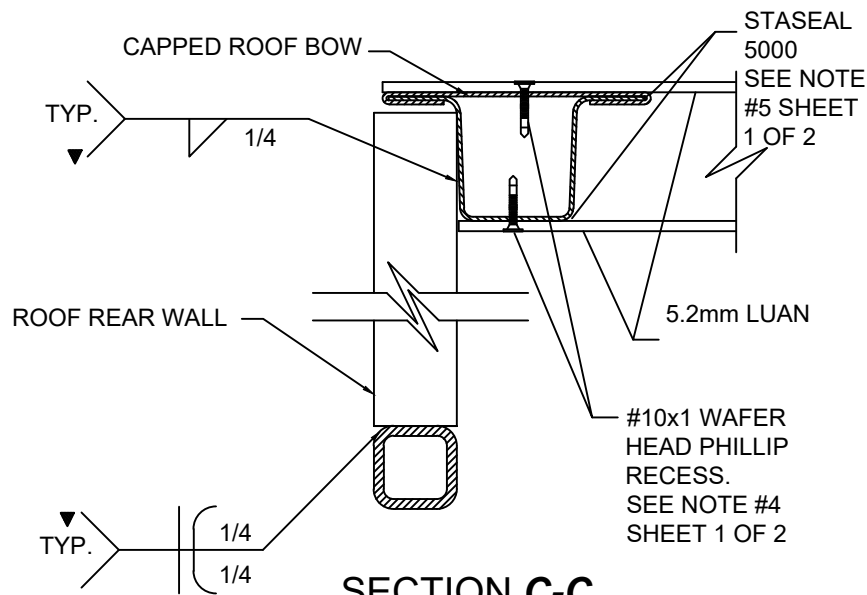
DWG. No.	3
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32-13-0017-18

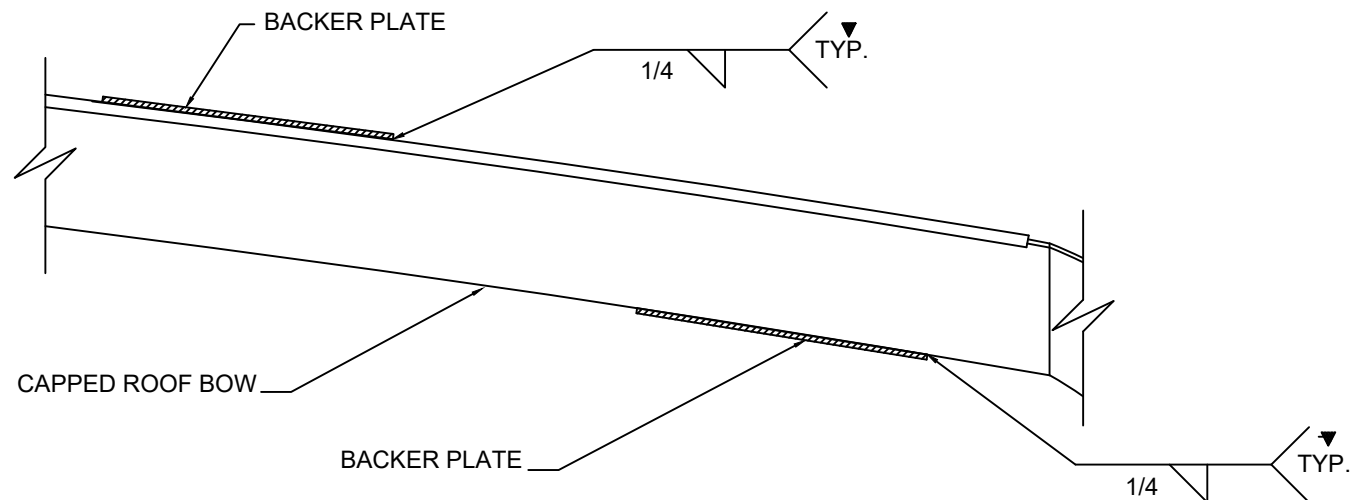
▼ CRITICAL CONTROL ITEM



SECTION A-A



SECTION C-C



SECTION B-B

T/A-71 NEW STYLE	33-5/8	30	10	12-1/4
ACC 23022 SERIES	38	20	10	14-3/4
ACC 23023 SERIES	33-5/8	28-3/4	10	14-3/4
T/A-77	18-1/4	59-1/2	10	10-3/8
T/A-73	28-1/4	39-1/2	10	9-1/2
T/A-71 OLD STYLE	33-5/8	28-3/4	10	12-1/4
T/A-70	36-3/4	22-1/2	10	11-5/8
T/A-30	31	34	10	9-1/2
EM-14 & RE-29	30-3/4	34-1/2	10	9-1/2
EM-6 & RE-10	36	24	10	9-1/2
EM-3 & RE-30	28-1/4	39-1/2	10	16
RE-15 & RE-20	28-1/4	39-1/2	10	9-1/2
EM-1 & EM-2	28-1/4	39-1/2	10	9-1/2
EM-7 GEN 5	36-1/8	23-3/4	10	9-1/2
EM-2 GEN 5	32-3/8	31-1/16	10	9-1/2
EM-1 GEN 5	28-3/16	39-5/8	10	9-1/2
EVAPORATOR MODEL	A-1	A-2	B-1	B-2

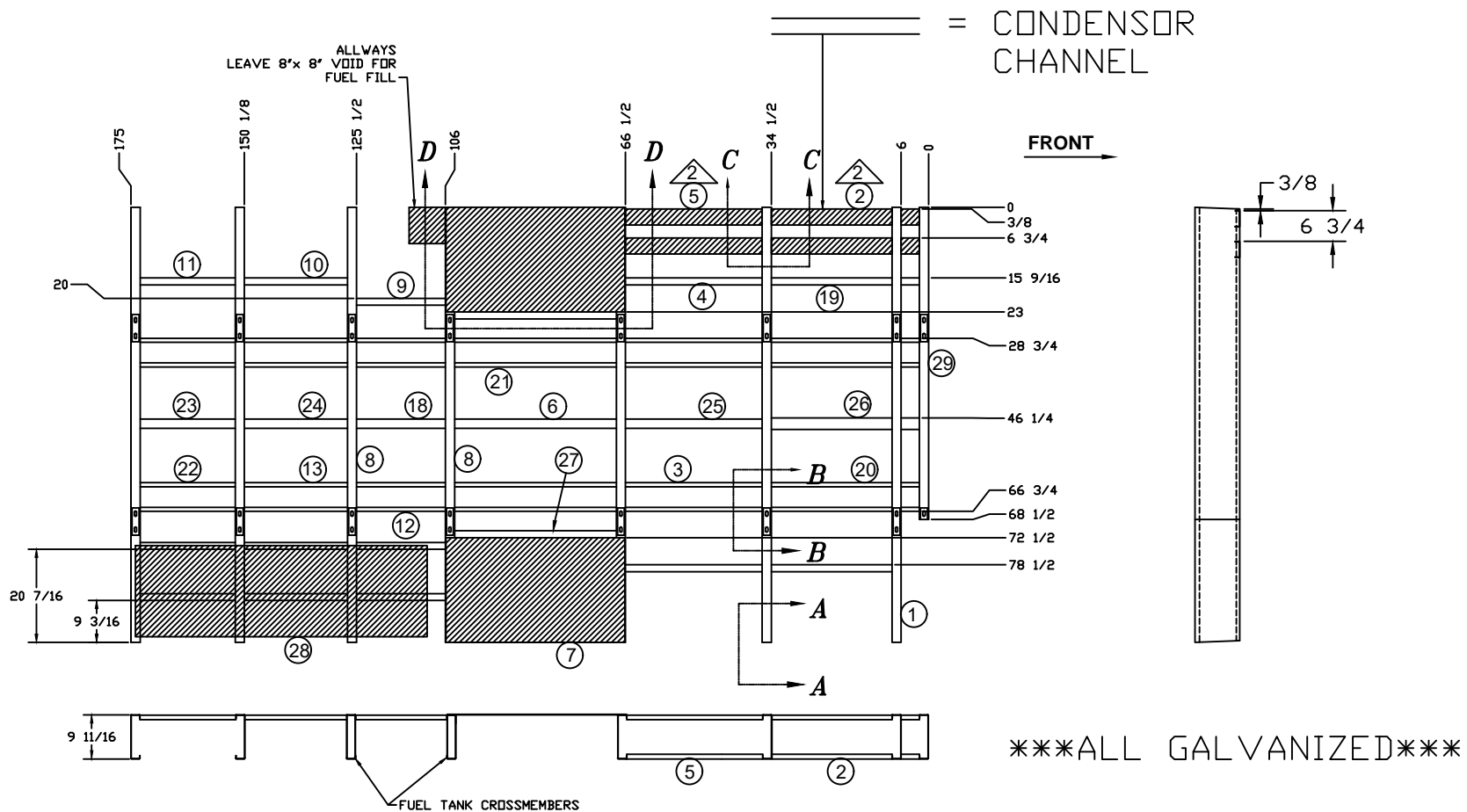
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REV.	LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		 Glaval Bus a division of Forest River, Inc.	
WOOD	OTHER	DATE: 06/11/18	TITLE: 158" WHEEL BASE MODEL 24
± 1/8"	± 1/16"	NAME: MKLINE	ROOF FRAME, DETAILS SINGLE HATCH
± 1°	± 1/2°	DWG. No.	32-13-0017-18

▼ CRITICAL CONTROL ITEM


USAGE: FORD 158" WHEEL BASE, MODEL 24



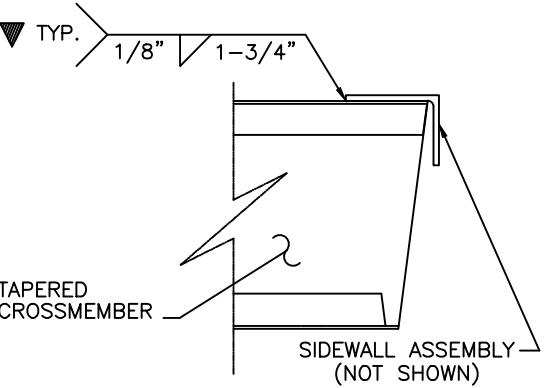
NOTES:

- 1- DRAWING VIEWED FROM INTERIOR SIDE OF UNIT.
- 2- LOCATION OF A/C BRACKETS: ONE MOUNT FLUSH WITH OUTSIDE EDGE OF CROSSMEMBER. THE OTHER MOUNTS 14-3/4" FROM OUTSIDE EDGE OF CROSSMEMBER.
- 3- SEE SHEET 2 OF 2 FOR DETAILS, TORQUE SPECIFICATIONS, SECTION VIEWS AND CUT LIST.

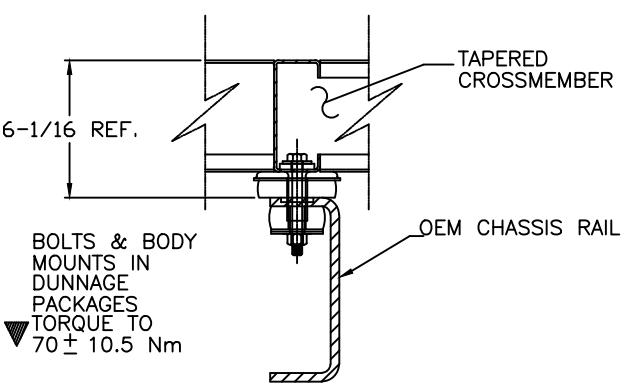
7	2	71002066	SHEET STEEL: 11ga. x 24" x 39-1/4" Lg. HRS
6	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 35-5/8" Lg.
5	2	70009046	"C" CHANNEL: 12ga. x 1" x 3-1/2" x 30" Lg.
4	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 30" Lg.
3	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 30" Lg. A-513
2	2		"C" CHANNEL: 12ga. x 1" x 3-1/2" x 26-1/2" Lg.
1	5	71009018	14ga. x 2 x 9-11/16 x 95-1/2 CROSSMEMBER A-365
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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						WOOD	OTHER	DATE 6/14/18	TITLE 158" WB MODEL 24
						± 1/8"	± 1/16"	NAME: MKLINE	FLOOR FRAME, RAISED FLOOR
						± 1°	± 1/2°	DWG. No.	32-13-0031-18 SPECIAL
REV. LET.	DESCRIPTION OF CHANGE					BY	CHK	DATE	ECN No.

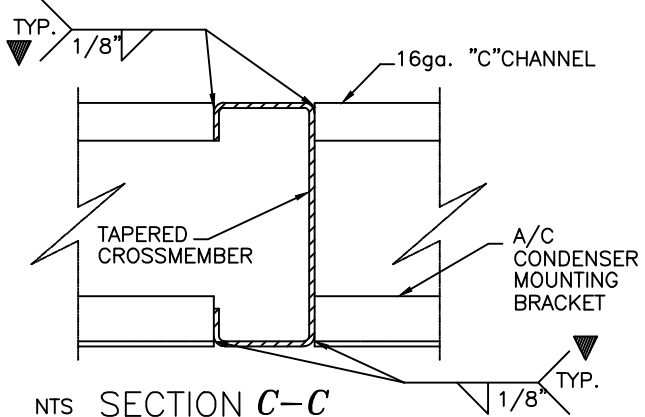
▼ CRITICAL CONTROL ITEM



NTS SECTION A-A



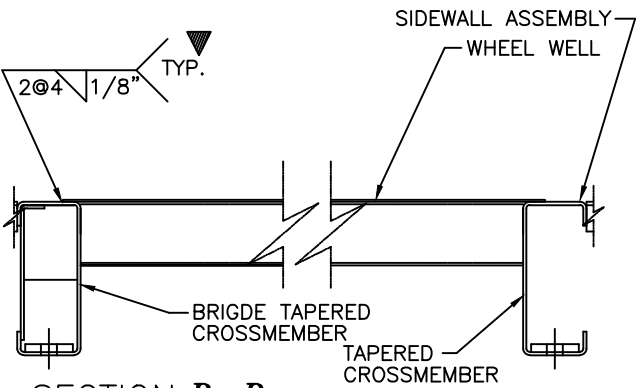
NTS SECTION B-B



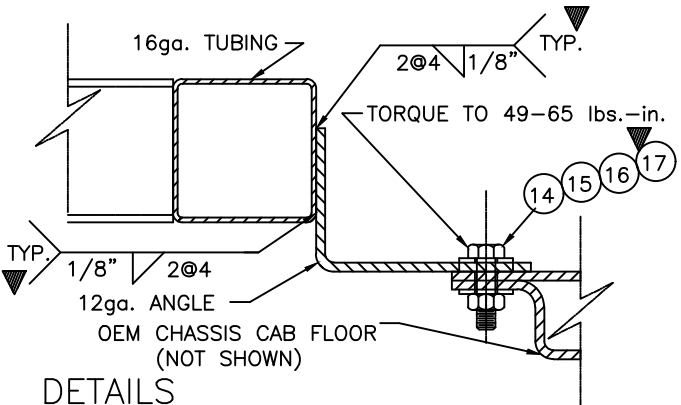
NTS SECTION C-C

ALL GALVANIZED

29	1		14ga. x 2 x 9-11/16 x 68-1/2 CROSSMEMBER A-365
28	2		PLATE: 11ga. 20" x 64" Lg.
27	2	71002028	TUBE: 16ga. x 1-1/2" x 1-1/2" x 35-5/8" Lg. A-513
26	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 26-1/2" Lg.
25	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 30" Lg.
24	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 22-3/8" Lg.
23	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 20-7/8" Lg.
22	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 20-7/8" Lg. A-513
21	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 35-5/8" Lg. A-513
20	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 26-1/2" Lg. A-513
19	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 26-1/2" Lg.
18	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 19-3/4" Lg.
17	7	80052007	NUT, HEX HEAD 3/8-16 UNC GRADE 5 ZINC
16	7	80042015	WASHER MED LOCK 3/8 ZINC
15	14	80042007	WASHER 3/8 USS ZINC
14	7	80112051	BOLT, HEX HEAD 3/8-16 X 1 UNC GRADE 5 ZINC
13	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 22-3/8" Lg. A-513
12	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 19-3/4" Lg. A-513
11	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 20-7/8" Lg.
10	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 22-3/8" Lg.
9	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 19-3/4" Lg.
8	2	70009055	14ga. x 2 x 4-13/16 x 95-1/2 bridge crossmember
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION



NTS SECTION D-D



NTS DETAILS

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REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE		TITLE	
WOOD	OTHER	DATE	6/14/18	TITLE	158' WB MODEL 24
± 1/8"	± 1/16"	NAME	MKLINE	FLOOR FRAME, RAISED FLOOR	
± 1"	± 1/2"	DWG. No.	32-13-0031-18	SPECIAL	

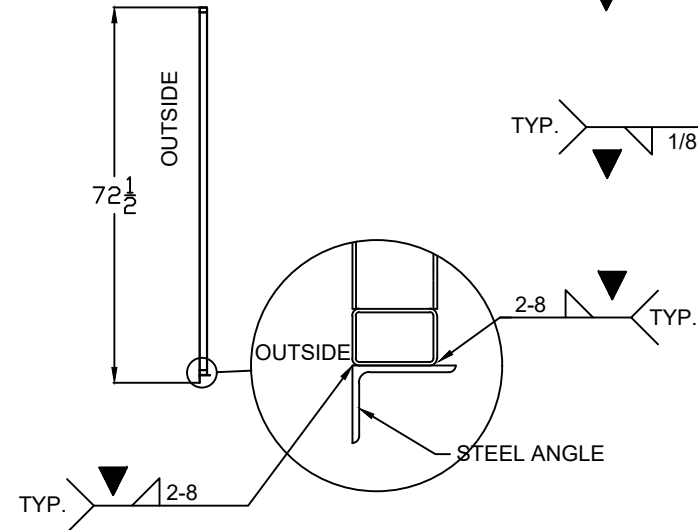
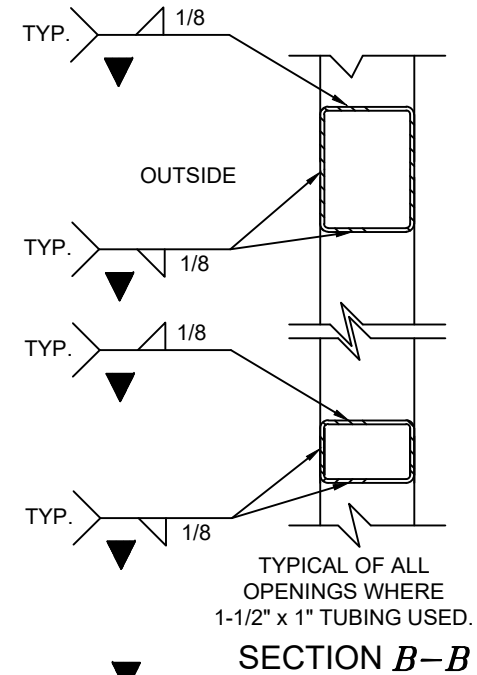
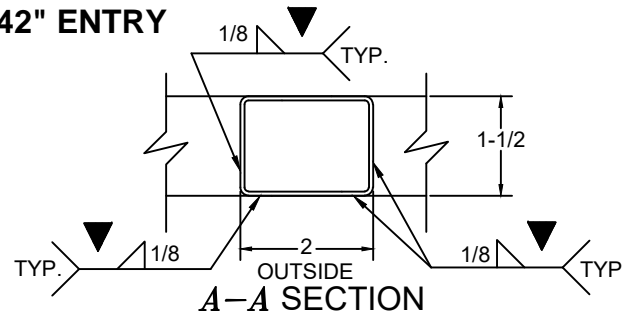
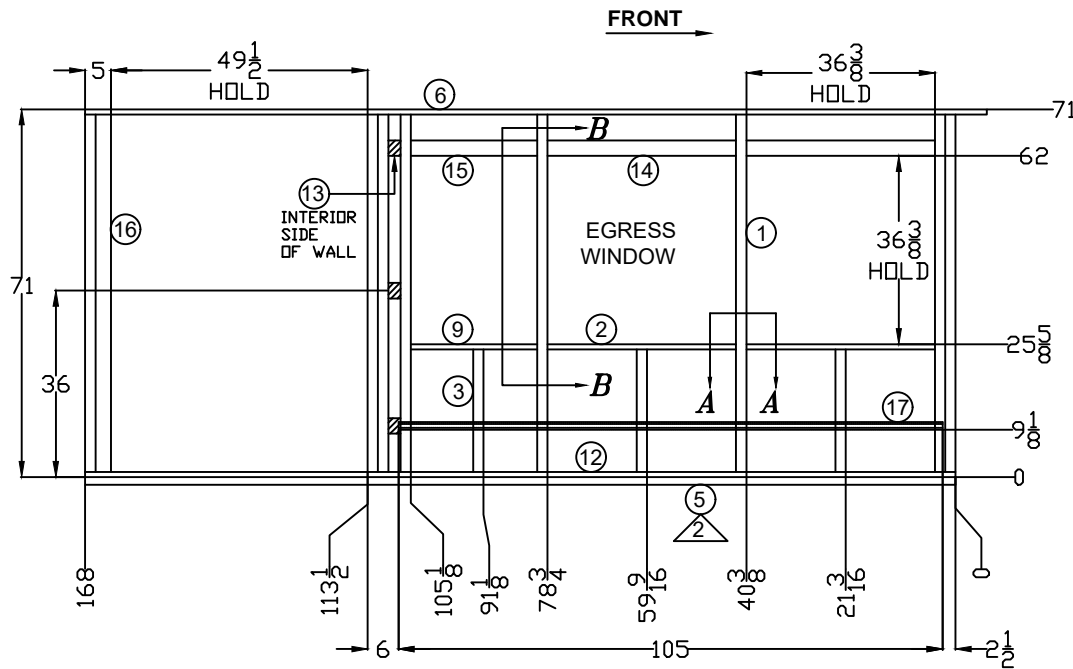


▼ CRITICAL CONTROL ITEM

USAGE: FORD 158"WB/MODEL 24, 42" ENTRY

NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.



ALL MATERIALS GALVANIZED

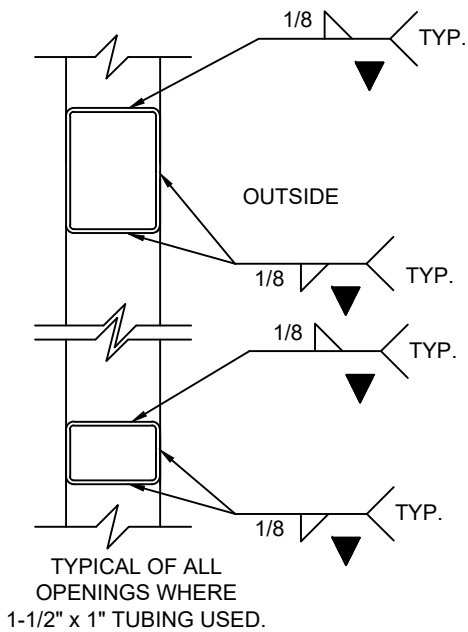
8	0		FRAME, SIDEWALL WHEEL WELL FORD	17	1		SEAT TRACK: 105-1/2"Lg.
7	0		TUBE: 18ga. x 1-1/2" x 2" x 66-13/16"Lg. A-513	16	1		TUBE: 18ga. x 1-1/2" x 3" x 69"Lg. A-513
6	1		TUBE: 16ga. x 1-1/2" x 1" x 174"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 168"Lg. A-513	14	2		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 46-3/4"Lg. A-513	13	3		STRAP: 11ga. x 3" x 2-3/8"Lg. A-513
3	4		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 168"Lg. A-513
2	2		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 65-3/4"Lg. A-513
1	8		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 64-3/4"Lg. A-513
				9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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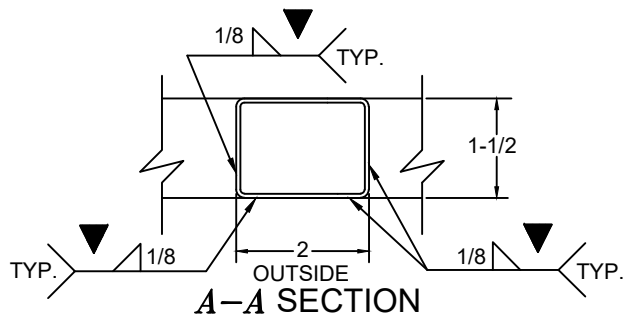
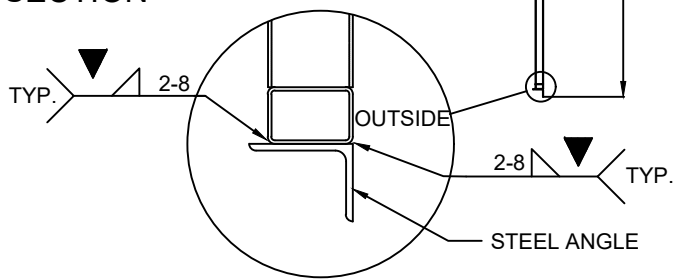
REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.	TOLERANCE UNLESS OTHERWISE SPECIFIED	WOOD	OTHER	DATE: 6/14/18	TITLE: 158" WB MODEL 24, 42" ENTRY SIDEWALL, R. LIFT, RAISED FLOOR
						± 1/8"	± 1/16"	NAME: MKLINE		
						± 1"	± 1/2"	DWG. No. 32-13-0030-18	SPECIAL 42 ENTRY	

▼ CRITICAL CONTROL ITEM

USAGE: FORD 158"WB/MODEL 24

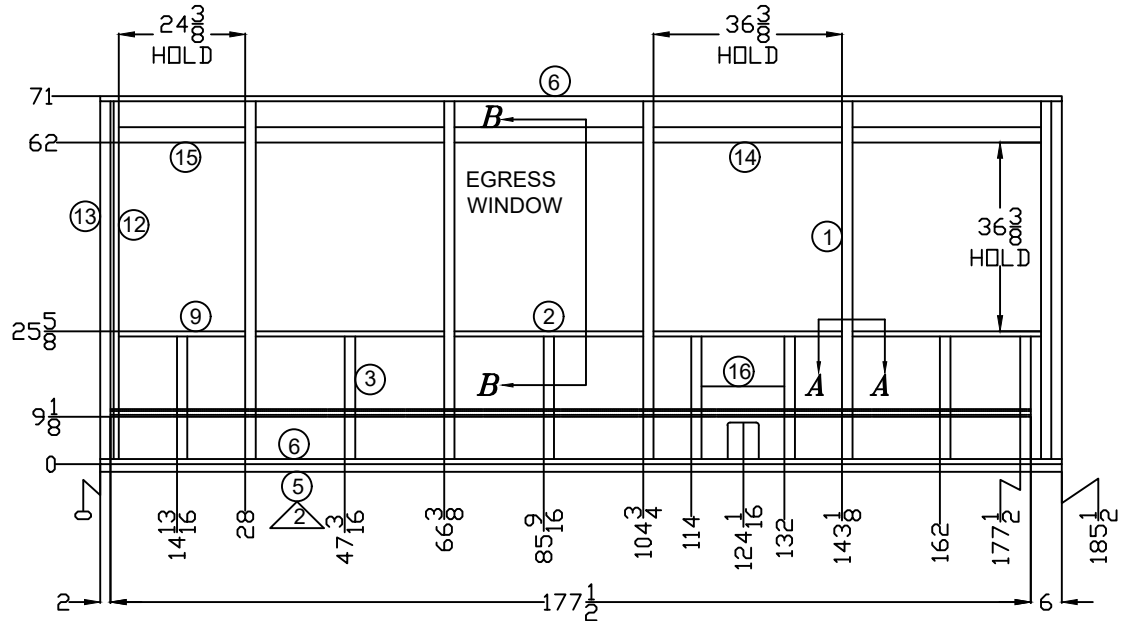


B-B SECTION



NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.




ALL MATERIALS GALVANIZED

8	0		FRAME, SIDEWALL WHEEL WELL FORD	17	1		SEAT TRACK: 177-1/2"Lg.
7	0		TUBE: 18ga. x 1-1/2" x 2" x 70-7/8"Lg. A-513	16	1		FUEL FILL BACKER BOARD
6	2		TUBE: 16ga. x 1-1/2" x 1" x 185-1/2"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 185-1/2"Lg. A-513	14	4		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 79-9/16"Lg. A-513	13	2		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
3	7		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 69"Lg. A-513
2	4		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 70-3/16"Lg. A-513
1	5		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 70-3/16"Lg. A-513
				9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.
LET.					



a division of Forest River, Inc.

TOLERANCE UNLESS OTHERWISE SPECIFIED

WOOD	OTHER
± 1/8"	± 1/16"
± 1"	± 1/2"

DATE: 6/13/18

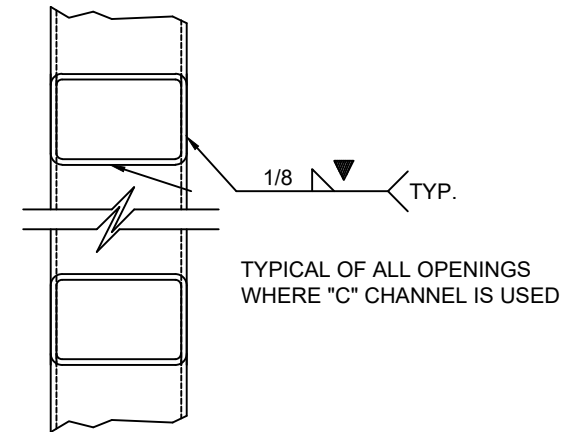
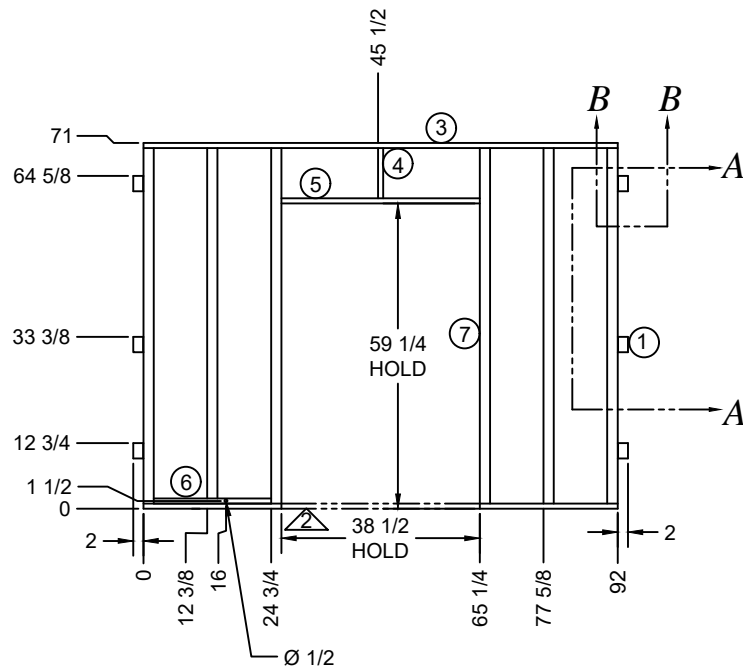
NAME: MKLINE

DWG. No. 32-13-0002-10

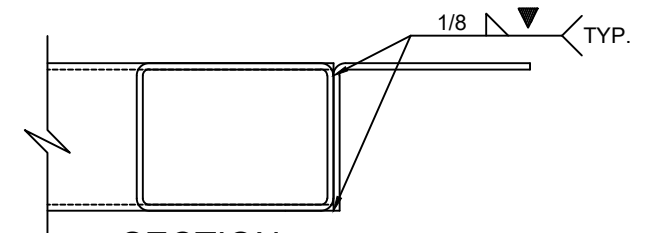
TITLE: 158" WB MODEL 24, DR. SIDEWALL, ALL PASS, RAISED FLOOR

▼ CRITICAL CONTROL ITEM

USAGE: Raised Floor w/ Rear Door, SPECIAL 1-1/2" THICK WALL



SECTION A-A



SECTION B-B

ALL MATERIALS aluminized

NOTES:

1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.

2- REMOVE STEEL TUBE IN DOOR AREA AFTER WALL MOUNT TO FLOOR
BUT BEFORE INSTALLING DOOR JAM ASSEMBLY.

7	6		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
6	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 10-3/8"Lg. A-513
5	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 38-1/2"Lg. A-513
4	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 9-3/4"Lg. A-513
3	2	02071055	TUBE: 16ga. x 1-1/2" x 1" x 92"Lg. A-513
2	0		
1	6		ANGLE: 16ga. x 1" x 2" x 6"Lg. A-513

REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION
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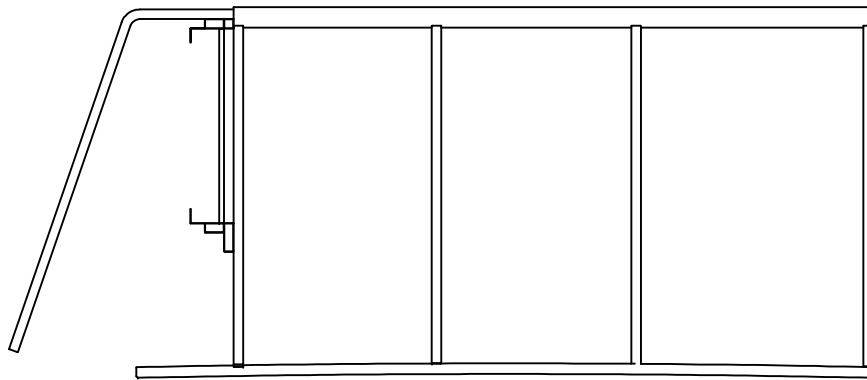
a division of Forest River, Inc.

DATE: 06/14/18	TITLE	Frame, Rear Wall Raised Floor With Door
DFTSN: MKLINE		
CHKR:	DWG. No.	31-28-0010-18 SPECIAL
APRVD:	SCALE	
	DISK No.	SHEET 1 OF 1

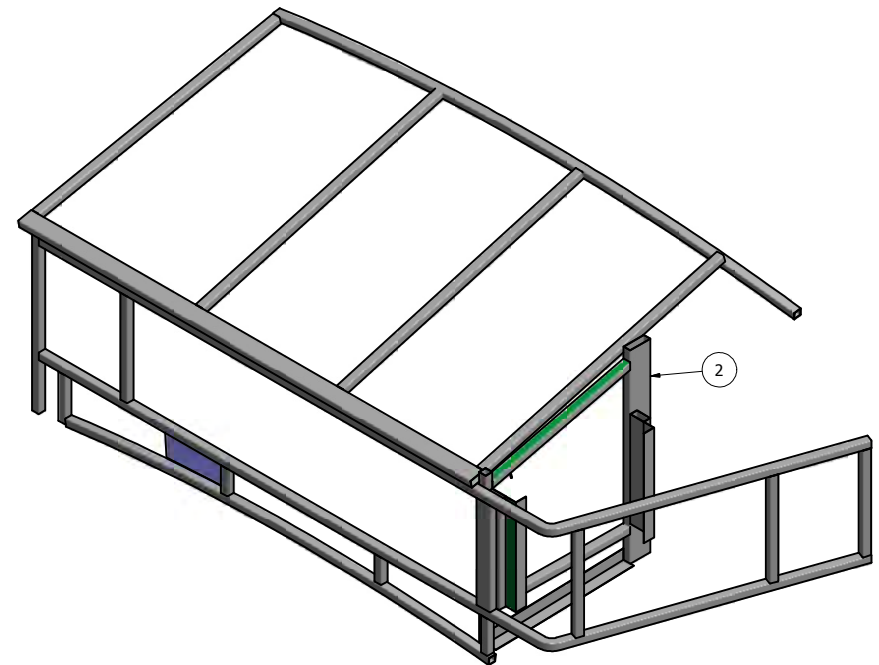
TOLERANCE UNLESS
OTHERWISE SPECIFIED
± .00 ± .030
± .000 ± .015
± .0000 ± .005

REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.
------	-----------------------	----	-----	------	---------

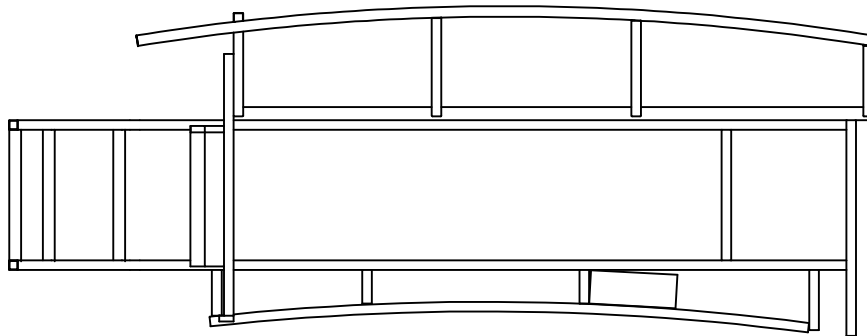
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FOREST RIVER.



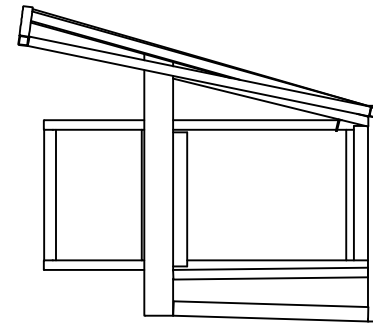
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



SIDE VIEW

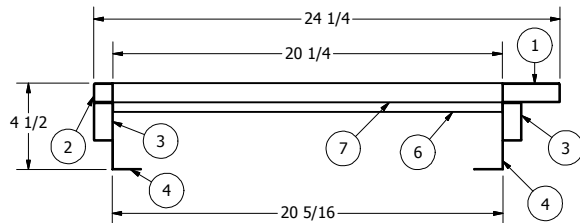
ALL MATERIALS ALUMINIZED

Note:

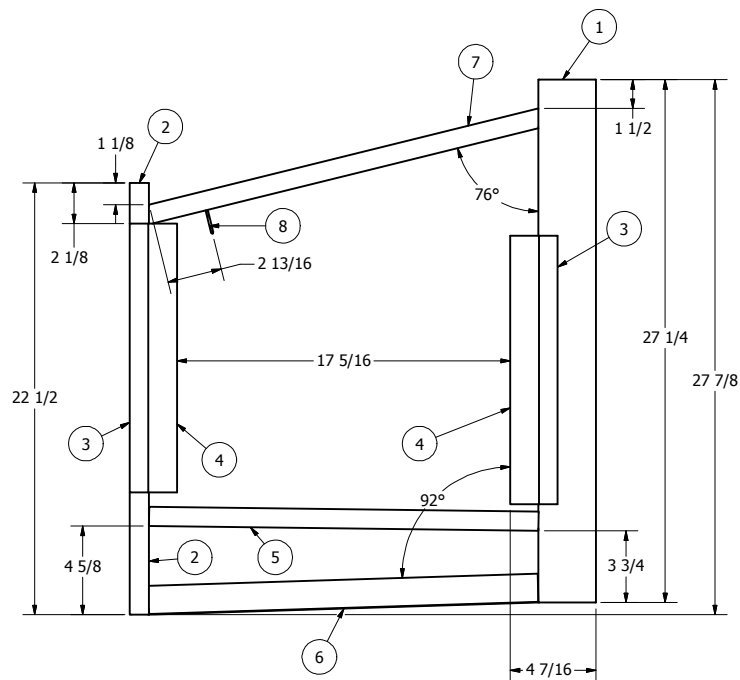
1). Viewed from Interior.

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	31-28-0307-11	FORD Front Cab Wrap Around
2	1	31-28-0299-11	Ford Electrical Panel Frame
3	1	31-28-0745-11	FORD Cab Overhead

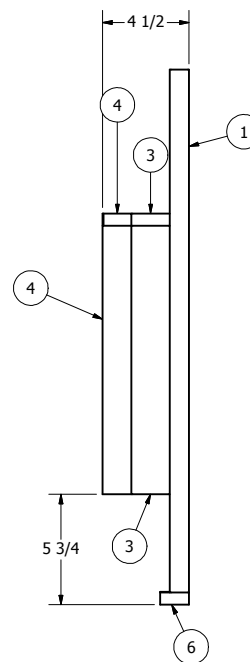
		A Division Of Forest River, Inc.	
DFTSN:	TAS	TITLE	Ford Front Cab, Over Head Cab, Electrical Panel Assembly
DATE:	02/04/15	DWG NO	31-28-0993-15
		SHEET	1 OF 1



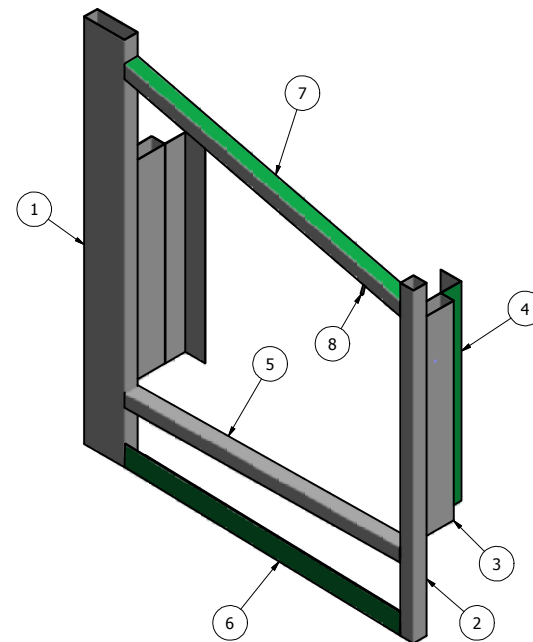
TOP VIEW



BACK VIEW



SIDE VIEW



ISOMETRIC VIEW

*** ALL MATERIALS ALUMINIZED ***

Note:

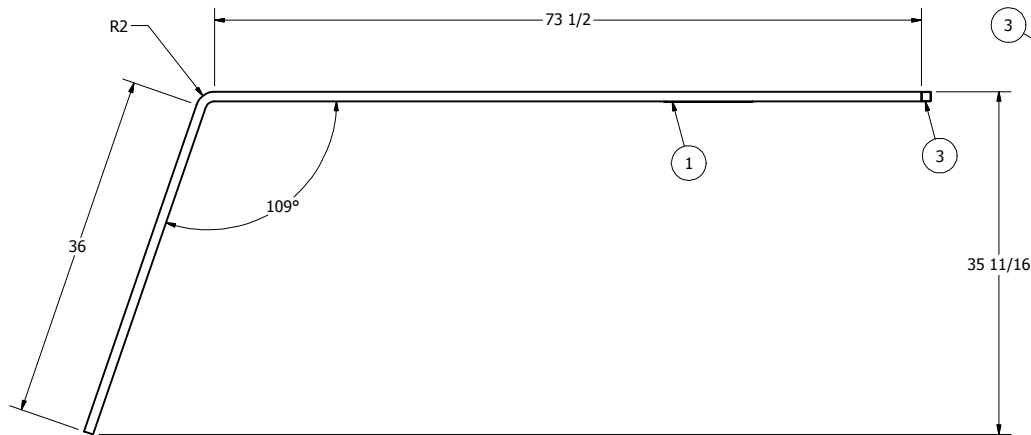
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Released For Production	9/21/07	ELF
31-28	"B"	Update From Auto Cad To Inventor... Updated To Match What Production Is Currently Building	11/14/07	TAS
31-28				

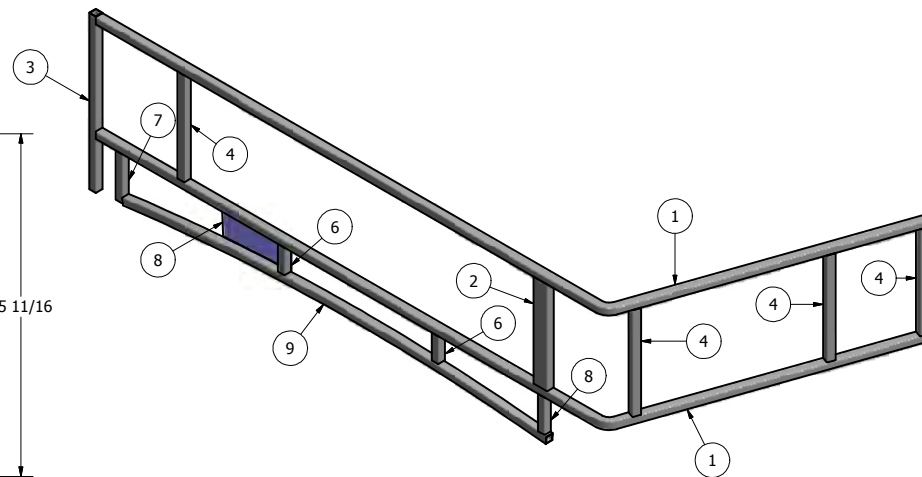
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1x3x27.25	Steel Tube 16ga. 1"x 3"x 27-1/4"
2	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
3	2	1x2x14	Steel Tube 16ga. 1"x 2"x 14"
4	2	02071056-14	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 14" lg. A-513
5	1	1x1x20.25	Steel Tube 16ga. 1"x 1"x 20-1/4"
6	1	02071056-20.25	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 20-1/4" lg. A-513
7	1	1x1x21.125 Angle Cut	Steel Tube 16 ga. 1"x 1"x 15-1/4" Angle Cut
8	1	.25-20 x 1.25 Stud Grade 8	1/2" 13 x 2" Grade 8 Hex Head Bolt



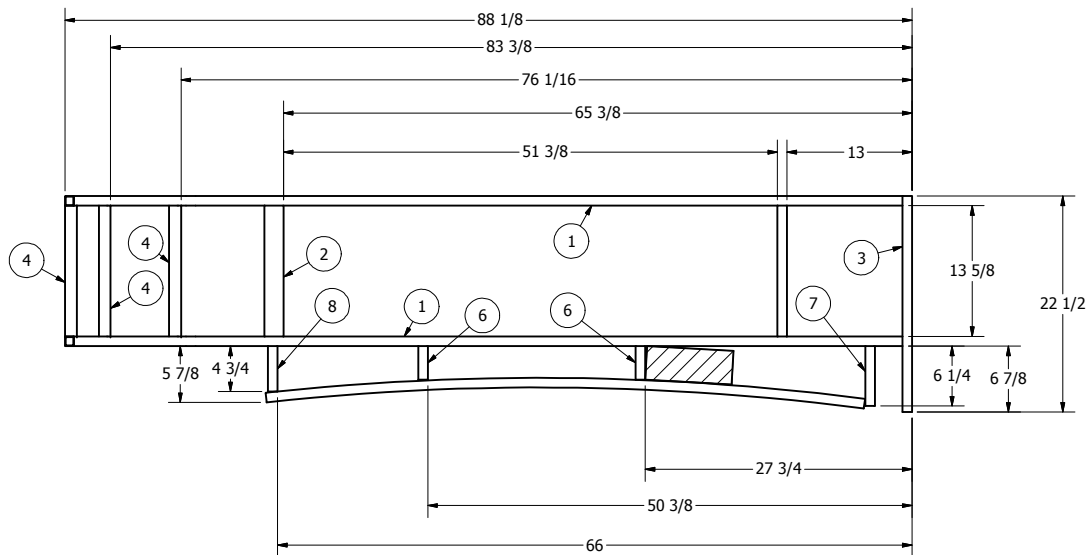
DFTSN:	TAS	TITLE	Ford Electrical Panel Frame
DATE:	11/07/11	DWG NO	31-28-0299-11
		SHEET	1 OF 1



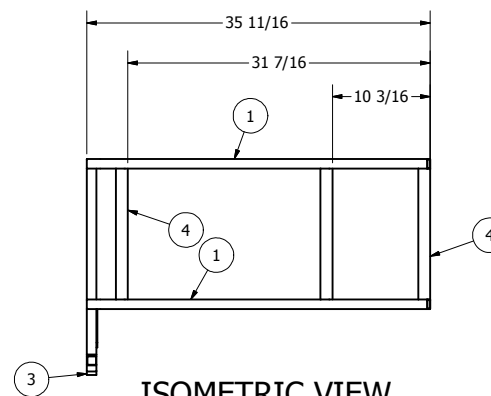
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



ISOMETRIC VIEW

ALL MATERIALS ALUMINIZED

Note:

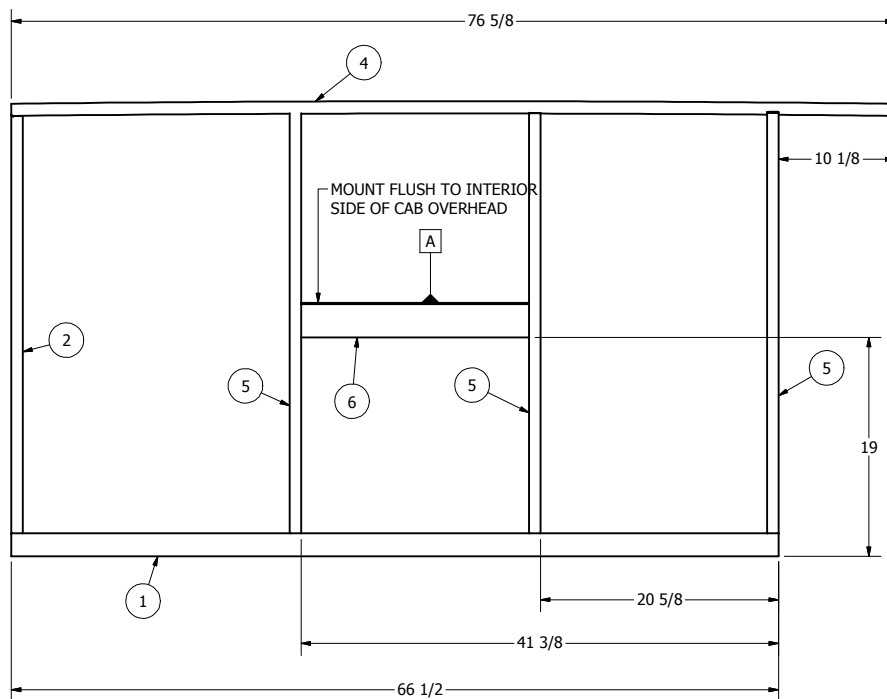
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Release To Production	10/26/2007	ELF
31-28	"B"	Changed Length of The Wrap Around Tubes	04/28/09	MDK
31-28	"C"	Update From Auto Cad Ton Inventor.. Updated To Match What Production Is Currently Building	11/14/2011	TAS
31-28	"D"	New Revised Standard 2015 Halo	02/05/2015	TAS

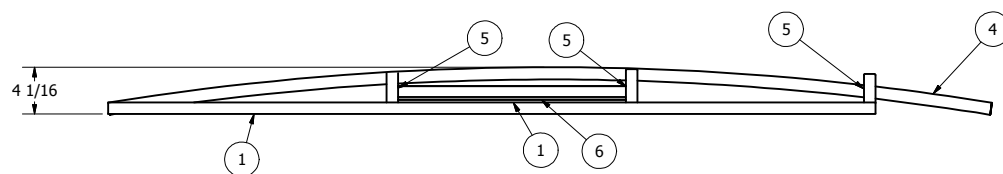
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	31-28-0747-11	Ford 1"x 1"x 16ga. Front Wrap Steel Tube
2	2	1x2x13.625	Steel Tube 16ga. 1"x 2"x 13-5/8"
3	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
4	5	1x1x13.625	Steel Tube 16ga. 1"x 1-1"x 13-5/8"
5	1	1x1x15.625	Steel Tube 16ga. 1"x 1"x 15-5/8"
6	2	1x1x3.5	Steel Tube 16ga. 1"x 1"x 3-1/2"
7	1	1x1x6.25	Steel Tube 16ga. 1"x 1"x 6-1/4"
8	1	1x1x4.75	Steel Tube 16ga. 1"x 1"x 4-3/4"
9	1	1 x 1 66.25 CAB CURVE	Ford 1"x 1"x 62-1/4" Steel Cab Radius Tube
10	1	1x1x4.375	Steel Tube 16ga. 1"x 1"x 4-3/8"



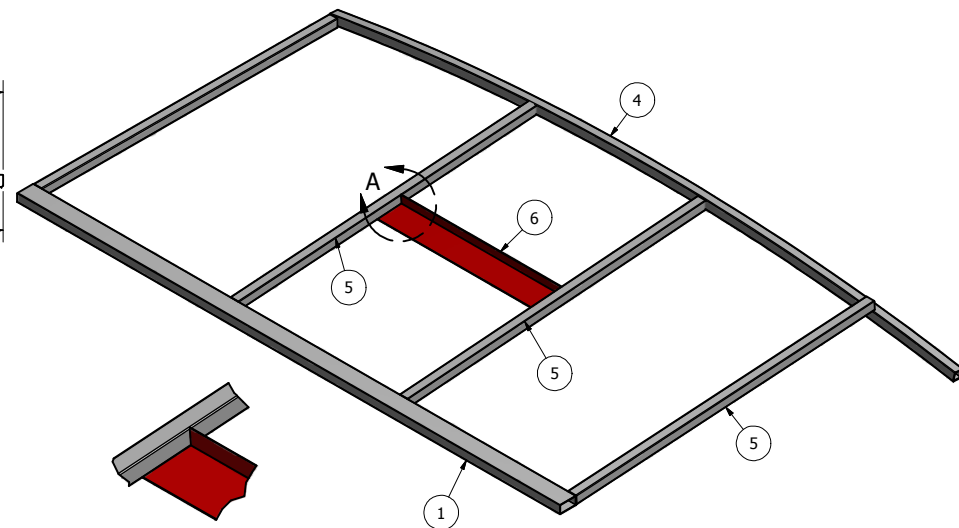
DFTSN:	TAS	TITLE	FORD Front Cab Wrap Around
DATE:	11/07/11	DWG NO	31-28-0307-11
		SHEET	1 OF 1



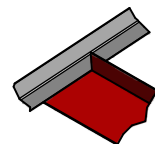
Top View



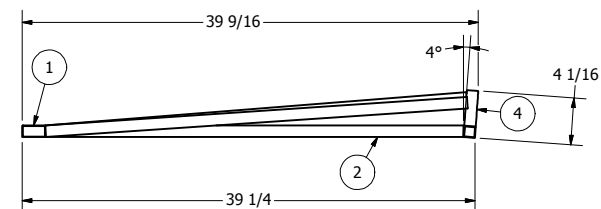
Front View



Isometric View



DETAIL A
SCALE 0.24 : 1



Side View

Note:

1). Viewed from Exterior.

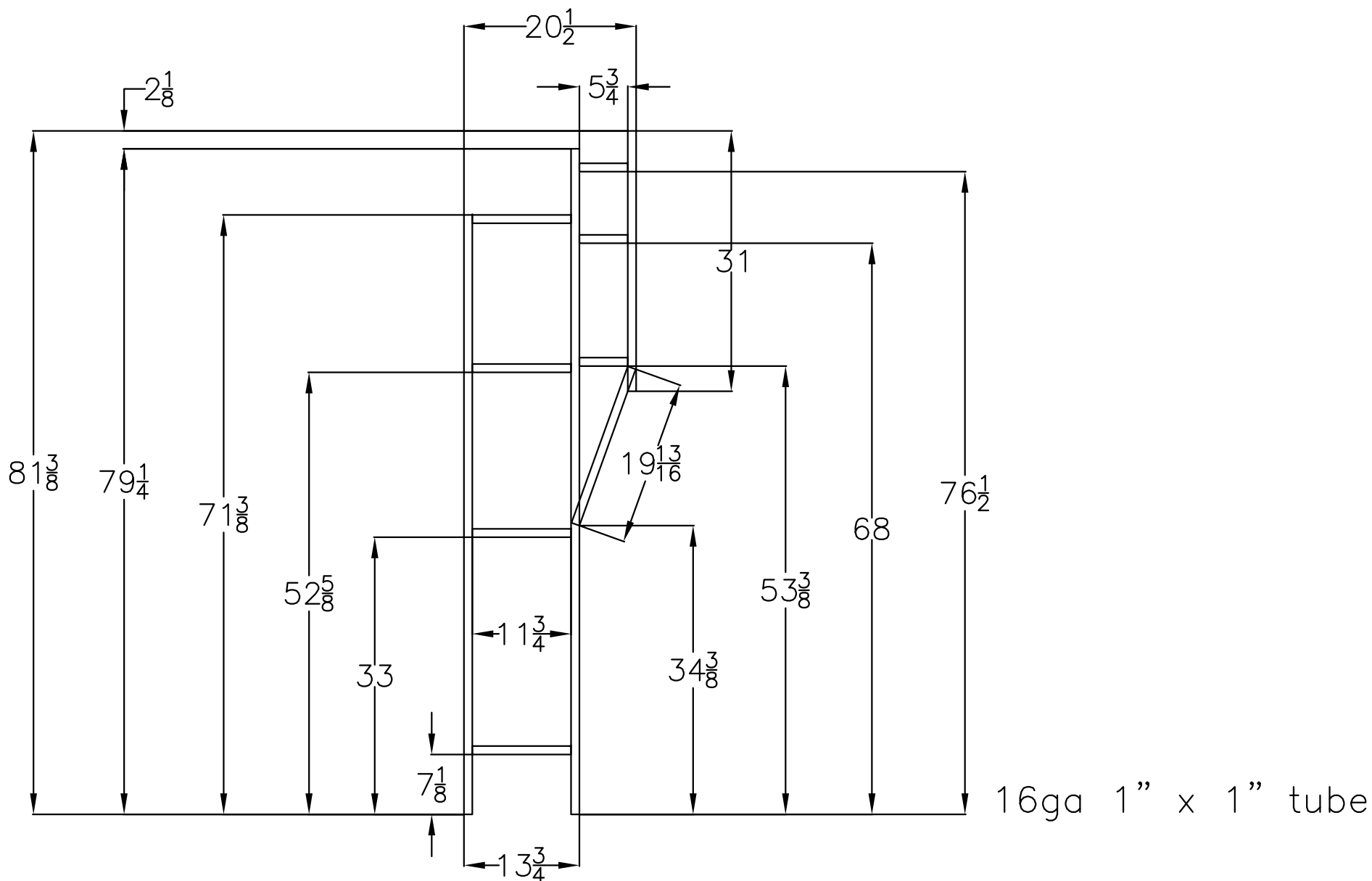
ALL MATERIALS ALUMINIZED

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1x2x66.5	Steel Tube 16ga. 1"x 2"x 66-1/2"
2	1	1x1x36.25	Tube 16ga. 1"x 1"x 36-1/4"
3	1	1x3x7	Steel Tube 16ga. 1"x 3"x 7"
4	1	31-28-0750-11	Ford Allstar Radius Tube 1"x 1"x 76-5/8"
5	3	1x1x36.625	Aluminized Steel Tube 16ga. 1"x 1"x 36-5/8"
6	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513
11	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513



DFTSN:	TAS	TITLE	FORD New Syle Cab Overhead
DATE:	11/07/11	DWG NO	31-28-0745-11
		SHEET	1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	ADDED ANGLE FOR BACKER CENTER CEILING STRIPE	3/22/2015	TAS

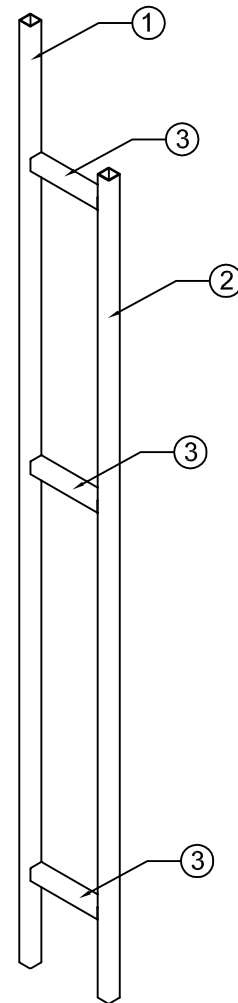
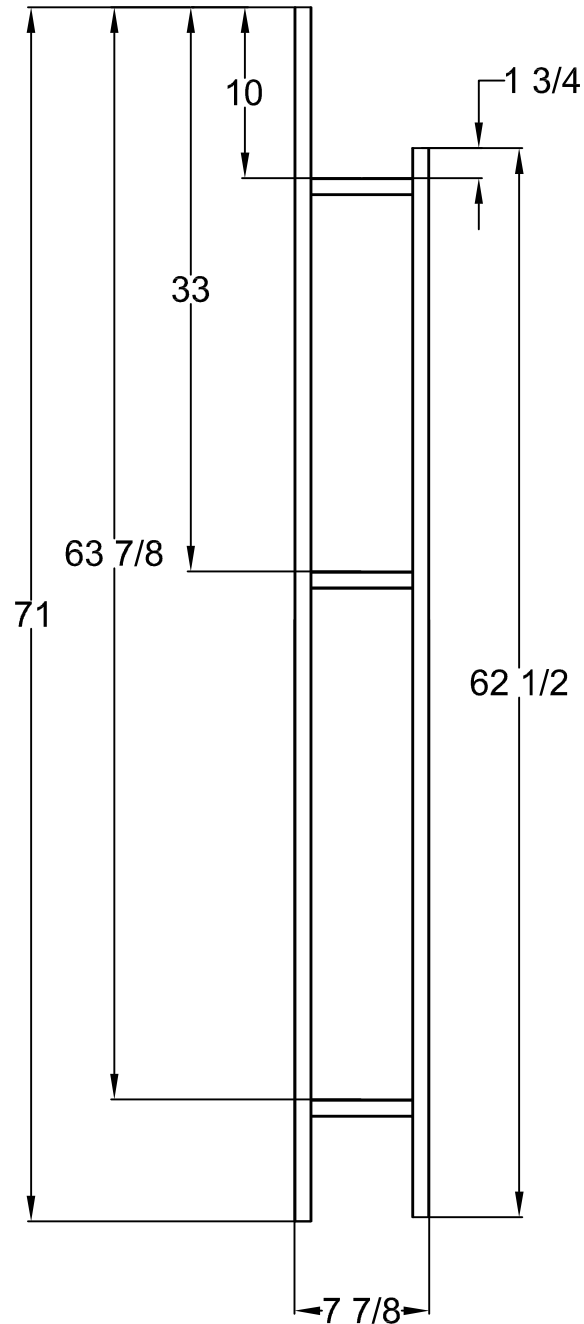


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REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		 a division of Forest River, Inc.	
WOOD	OTHER	DATE: 7/27/17	TITLE: streetside pillar
± 1/8"	± 1/16"	NAME: MK	
± 1"	± 1/2"	DWG. No. 31-28-0955-14	



16ga 1" x 1" tube

ALL MATERIALS ALUMINIZED

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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

± 1"

± 1/2"

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

DATE: 7/27/17
NAME: MK
DWG. No.


TITLE:

curbside pillar

Glaval Bus a division of Forest River, Inc.



*****ALL MATERIALS ALUMINIZED*****

					TOLERANCE UNLESS OTHERWISE SPECIFIED		 Glaval Bus <i>a division of Forest River, Inc.</i>	
					WOOD	OTHER	DATE: 06/30/17	TITLE: RAISED FLOOR-3
					± 1/8"	± 1/16"	NAME: RTS	STEP FALSE FLOOR ASSEMBLY
REV. LET.	DESCRIPTION OF CHANGE				BY	DATE	ECN No.	± 1* ± 1/2* DWG. No. 31-28-0531-17C



The following information is submitted for all Glaval Bus products proposed on this bid as supporting documentation of the structural soundness and impact resistance of the bodies manufactured. All vehicles are built using virtually the same materials with some minor differences in the height and width of cross members due to entry floor heights and/or body width variations.

A representative set of construction prints provided by engineering supplements this verbal accounting of our materials and assembly specifications.

If, in the reviewing of these written technical specifications and engineering frame prints submitted any questions arise, please contact us immediately for any clarification or help in interpretation and understanding.

3.0 Body Construction – General Frame Construction

Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral steel frame that is mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

3.0.1 Floor frame construction and assembly –

- 3.0.1.1 Cross Members -- The floor cross members form the base structural support for the rest of the frame components. Our cross members are constructed of 14 gauge aluminized steel, formed to a capital “C” shape. Cross members over the fuel tank are made to provide the clearance needed to conform with FMVSS301, and include formed internal reinforcements welded in place for additional strength. All additional longitudinal and latitudinal structure is flush welded in place to form a one piece floor upon completion.
- 3.0.1.2 Aluminized steel “Hat Posts” – 1”x1”x4” run the length of the floor between cross members and are welded into place. This extremely strong form is used to weld our HSLA steel seat track in place.
- 3.0.1.3 Aluminized steel C Channel – 1”x1.5” C channel is welded in between cross members the full length of the floor in 5 places. Coupled with the Hat Posts this provides a one-piece strong “ladder” type frame for the flooring.
- 3.0.1.4 Seat Track – 12 gauge roll formed high strength/low alloy steel is wire welded in place for seat mounting down each side of the bus, with lengths predicated on the floor plan chosen. This is yet another stiffener in our extensive construction process.



- 3.0.1.5 Wheel Wells -- Constructed of 14 gauge ALUMINIZED steel, wheel wells are also welded in during the floor construction process. All seams in the wheel well are welded to create a one piece water resistant wheel housing structure. The wheel wells also provide additional strength to the body assembly, when welded in place.
- 3.0.1.6 Structural Aluminized steel Angle – 1/8” thick 1.5” x 2.5” structural aluminized steel angle is used the full perimeter length of each floor assembly, welded to the ends of all floor cross members. This provides not only a flat plane for joining the sidewall assembly, but also ties all cross members together and provides additional side impact resistance.
- 3.0.1.7 Additional structure – When adding vertical stanchions, wheel chair lifts and/or tie down options, additional structure is welded into the floor at locations specified by our engineering department on CAD drawings.

3.0.2 Sidewall Construction –

- 3.0.2.1 Sidewall vertical member – The heart of our sidewall is the vertical structure, a roll formed 18 gauge aluminized steel 1.5" x 2" tube that provides strength and rigidity. The vertical member is installed in full lengths and in shorter sections below window frames. Additional vertical structure is used at both ends of the sidewall enabling the structure to withstand the forces applied by the vehicle when in motion.
- 3.0.2.2 Aluminized steel Tubing – 1.5”x1” lower and 1.5”x3” upper 16 gauge aluminized steel tubing is welded in horizontally between vertical members to frame in window openings. This adds front to rear reinforcement as well.
- 3.0.2.3 Seat Track – 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall below the window frame. While serving as a seat attaching device, it adds excellent structure to the sidewall and also adds excellent side impact resistance.
- 3.0.2.4 Wheelchair Options – Add another layer of metal. Depending on track locations, another structure of 11 gauge thick aluminized steel is welded in place between each vertical member for attaching a shoulder belt mount. Also, additional structure is added to accommodate wheelchair door frames – either 1.5”x1” or 1.5”x2” 16 gauge wall aluinizd steel tubing..
- 3.0.2.5 Full length glavanized steel tubing – 1.5”x1” 16 gauge aluinizd steel tubing is stitch welded to the sidewall bottom and top at each vertical member for attaching to the floor and roof sections, respectively.

3.0.3 Rear Wall Construction –

- 3.0.3.1 Rear wall vertical member – The vertical sidewall 1.5"x 2" aluminized steel tube is also used in the rear wall assembly. Full length structure is used at varying places,



depending on choice of rear window, or rear door. Shorter cut pieces are used above windows and doors. Additional side windows used with the rear door also change the configuration.

3.0.3.2 Aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded horizontally between vertical members to provide a window frame in the standard product, and used as an upper door frame in the optional rear assembly.

3.0.3.3 Full length aluminized steel tubing – 1.5"x1" 16 gauge aluminized steel tubing stitch welded to the rear wall top and bottom as in the sidewall

assembly. **3.0.4 Roof Construction –**

3.0.4.1 Roof Bows – Radius formed one-piece 16 gauge aluminized steel roof bows formed as a modified hat post design with eight bends for exceptional strength and located on 16" centers (the closest in the industry), including 4 bends in the web that allows for the roof structure to be capable of taking severe loads. They are then capped with top flat pieces from flange to flange to provide abundant surface area for securing the exterior roof material.

3.0.4.2 aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" x 3" 16 gauge aluminized steel tubing to all upper window openings as required. A full perimeter is also welded on to mate the roof to the sidewall and rear wall, with short vertical pieces providing support on the front and rear ends. The 3" wide aluminized steel tube supplies a structural mounting surface for shoulder belt attachment and has been pull tested to federal standards.

3.0.5 Driver Compartment Overhead Halo –

3.0.5.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is cut and jig welded into an integrated one piece structure spanning from the front roof bow of the body to the newly cut roof line of the cab. Also created during the structure manufacture is the housing for mounting the electronic circuit board.

3.0.5.2 11 Gauge aluminized steel – formed to make brackets used to mount to the chassis roof.

3.0.6 False Floor (Cab to body transition) –

3.0.6.1 aluminized steel Tubing – 2" x 2" 16 gauge aluminized steel tubing is welded together forming a flat body floor transition from the step area back to the actual body area. An overhang on the curbside provides a secure attach point frontally for the entry door frame added later.

3.0.6.2 Structural aluminized steel angle – 11 gauge 1.5"x1.5" structural angle is added in

short lengths five places to provide attachment points to the chassis floor.



3.0.7 Interior Vertical Transition Frames –

3.0.7.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is used vertically and a ladder type assembly is made welding the 1x 1 tube to .75"x.75" 11 gauge aluminized steel tube that is used horizontally in the assemblies. These pieces transition from the body fronts on each side to the driver halo side assembly and the entry door frame assembly on the curbside.

3.0.8 Entry Door & Step Assembly Frame –

3.0.8.1 aluminized steel Tubing – 1"x1" 16 gauge and .75"x.75" 11 gauge aluminized steel tube is cut to length and welded together in a ladder type construction forming a rigid frame for attaching the entry door/step assembly.

3.0.9 Entry Door/Step Assembly –

3.0.9.1 11 Gauge aluminized steel – The step riser/tread piece is manufactured from one-piece 11 gauge aluminized steel and uses 90° bends at all risers and treads. The bottom tread also adds an additional 90° bend for additional strength and safety. Upper and lower side pieces are then attached and an 11 gauge flat plate with holes is used to bridge the lower and upper side pieces, then is stitch welded and plug welded to form a strong one piece assembly prior to inserting and welding to the entry step framing.

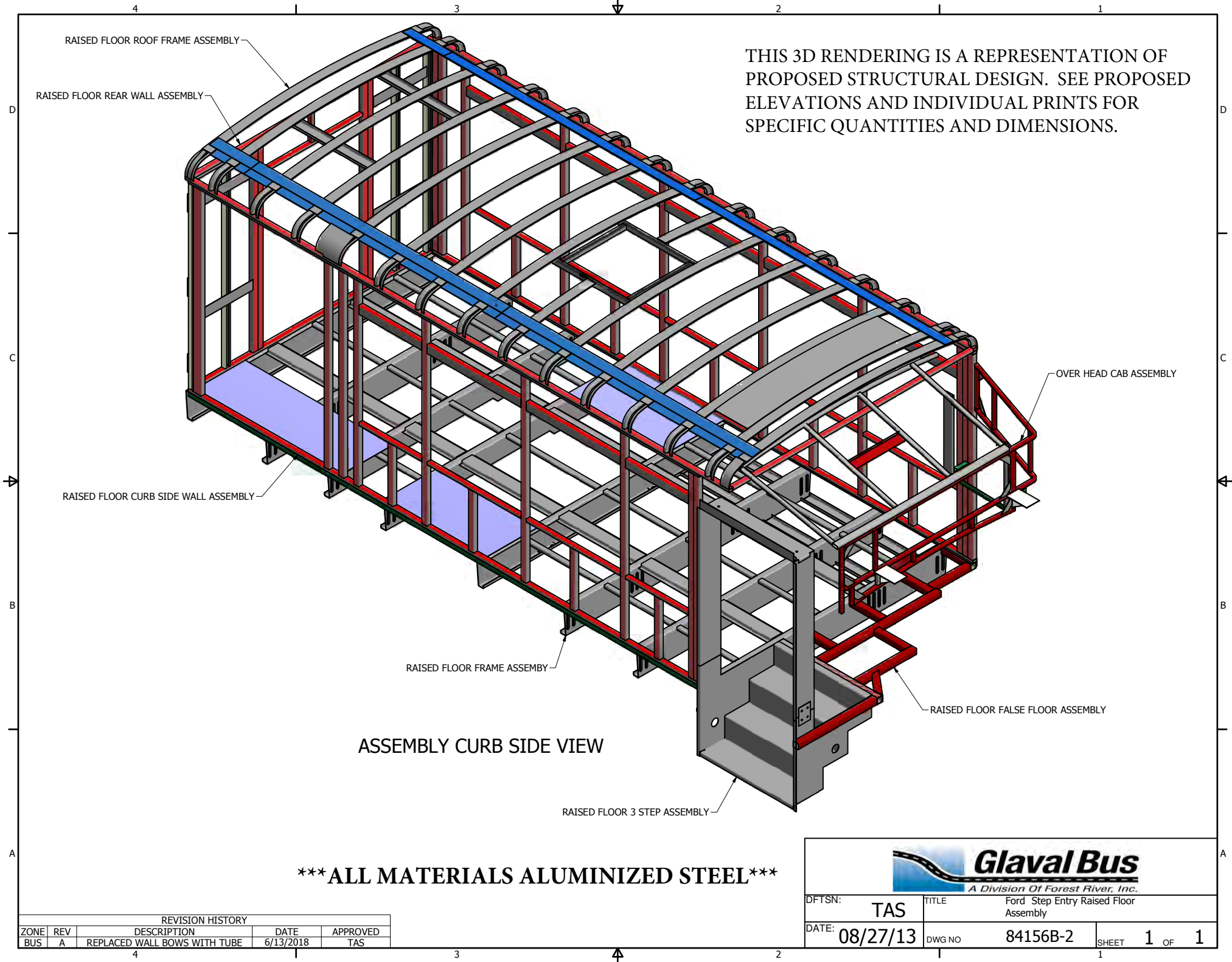
APPLICATION OF EXTERIOR SIDEWALL MATERIAL

GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

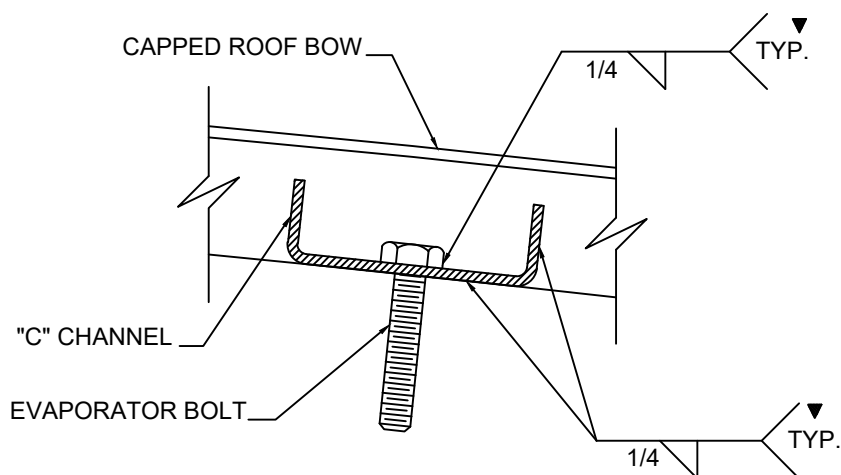
The exterior is .024" galvanized steel pre-painted white with an underlayment of 5/32" luan. The interior is 5/32" luan covered with a light gray FRP or padded vinyl. The foam filled aluminized steel cage is placed in the center and all layers are adhered using a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

Composite FRP exterior sidewall panels are installed using the same method.

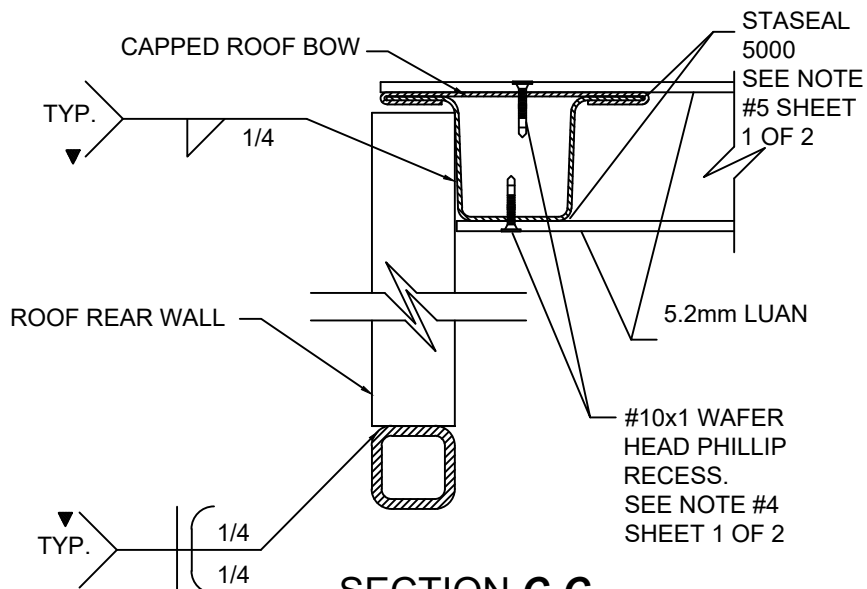
Should any further questions arise, please contact your Glaval Bus representative.



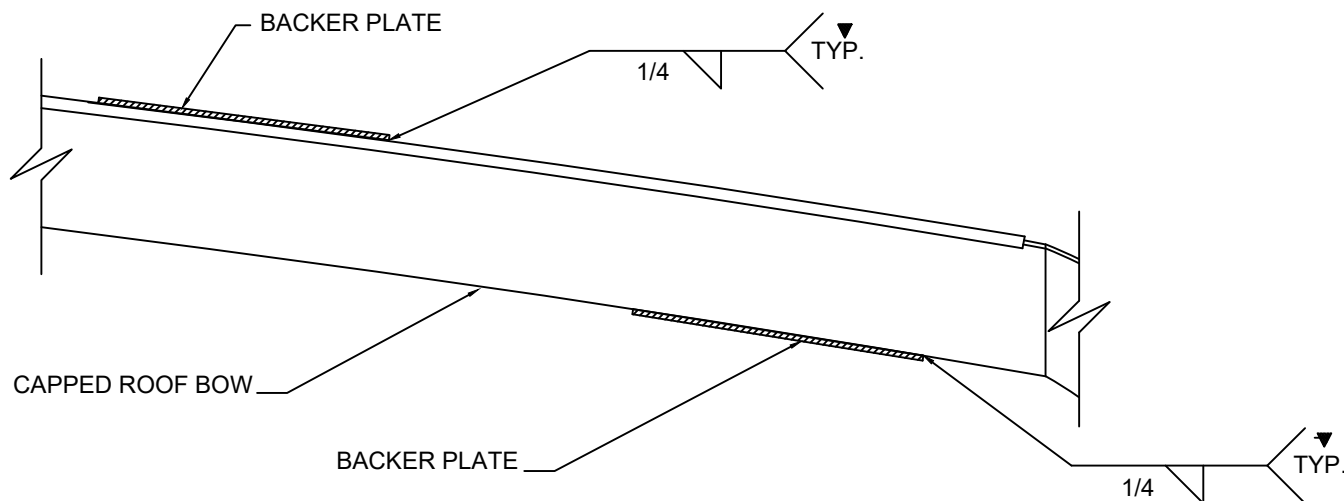
▼ CRITICAL CONTROL ITEM



SECTION A-A



SECTION C-C



SECTION *B-B*

T/A-71 NEW STYLE	33-5/8	30	10	12-1/4
ACC 23022 SERIES	38	20	10	14-3/4
ACC 23023 SERIES	33-5/8	28-3/4	10	14-3/4
T/A-77	18-1/4	59-1/2	10	10-3/8
T/A-73	28-1/4	39-1/2	10	9-1/2
T/A-71 OLD STYLE	33-5/8	28-3/4	10	12-1/4
T/A-70	36-3/4	22-1/2	10	11-5/8
T/A-30	31	34	10	9-1/2
EM-14 & RE-29	30-3/4	34-1/2	10	9-1/2
EM-6 & RE-10	36	24	10	9-1/2
EM-3 & RE-30	28-1/4	39-1/2	10	16
RE-15 & RE-20	28-1/4	39-1/2	10	9-1/2
EM-1 & EM-2	28-1/4	39-1/2	10	9-1/2
EM-7 GEN 5	36-1/8	23-3/4	10	9-1/2
EM-2 GEN 5	32-3/8	31-1/16	10	9-1/2
EM-1 GEN 5	28-3/16	39-5/8	10	9-1/2
EVAPORATOR MODEL	A-1	A-2	B-1	B-2

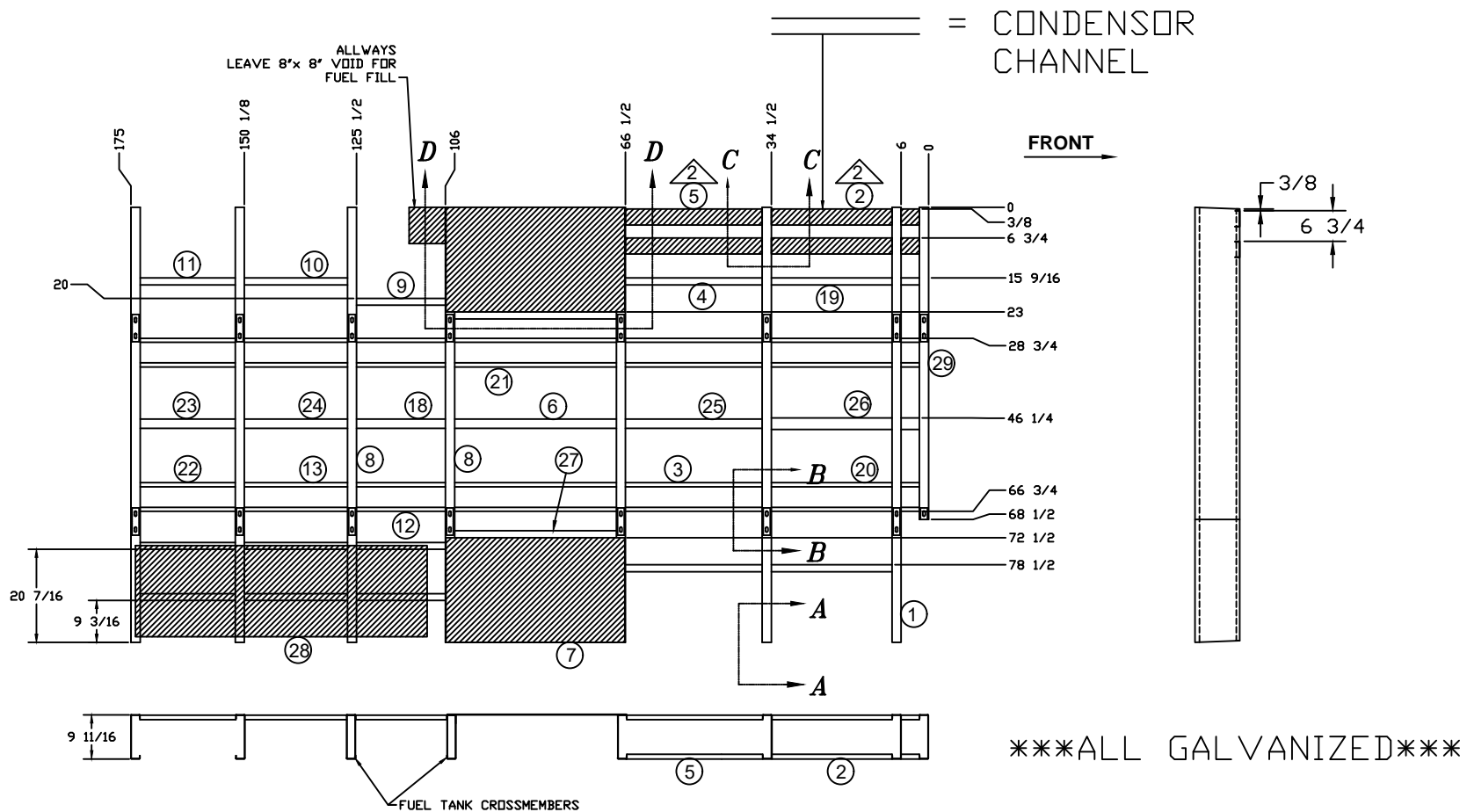
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REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		 Glaval Bus a division of Forest River, Inc.	
WOOD	OTHER	DATE: 06/11/18	TITLE: 158" WHEEL BASE MODEL 24
+ 1/8"	+ 1/16"	NAME: MKLINE	ROOF FRAME, DETAILS SINGLE HATCH
+ 1°	+ 1/2°	DWG. No	32-13-0017-18

▼ CRITICAL CONTROL ITEM

USAGE: FORD 158" WHEEL BASE, MODEL 24



NOTES:

- 1- DRAWING VIEWED FROM INTERIOR SIDE OF UNIT.
- 2- LOCATION OF A/C BRACKETS: ONE MOUNT FLUSH WITH OUTSIDE EDGE OF CROSSMEMBER. THE OTHER MOUNTS 14-3/4" FROM OUTSIDE EDGE OF CROSSMEMBER.
- 3- SEE SHEET 2 OF 2 FOR DETAILS, TORQUE SPECIFICATIONS, SECTION VIEWS AND CUT LIST.

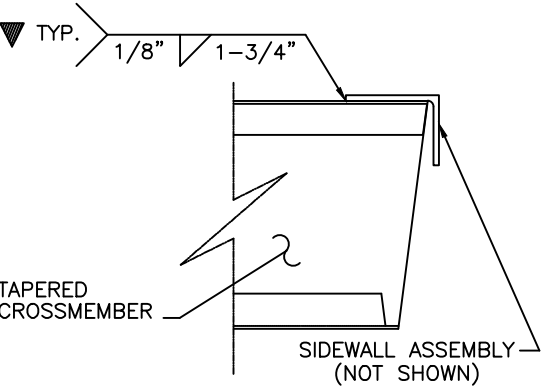
7	2	71002066	SHEET STEEL: 11ga. x 24" x 39-1/4" Lg. HRS
6	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 35-5/8" Lg.
5	2	70009046	"C" CHANNEL: 12ga. x 1" x 3-1/2" x 30" Lg.
4	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 30" Lg.
3	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 30" Lg. A-513
2	2		"C" CHANNEL: 12ga. x 1" x 3-1/2" x 26-1/2" Lg.
1	5	71009018	14ga. x 2 x 9-11/16 x 95-1/2 CROSSMEMBER A-365
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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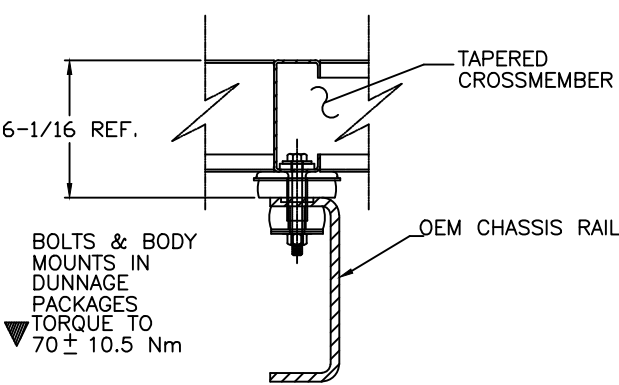
REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE		TITLE	
WOOD	OTHER	6/14/18	6/14/18	158" WB MODEL 24 FLOOR FRAME, RAISED FLOOR	
± 1/8"	± 1/16"	NAME: MKLINE		DWG. No. 32-13-0031-18 SPECIAL	
± 1"	± 1/2"				

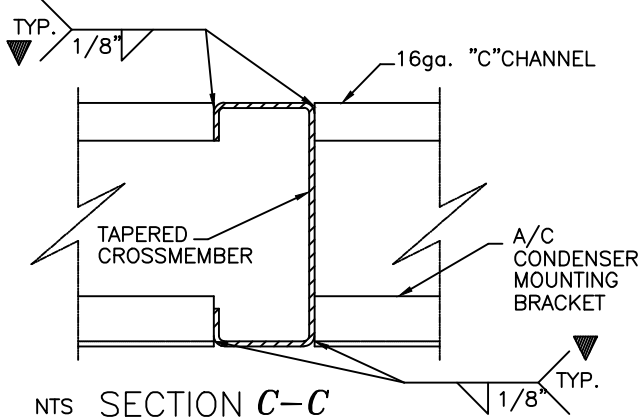
▼ CRITICAL CONTROL ITEM



NTS SECTION A-A



NTS SECTION B-B

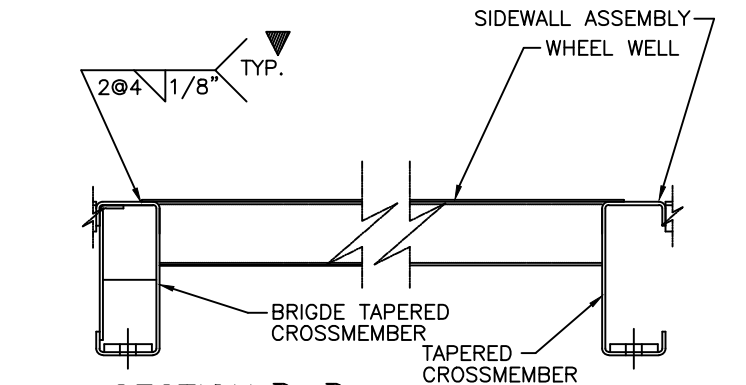


NTS SECTION C-C

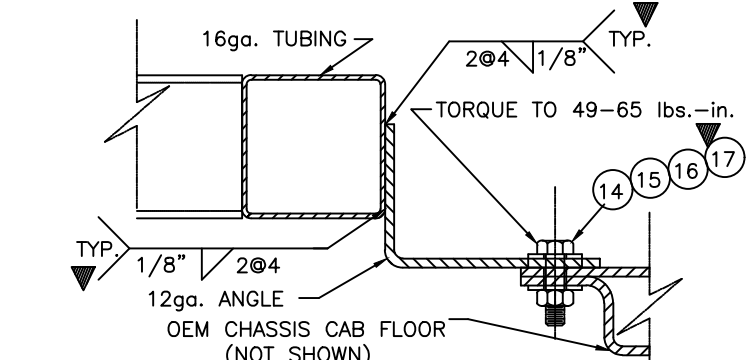
ALL GALVANIZED

29	1		14ga. x 2 x 9-11/16 x 68-1/2 CROSSMEMBER A-365
28	2		PLATE: 11ga. 20" x 64" Lg.
27	2	71002028	TUBE: 16ga. x 1-1/2" x 1-1/2" x 35-5/8" Lg. A-513
26	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 26-1/2" Lg.
25	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 30" Lg.
24	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 22-3/8" Lg.
23	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 20-7/8" Lg.
22	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 20-7/8" Lg. A-513
21	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 35-5/8" Lg. A-513
20	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 26-1/2" Lg. A-513
19	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 26-1/2" Lg.
18	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 19-3/4" Lg.
17	7	80052007	NUT, HEX HEAD 3/8-16 UNC GRADE 5 ZINC
16	7	80042015	WASHER MED LOCK 3/8 ZINC
15	14	80042007	WASHER 3/8 USS ZINC
14	7	80112051	BOLT, HEX HEAD 3/8-16 X 1 UNC GRADE 5 ZINC
13	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 22-3/8" Lg. A-513
12	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 19-3/4" Lg. A-513
11	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 20-7/8" Lg.
10	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 22-3/8" Lg.
9	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 19-3/4" Lg.
8	2	70009055	14ga. x 2 x 4-13/16 x 95-1/2 bridge crossmember

REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION
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NTS SECTION D-D



NTS DETAILS

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REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE		TITLE	
WOOD	OTHER	DATE	6/14/18	TITLE	158' WB MODEL 24
± 1/8"	± 1/16"	NAME	MKLINE	FLOOR FRAME, RAISED FLOOR	
± 1"	± 1/2"	DWG. No.	32-13-0031-18	SPECIAL	

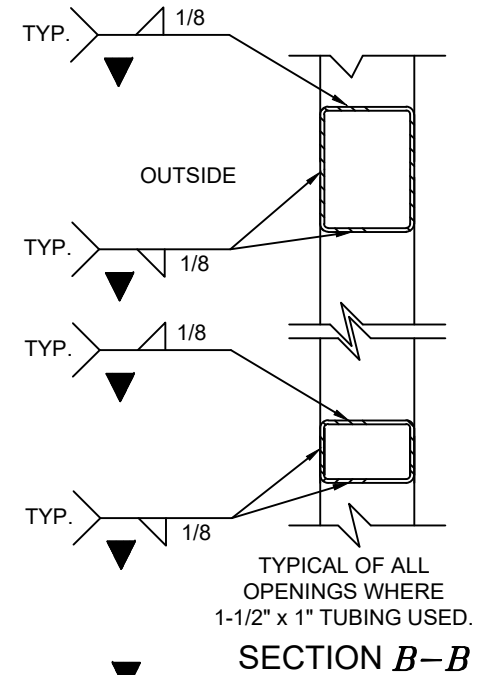
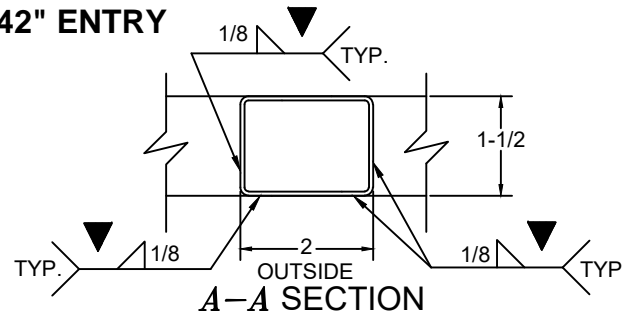
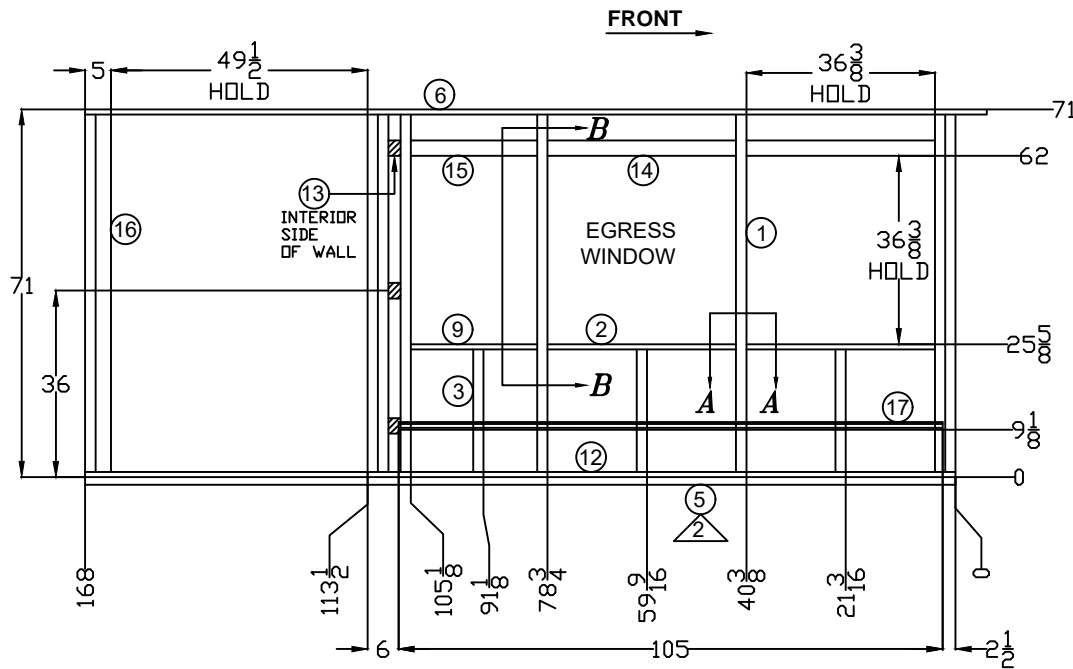


▼ CRITICAL CONTROL ITEM

USAGE: FORD 158"WB/MODEL 24, 42" ENTRY

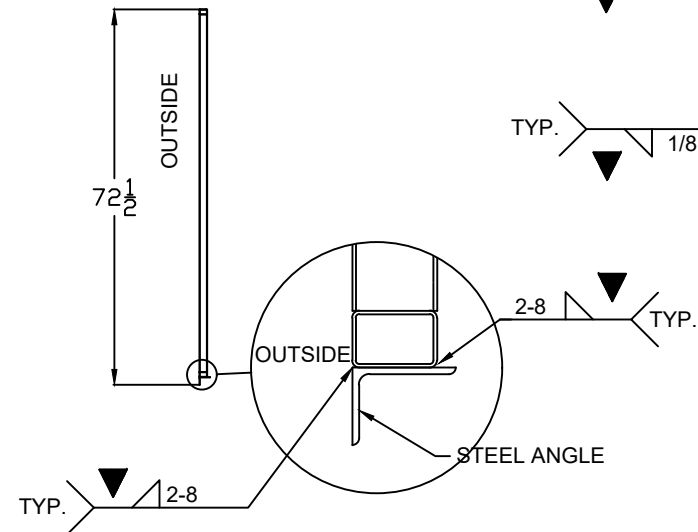
NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.



TYPICAL OF ALL OPENINGS WHERE 1-1/2" x 1" TUBING USED.

SECTION B-B



ALL MATERIALS GALVANIZED

8	0		FRAME, SIDEWALL WHEEL WELL FORD	17	1		SEAT TRACK: 105-1/2"Lg.
7	0		TUBE: 18ga. x 1-1/2" x 2" x 66-13/16"Lg. A-513	16	1		TUBE: 18ga. x 1-1/2" x 3" x 69"Lg. A-513
6	1		TUBE: 16ga. x 1-1/2" x 1" x 174"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 168"Lg. A-513	14	2		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 46-3/4"Lg. A-513	13	3		STRAP: 11ga. x 3" x 2-3/8"Lg. A-513
3	4		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 168"Lg. A-513
2	2		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 65-3/4"Lg. A-513
1	8		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 64-3/4"Lg. A-513
				9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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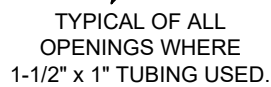
REV.	LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED	WOOD	OTHER	DATE: 6/14/18	TITLE: 158" WB MODEL 24, 42" ENTRY SIDEWALL, R. LIFT, RAISED FLOOR
± 1/8"	± 1/16"	NAME: MKLINE	DWG. No. 32-13-0030-18	SPECIAL 42 ENTRY
± 1"	± 1/2"			

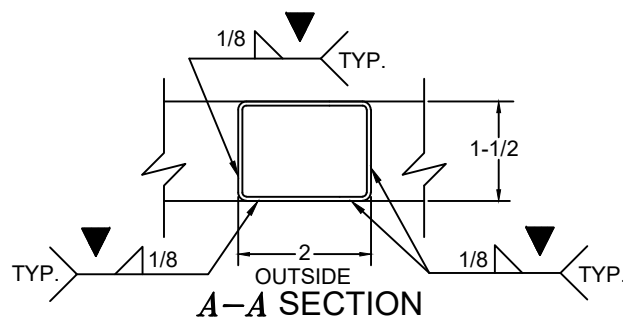
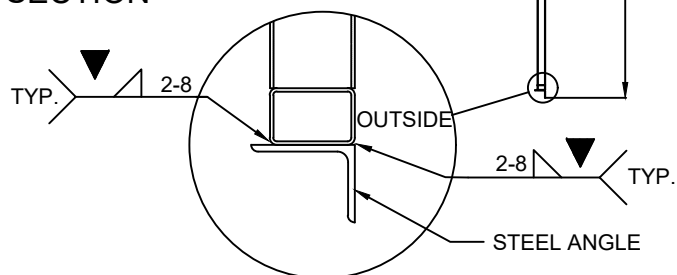


a division of Forest River, Inc.

USAGE: FORD 158"WB/MODEL 24

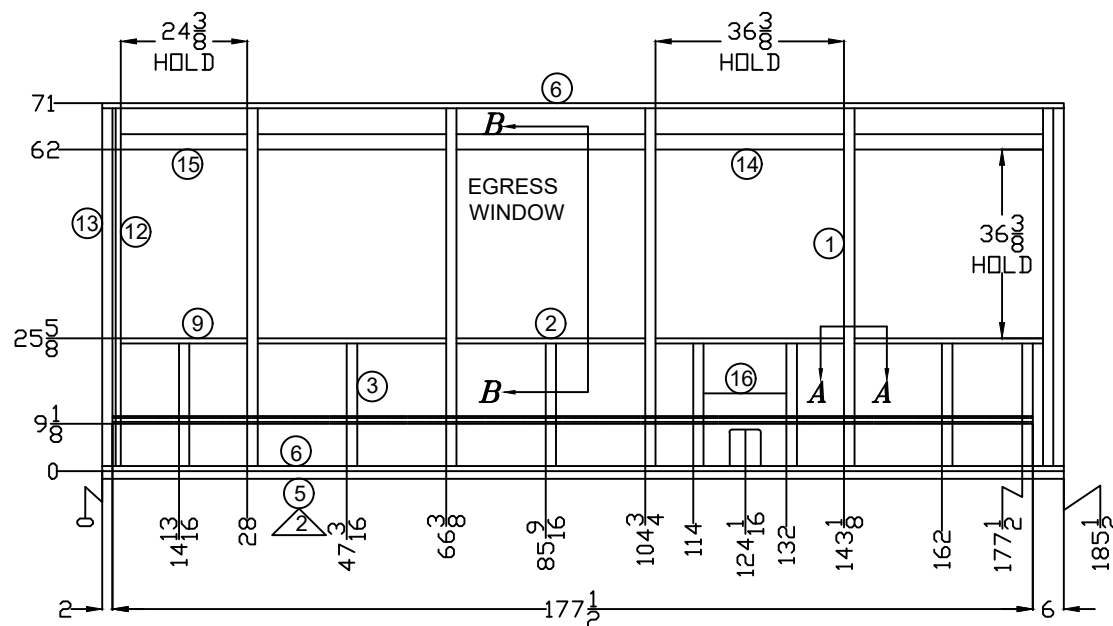


B-B SECTION



NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.



ALL MATERIALS GALVANIZED

ALL MATERIALS GALVANIZED				17	1		SEAT TRACK: 177-1/2"Lg.
8	0		FRAME, SIDEWALL WHEEL WELL FORD	16	1		FUEL FILL BACKER BOARD
7	0		TUBE: 18ga. x 1-1/2" x 2" x 70-7/8"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
6	2		TUBE: 16ga. x 1-1/2" x 1" x 185-1/2"Lg. A-513	14	4		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 185-1/2"Lg. A-513	13	2		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 79-9/16"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 69"Lg. A-513
3	7		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 70-3/16"Lg. A-513
2	4		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 70-3/16"Lg. A-513
1	5		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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D					
REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

	WOOD	OTHER
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$\pm 1/8"$	$\pm 1/16"$
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$\pm 1^\circ$	$\pm 1/2^\circ$
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a division of Forest River, Inc.

DATE: 6/13/18

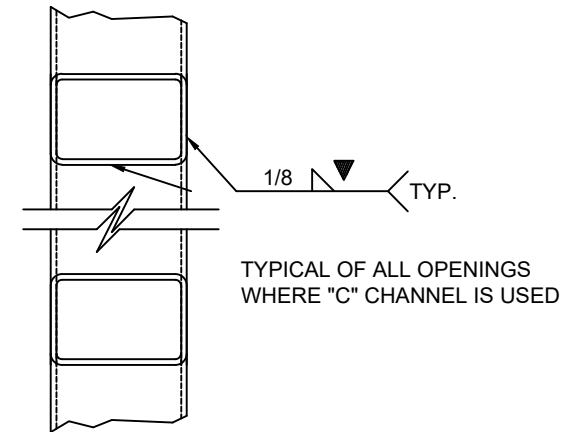
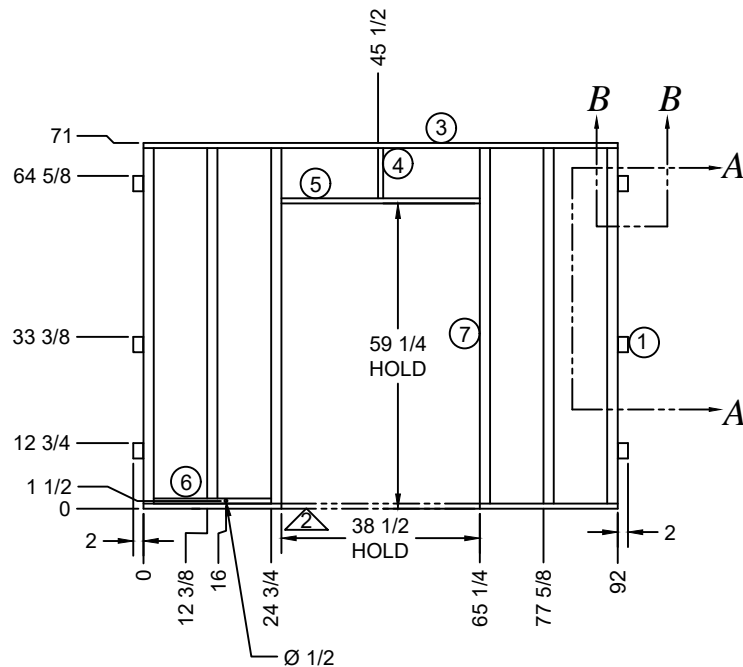
NAME: MKLINE

DWG. No.	3
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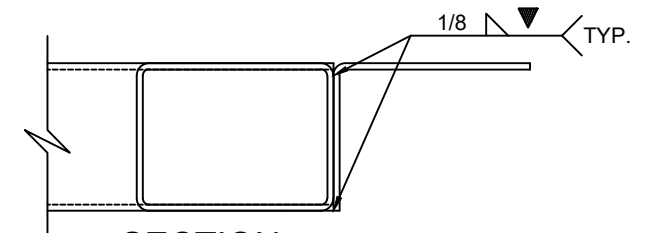
TITLE: 158" WB MODEL 24, DR. SIDEWALL
ALL PASS, RAISED FLOOR

▼ CRITICAL CONTROL ITEM

USAGE: Raised Floor w/ Rear Door, SPECIAL 1-1/2" THICK WALL



SECTION A-A



SECTION B-B

ALL MATERIALS aluminized

NOTES:

1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.

2- REMOVE STEEL TUBE IN DOOR AREA AFTER WALL MOUNT TO FLOOR
BUT BEFORE INSTALLING DOOR JAM ASSEMBLY.

7	6		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
6	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 10-3/8"Lg. A-513
5	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 38-1/2"Lg. A-513
4	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 9-3/4"Lg. A-513
3	2	02071055	TUBE: 16ga. x 1-1/2" x 1" x 92"Lg. A-513
2	0		
1	6		ANGLE: 16ga. x 1" x 2" x 6"Lg. A-513

REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION
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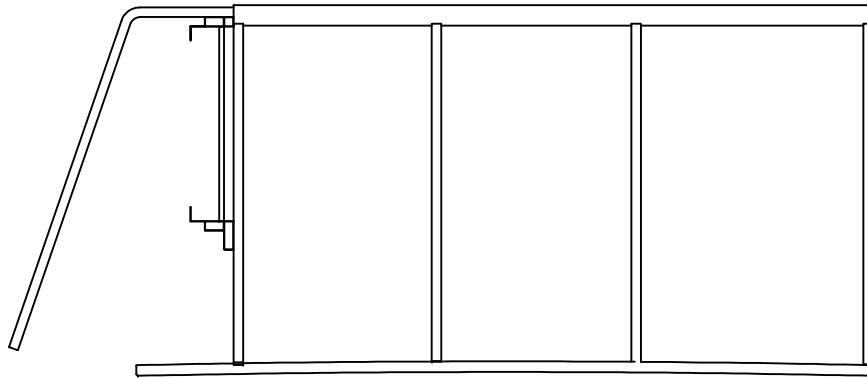
a division of Forest River, Inc.

DATE: 06/14/18	TITLE	Frame, Rear Wall Raised Floor With Door
DFTSN: MKLINE		
CHKR:	DWG. No.	31-28-0010-18 SPECIAL
APRVD:	SCALE	
	DISK No.	SHEET 1 OF 1

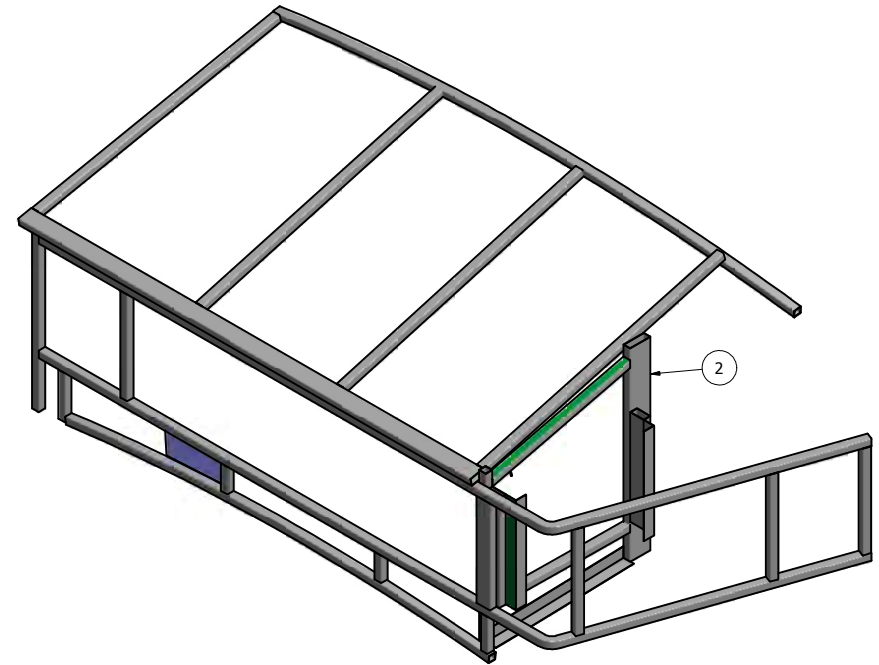
TOLERANCE UNLESS
OTHERWISE SPECIFIED
± .00 ± .030
± .000 ± .015
± .0000 ± .005

REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.
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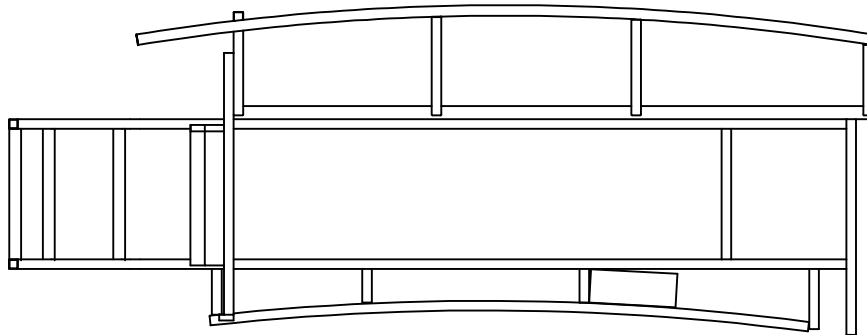
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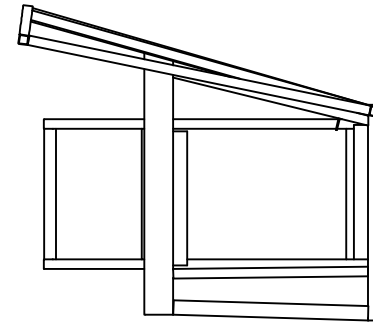
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



SIDE VIEW

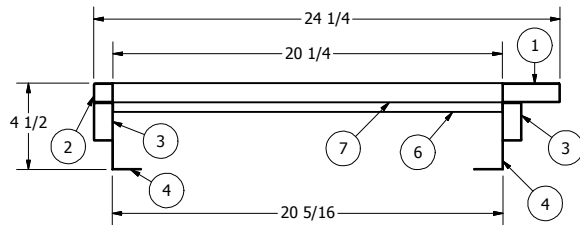
ALL MATERIALS ALUMINIZED

Note:

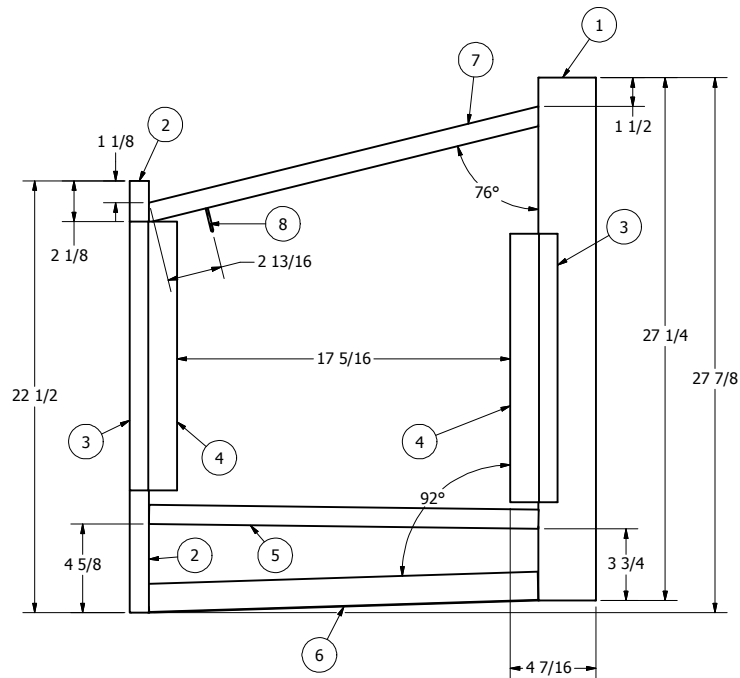
1). Viewed from Interior.

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	31-28-0307-11	FORD Front Cab Wrap Around
2	1	31-28-0299-11	Ford Electrical Panel Frame
3	1	31-28-0745-11	FORD Cab Overhead

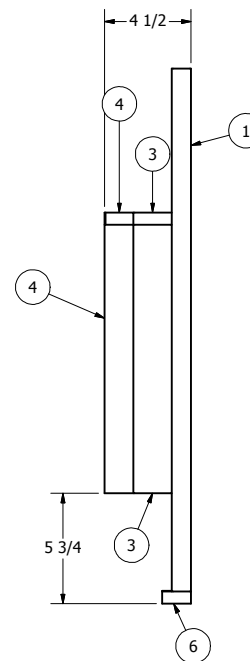
	
<i>A Division Of Forest River, Inc.</i>	
DFTSN: TAS	TITLE: Ford Front Cab, Over Head Cab, Electrical Panel Assembly
DATE: 02/04/15	DWG NO: 31-28-0993-15
SHEET 1 OF 1	



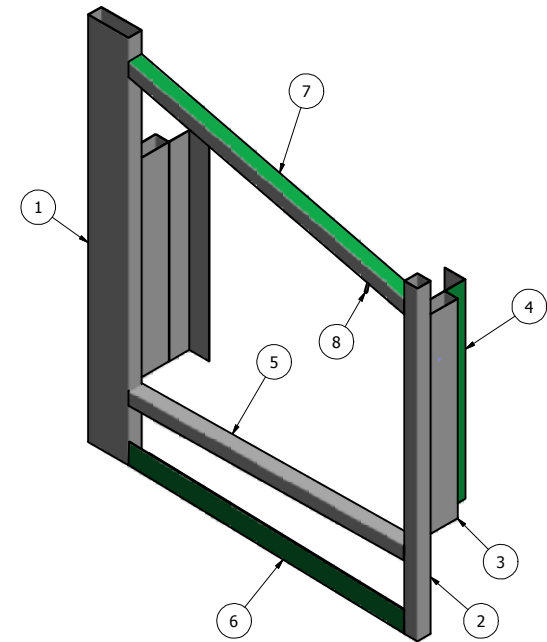
TOP VIEW



BACK VIEW



SIDE VIEW



ISOMETRIC VIEW

*** ALL MATERIALS ALUMINIZED ***

Note:

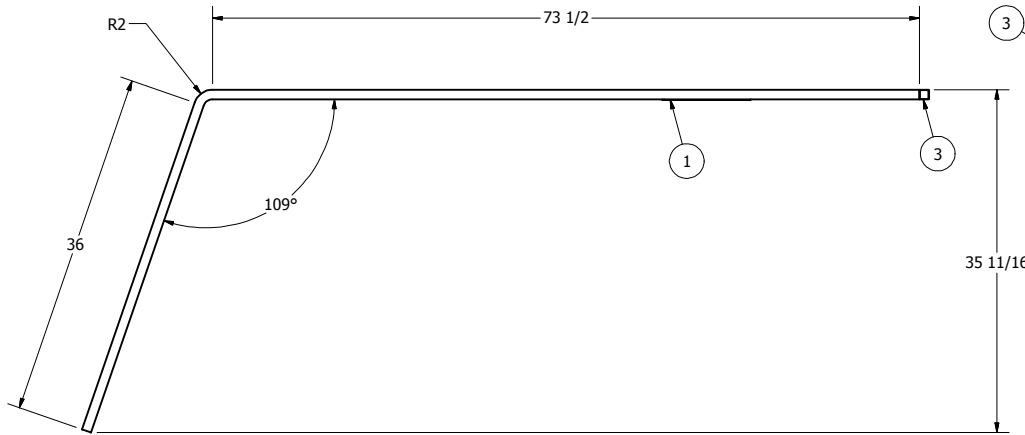
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Released For Production	9/21/07	ELF
31-28	"B"	Update From Auto Cad To Inventor... Updated To Match What Production Is Currently Building	11/14/07	TAS
31-28				

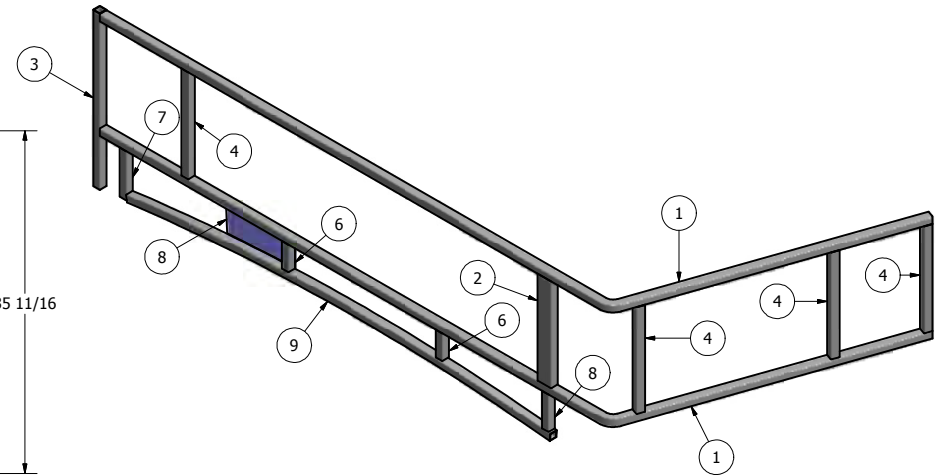
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1x3x27.25	Steel Tube 16ga. 1"x 3"x 27-1/4"
2	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
3	2	1x2x14	Steel Tube 16ga. 1"x 2"x 14"
4	2	02071056-14	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 14" Ig. A-513
5	1	1x1x20.25	Steel Tube 16ga. 1"x 1"x 20-1/4"
6	1	02071056-20.25	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 20-1/4" Ig. A-513
7	1	1x1x21.125 Angle Cut	Steel Tube 16 ga. 1"x 1"x 15-1/4" Angle Cut
8	1	.25-20 x 1.25 Stud Grade 8	1/2" 13 x 2" Grade 8 Hex Head Bolt



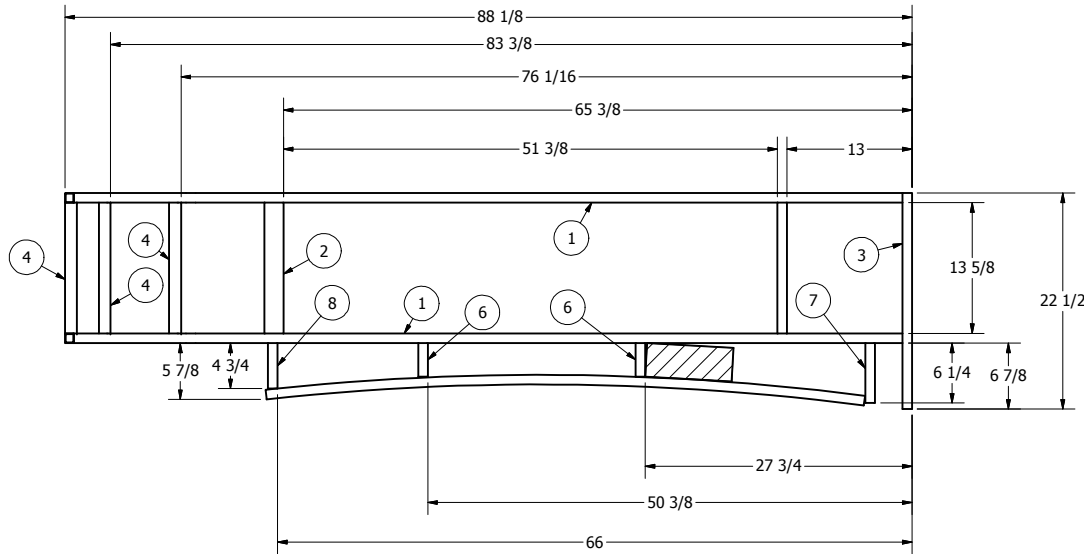
DFTSN:	TAS	TITLE	Ford Electrical Panel Frame
DATE:	11/07/11	DWG NO	31-28-0299-11
		SHEET	1 OF 1



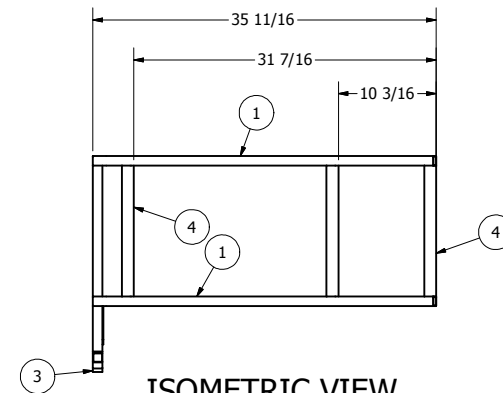
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



ISOMETRIC VIEW

ALL MATERIALS ALUMINIZED

Note:

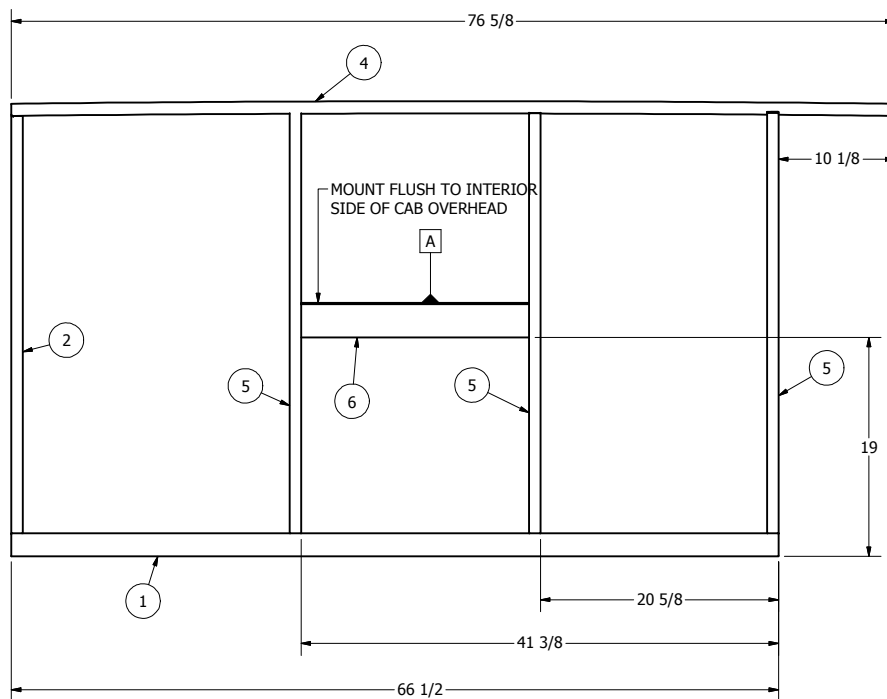
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Release To Production	10/26/2007	ELF
31-28	"B"	Changed Length of The Wrap Around Tubes	04/28/09	MDK
31-28	"C"	Update From Auto Cad Ton Inventor.. Updated To Match What Production Is Currently Building	11/14/2011	TAS
31-28	"D"	New Revised Standard 2015 Halo	02/05/2015	TAS

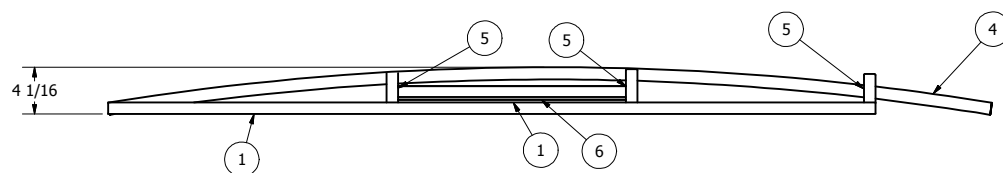
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	31-28-0747-11	Ford 1"x 1"x 16ga. Front Wrap Steel Tube
2	2	1x2x13.625	Steel Tube 16ga. 1"x 2"x 13-5/8"
3	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
4	5	1x1x13.625	Steel Tube 16ga. 1"x 1-1"x 13-5/8"
5	1	1x1x15.625	Steel Tube 16ga. 1"x 1"x 15-5/8"
6	2	1x1x3.5	Steel Tube 16ga. 1"x 1"x 3-1/2"
7	1	1x1x6.25	Steel Tube 16ga. 1"x 1"x 6-1/4"
8	1	1x1x4.75	Steel Tube 16ga. 1"x 1"x 4-3/4"
9	1	1 x1 66.25 CAB CURVE	Ford 1"x 1"x 62-1/4" Steel Cab Radius Tube
10	1	1x1x4.375	Steel Tube 16ga. 1"x 1"x 4-3/8"



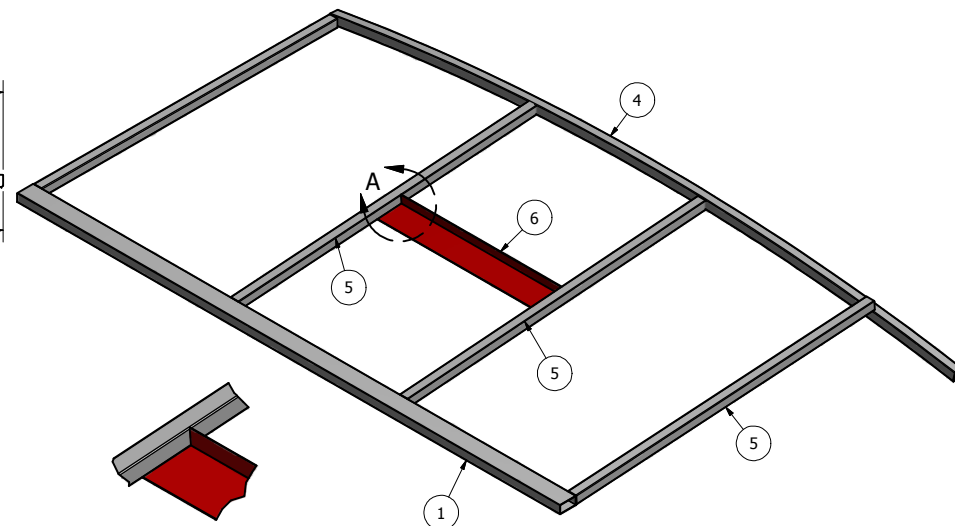
DFTSN:	TAS	TITLE	FORD Front Cab Wrap Around
DATE:	11/07/11	DWG NO	31-28-0307-11
		SHEET	1 OF 1



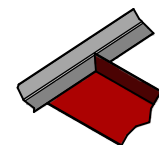
Top View



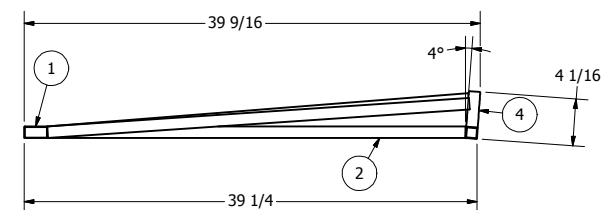
Front View



Isometric View



DETAIL A
SCALE 0.24 : 1



Side View

Note:

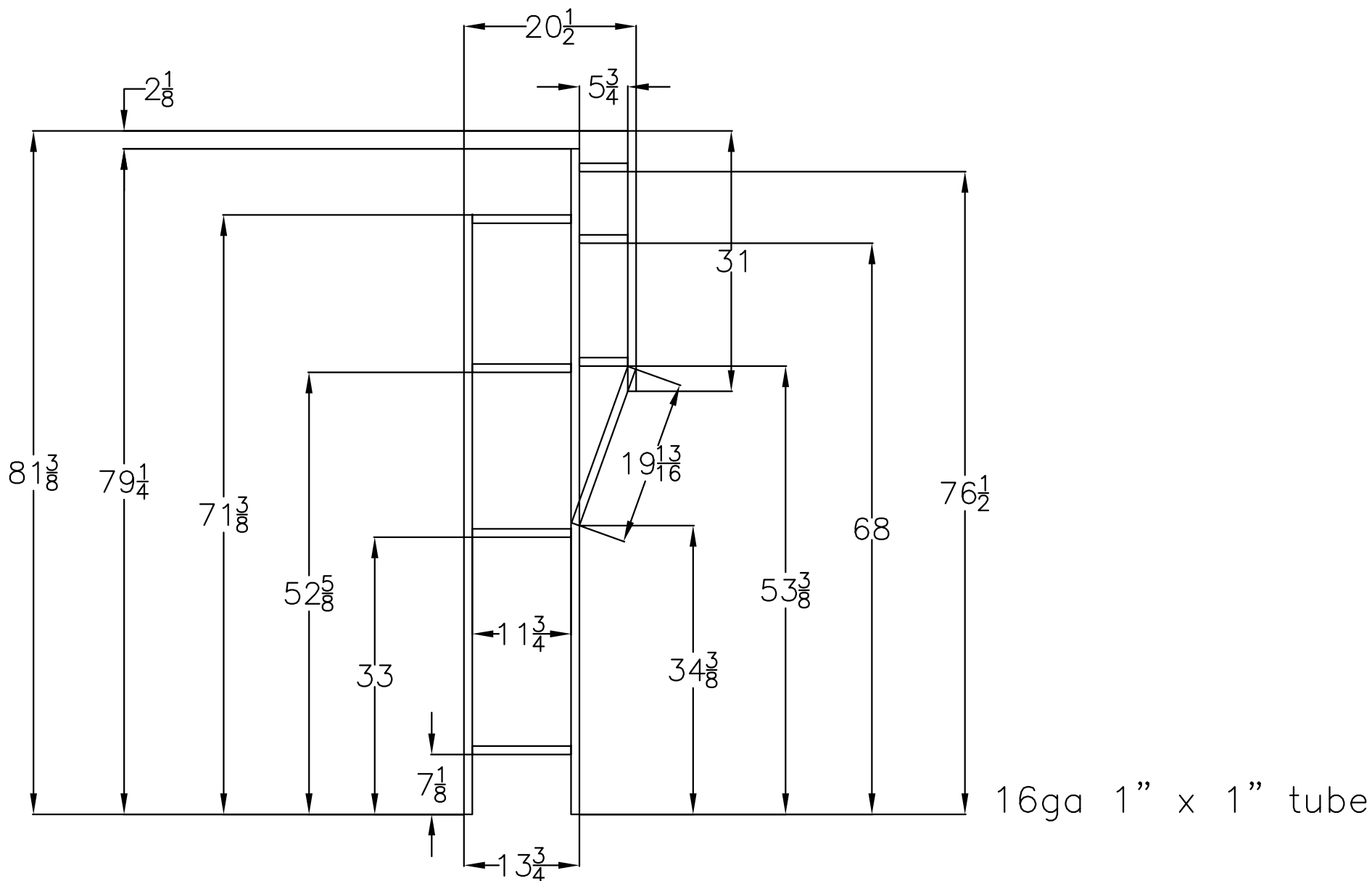
1). Viewed from Exterior.

ALL MATERIALS ALUMINIZED

Parts List				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	1x2x66.5	Steel Tube 16ga. 1"x 2"x 66-1/2"	
2	1	1x1x36.25	Tube 16ga. 1"x 1"x 36-1/4"	
3	1	1x3x7	Steel Tube 16ga. 1"x 3"x 7"	
4	1	31-28-0750-11	Ford Allstar Radius Tube 1"x 1"x 76-5/8"	
5	3	1x1x36.625	Aluminized Steel Tube 16ga. 1"x 1"x 36-5/8"	
6	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513	
11	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513	

DFTSN: TAS		TITLE: FORD New Syle Cab Overhead	
DATE: 11/07/11		DWG NO: 31-28-0745-11	SHEET 1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	ADDED ANGLE FOR BACKER CENTER CEILING STRIPE	3/22/2015	TAS



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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

± 1"

± 1/2"

Glaval Bus

a division of Forest River, Inc.

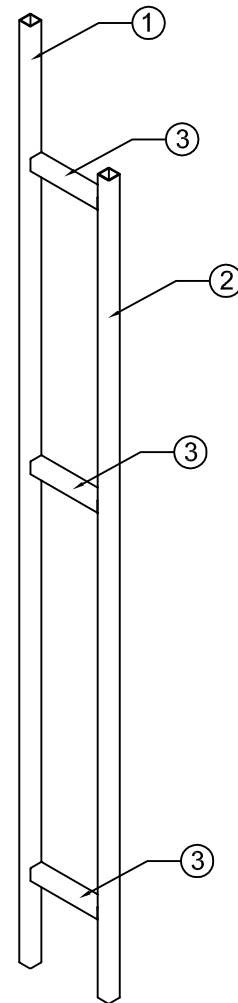
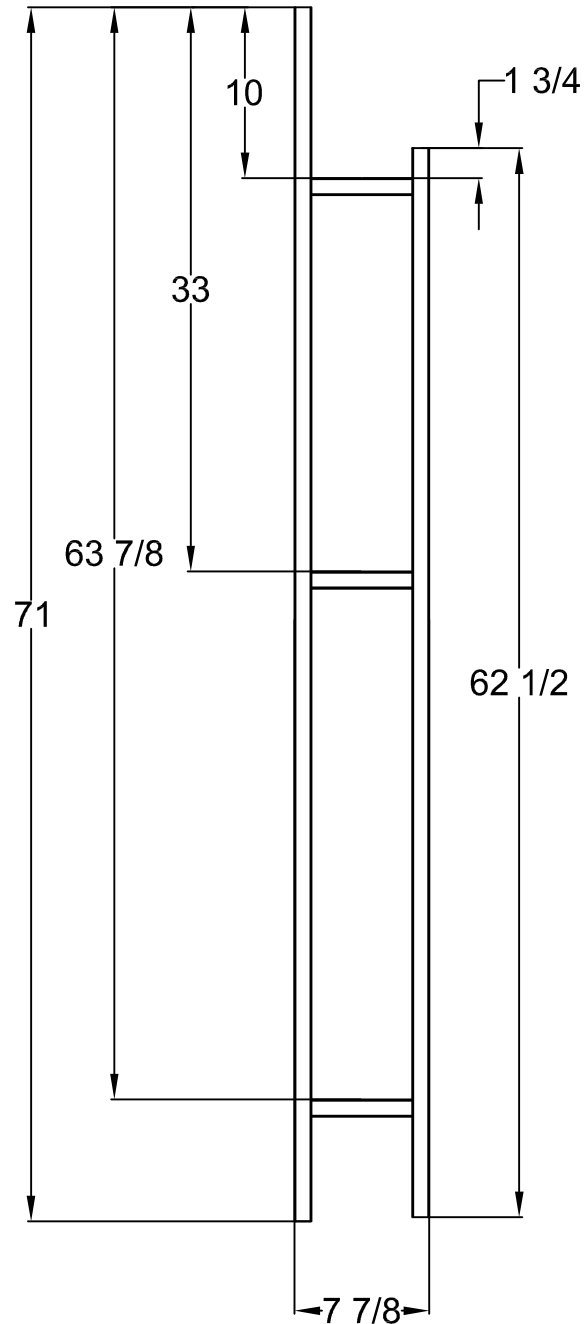
DATE: 7/27/17

TITLE:

NAME: MK

streetside pillar

DWG. No. 31-28-0955-14



16ga 1" x 1" tube

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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

± 1"

± 1/2"

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

DATE: 7/27/17

NAME: MK

DWG. No.

Glaval Bus


a division of Forest River, Inc.

TITLE:

curbside pillar



ALL MATERIALS ALUMINIZED

					TOLERANCE UNLESS OTHERWISE SPECIFIED	 Glaval Bus a division of Forest River, Inc.	
					WOOD	OTHER	DATE: 06/30/17
					+ 1/8"	+ 1/16"	TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY
REV. LET.	DESCRIPTION OF CHANGE	BY	DATE	ECN No.	+ 1*	+ 1/2*	DWG. No. 31-28-0531-17C



The following information is submitted for all Glaval Bus products proposed on this bid as supporting documentation of the structural soundness and impact resistance of the bodies manufactured. All vehicles are built using virtually the same materials with some minor differences in the height and width of cross members due to entry floor heights and/or body width variations.

A representative set of construction prints provided by engineering supplements this verbal accounting of our materials and assembly specifications.

If, in the reviewing of these written technical specifications and engineering frame prints submitted any questions arise, please contact us immediately for any clarification or help in interpretation and understanding.

3.0 Body Construction – General Frame Construction

Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral steel frame that is mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

3.0.1 Floor frame construction and assembly –

- 3.0.1.1 Cross Members -- The floor cross members form the base structural support for the rest of the frame components. Our cross members are constructed of 14 gauge aluminized steel, formed to a capital “C” shape. Cross members over the fuel tank are made to provide the clearance needed to conform with FMVSS301, and include formed internal reinforcements welded in place for additional strength. All additional longitudinal and latitudinal structure is flush welded in place to form a one piece floor upon completion.
- 3.0.1.2 Aluminized steel “Hat Posts” – 1”x1”x4” run the length of the floor between cross members and are welded into place. This extremely strong form is used to weld our HSLA steel seat track in place.
- 3.0.1.3 Aluminized steel C Channel – 1”x1.5” C channel is welded in between cross members the full length of the floor in 5 places. Coupled with the Hat Posts this provides a one-piece strong “ladder” type frame for the flooring.
- 3.0.1.4 Seat Track – 12 gauge roll formed high strength/low alloy steel is wire welded in place for seat mounting down each side of the bus, with lengths predicated on the floor plan chosen. This is yet another stiffener in our extensive construction process.



- 3.0.1.5 Wheel Wells -- Constructed of 14 gauge ALUMINIZED steel, wheel wells are also welded in during the floor construction process. All seams in the wheel well are welded to create a one piece water resistant wheel housing structure. The wheel wells also provide additional strength to the body assembly, when welded in place.
- 3.0.1.6 Structural Aluminized steel Angle – 1/8” thick 1.5” x 2.5” structural aluminized steel angle is used the full perimeter length of each floor assembly, welded to the ends of all floor cross members. This provides not only a flat plane for joining the sidewall assembly, but also ties all cross members together and provides additional side impact resistance.
- 3.0.1.7 Additional structure – When adding vertical stanchions, wheel chair lifts and/or tie down options, additional structure is welded into the floor at locations specified by our engineering department on CAD drawings.

3.0.2 Sidewall Construction –

- 3.0.2.1 Sidewall vertical member – The heart of our sidewall is the vertical structure, a roll formed 18 gauge aluminized steel 1.5" x 2" tube that provides strength and rigidity. The vertical member is installed in full lengths and in shorter sections below window frames. Additional vertical structure is used at both ends of the sidewall enabling the structure to withstand the forces applied by the vehicle when in motion.
- 3.0.2.2 Aluminized steel Tubing – 1.5”x1” lower and 1.5”x3” upper 16 gauge aluminized steel tubing is welded in horizontally between vertical members to frame in window openings. This adds front to rear reinforcement as well.
- 3.0.2.3 Seat Track – 12 gauge high strength/low alloy roll formed ALUMINIZED steel welded down each sidewall below the window frame. While serving as a seat attaching device, it adds excellent structure to the sidewall and also adds excellent side impact resistance.
- 3.0.2.4 Wheelchair Options – Add another layer of metal. Depending on track locations, another structure of 11 gauge thick aluminized steel is welded in place between each vertical member for attaching a shoulder belt mount. Also, additional structure is added to accommodate wheelchair door frames – either 1.5”x1” or 1.5”x2” 16 gauge wall aluinizd steel tubing..
- 3.0.2.5 Full length glavanized steel tubing – 1.5”x1” 16 gauge aluinizd steel tubing is stitch welded to the sidewall bottom and top at each vertical member for attaching to the floor and roof sections, respectively.

3.0.3 Rear Wall Construction –

- 3.0.3.1 Rear wall vertical member – The vertical sidewall 1.5"x 2" aluminized steel tube is also used in the rear wall assembly. Full length structure is used at varying places,



depending on choice of rear window, or rear door. Shorter cut pieces are used above windows and doors. Additional side windows used with the rear door also change the configuration.

3.0.3.2 Aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded horizontally between vertical members to provide a window frame in the standard product, and used as an upper door frame in the optional rear assembly.

3.0.3.3 Full length aluminized steel tubing – 1.5"x1" 16 gauge aluminized steel tubing stitch welded to the rear wall top and bottom as in the sidewall

assembly. **3.0.4 Roof Construction –**

3.0.4.1 Roof Bows – Radius formed one-piece 16 gauge aluminized steel roof bows formed as a modified hat post design with eight bends for exceptional strength and located on 16" centers (the closest in the industry), including 4 bends in the web that allows for the roof structure to be capable of taking severe loads. They are then capped with top flat pieces from flange to flange to provide abundant surface area for securing the exterior roof material.

3.0.4.2 aluminized steel Tubing – 1.5"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1.5" x 3" 16 gauge aluminized steel tubing to all upper window openings as required. A full perimeter is also welded on to mate the roof to the sidewall and rear wall, with short vertical pieces providing support on the front and rear ends. The 3" wide aluminized steel tube supplies a structural mounting surface for shoulder belt attachment and has been pull tested to federal standards.

3.0.5 Driver Compartment Overhead Halo –

3.0.5.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is cut and jig welded into an integrated one piece structure spanning from the front roof bow of the body to the newly cut roof line of the cab. Also created during the structure manufacture is the housing for mounting the electronic circuit board.

3.0.5.2 11 Gauge aluminized steel – formed to make brackets used to mount to the chassis roof.

3.0.6 False Floor (Cab to body transition) –

3.0.6.1 aluminized steel Tubing – 2" x 2" 16 gauge aluminized steel tubing is welded together forming a flat body floor transition from the step area back to the actual body area. An overhang on the curbside provides a secure attach point frontally for the entry door frame added later.

3.0.6.2 Structural aluminized steel angle – 11 gauge 1.5"x1.5" structural angle is added in

short lengths five places to provide attachment points to the chassis floor.



3.0.7 Interior Vertical Transition Frames –

3.0.7.1 aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is used vertically and a ladder type assembly is made welding the 1x 1 tube to .75"x.75" 11 gauge aluminized steel tube that is used horizontally in the assemblies. These pieces transition from the body fronts on each side to the driver halo side assembly and the entry door frame assembly on the curbside.

3.0.8 Entry Door & Step Assembly Frame –

3.0.8.1 aluminized steel Tubing – 1"x1" 16 gauge and .75"x.75" 11 gauge aluminized steel tube is cut to length and welded together in a ladder type construction forming a rigid frame for attaching the entry door/step assembly.

3.0.9 Entry Door/Step Assembly –

3.0.9.1 11 Gauge aluminized steel – The step riser/tread piece is manufactured from one-piece 11 gauge aluminized steel and uses 90° bends at all risers and treads. The bottom tread also adds an additional 90° bend for additional strength and safety. Upper and lower side pieces are then attached and an 11 gauge flat plate with holes is used to bridge the lower and upper side pieces, then is stitch welded and plug welded to form a strong one piece assembly prior to inserting and welding to the entry step framing.

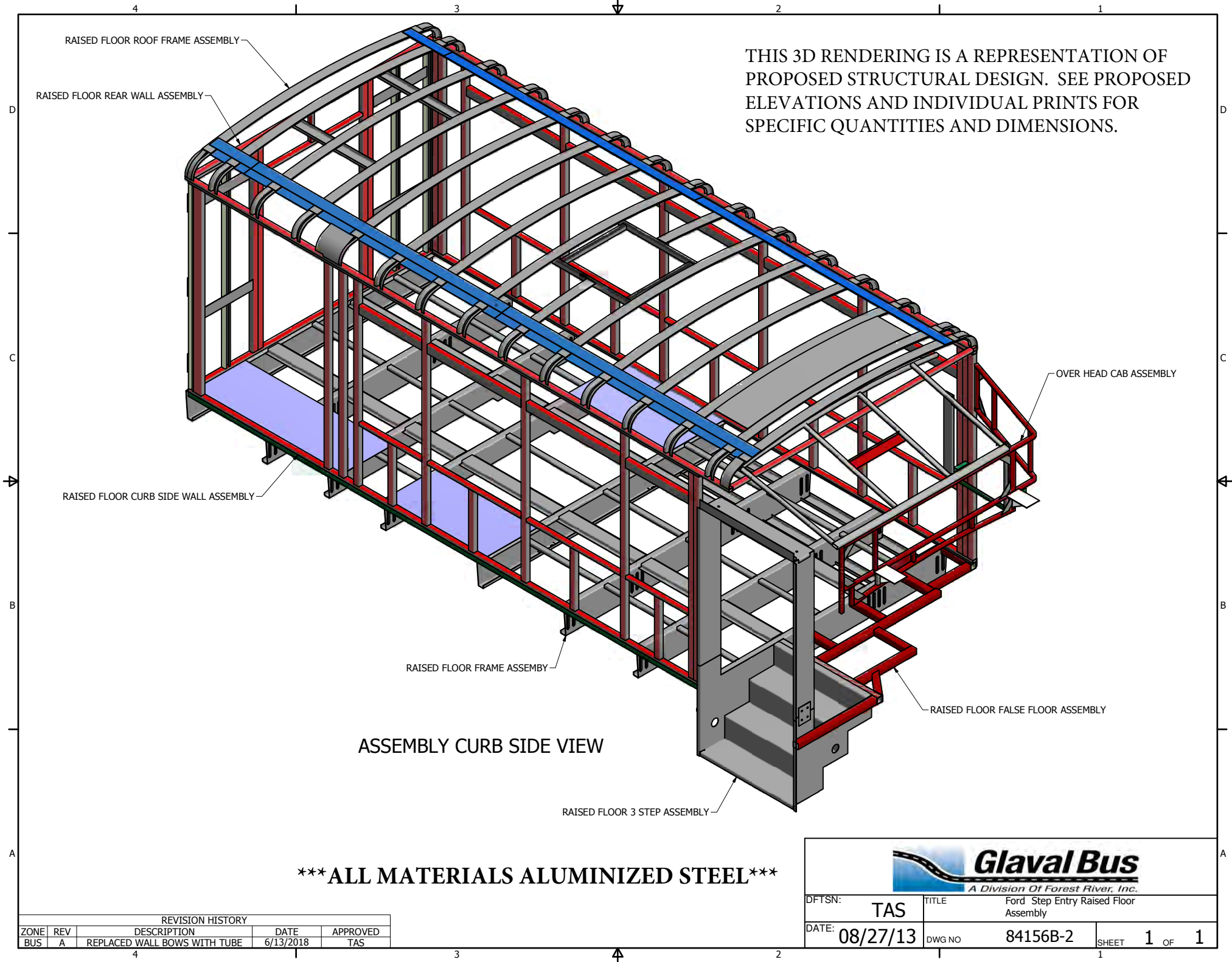
APPLICATION OF EXTERIOR SIDEWALL MATERIAL

GALVAIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

The exterior is .024" galvanized steel pre-painted white with an underlayment of 5/32" luan. The interior is 5/32" luan covered with a light gray FRP or padded vinyl. The foam filled aluminized steel cage is placed in the center and all layers are adhered using a cross linked polyurethane hot melt adhesive. The entire assembly is then laminated to assure adhesion.

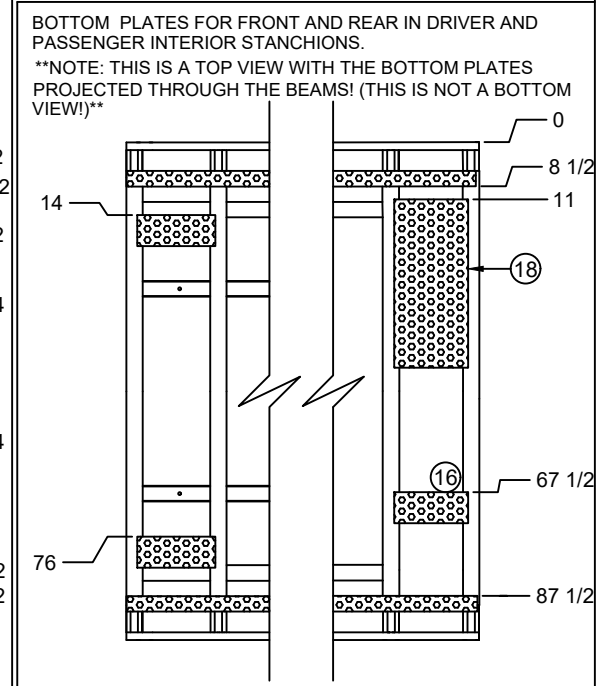
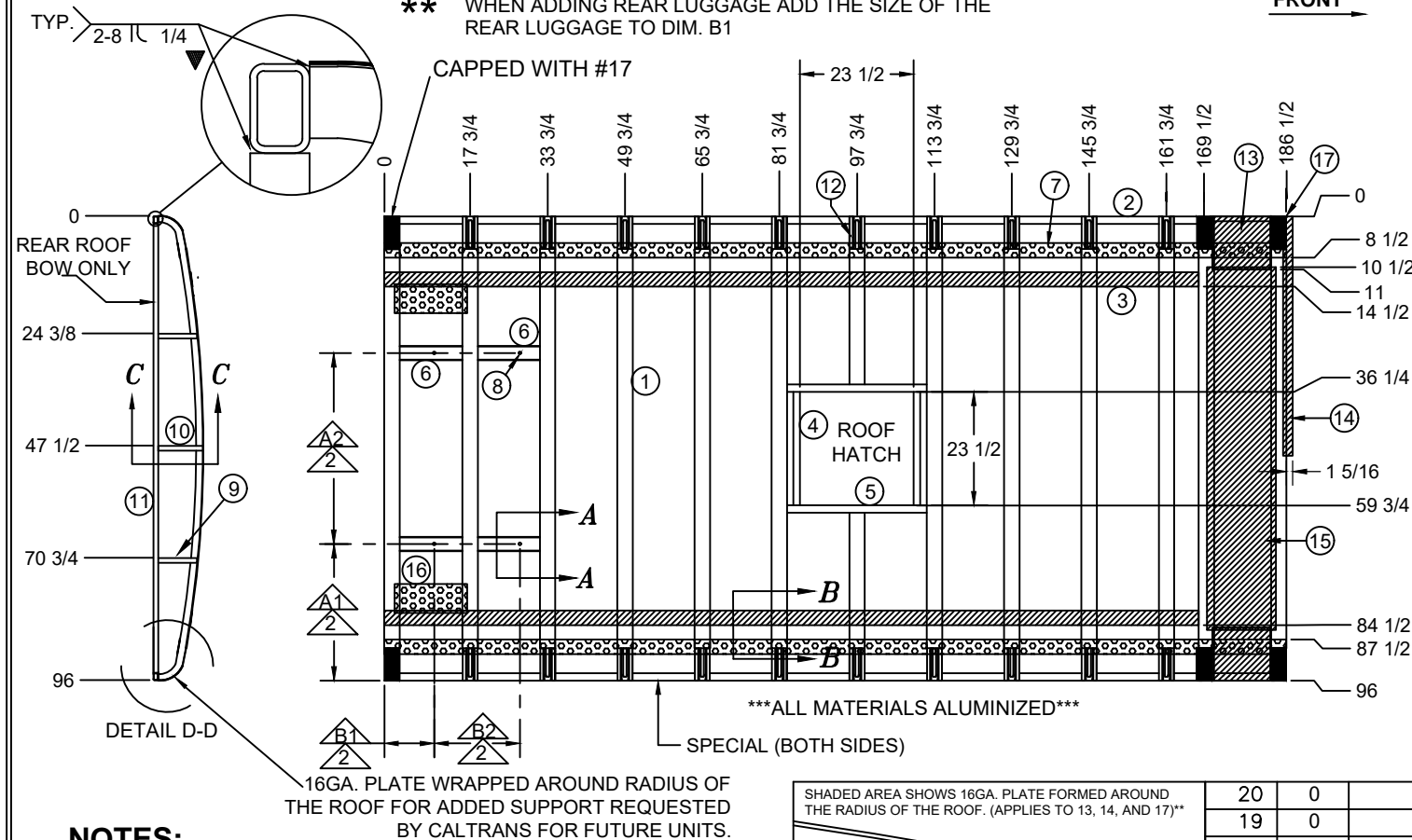
Composite FRP exterior sidewall panels are installed using the same method.

Should any further questions arise, please contact your Glaval Bus representative.



USAGE: FORD MODEL 24

FRONT



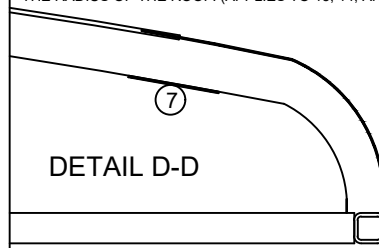
NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- A/C BOLT PATTREN MAY VERY SEE SALES ORDER.
- 3- BEFORE CUT ROOF HATCH SEE SALES ORDER.
- 4- SCREW LOCATION AT SEAMS AND EDGES 8" ON CENTER
ALL OTHER LOCATION 16" ON CENTER.
- 5- SEALANT USAGE: 1/4" MINIMUM 3/8" MAXIMUM BEAD ON ALL
ROOF FRAME TO LUAN SURFACES.

ALL MATERIALS ALUMINIZED

- SPECIAL (BOTH SIDES)

SHADED AREA SHOWS 16GA. PLATE FORMED AROUND THE RADIUS OF THE ROOF. (APPLIES TO 13, 14, AND 17)**



5	2	70009047	"C" CHANNEL: 16ga. x 1-3/8" x 1-3/8" x 30-1/2" Lg.
4	2	70009047	"C" CHANNEL: 16ga. x 1-3/8" x 1-3/8" x 24-1/4" Lg.
3	2		SHEET STEEL: 16ga. x 3" x 168-1/2" Lg.
2	2		TUBE: 16ga. x 1" x 1.5" x 186-1/2" Lg. A-513
1	12	02062357	ROOF BOW W/CAP 16ga x 3-3/16 x 96" Lg.

20	0		PLATE: 16ga. x 10" x 16" Lg.
19	0		SHEET STEEL: 16ga. x 3" x 77" Lg.
18	1		SHEET STEEL: 16ga. x 14-1/4" x 32-1/2" Lg.
17	6		PLATE: 16ga. x 1-1/2" x 9" Lg.
16	3		SHEET STEEL: 16ga. x 6" x 15" Lg.
15	1		PLATE: 16ga. x 14-1/4" x 75" Lg.
14	1		SHEET STEEL: 16ga. x 2" x 52-1/2" Lg.
13	2		SHEET STEEL: 16ga. x 12" x 15" Lg.
12	2	02062357	ROOF BOW W/CAP 16ga. x 3-3/16 x 35-1/4" Lg.
11	1		TUBE: 16ga. x 1" x 1" x 93" Lg. A-513
10	1		TUBE: 16ga. x 1" x 1" x 8-1/2" Lg. A-513
9	2		TUBE: 16ga. x 1" x 1" x 8" Lg. A-513
8	4		BOLT: 3/8-16 x 3" Lg. HEX HEAD
7	2		SHEET STEEL: 16ga. x 3" x 186-1/2" Lg.
6	4	70009046	"C" CHANNEL: 16ga. x 1" x 3-1/2" x 14-1/2" Lg.

- ADDITIONAL CAP

- PLATE WELDED TO TOP OF ROOF BOWS

- PLATE WELDED TO BOTTOM OF
ROOF BOWS

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REV.
LET

DESCRIPTION OF CHANGE

BY

CH

	DATE
--	------

DAT

--	--

ECN No.

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

	+ 1/8"
--	--------

	- 170
	+ 1°

WOOD

+ 1/8"

-	170
+	1°


Glaval Bus

a division of Forest River, Inc.

DATE: 06/11/18

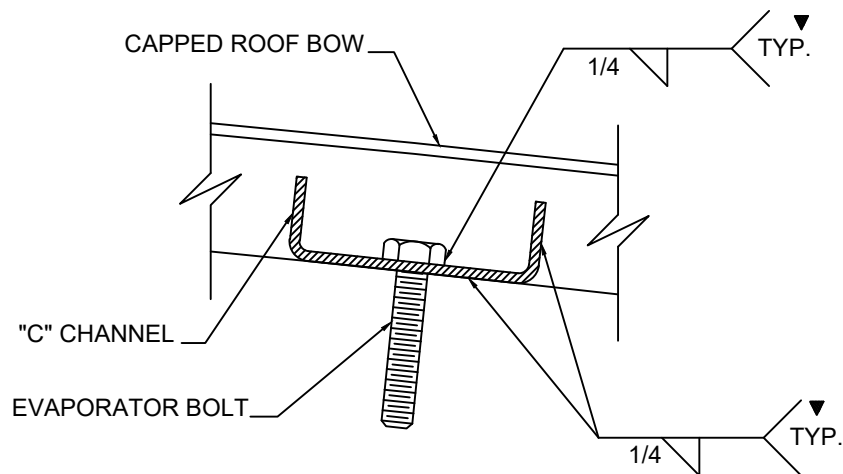
NAME: MKI INF

NAME: MIKEINE	
DWG. No.	3

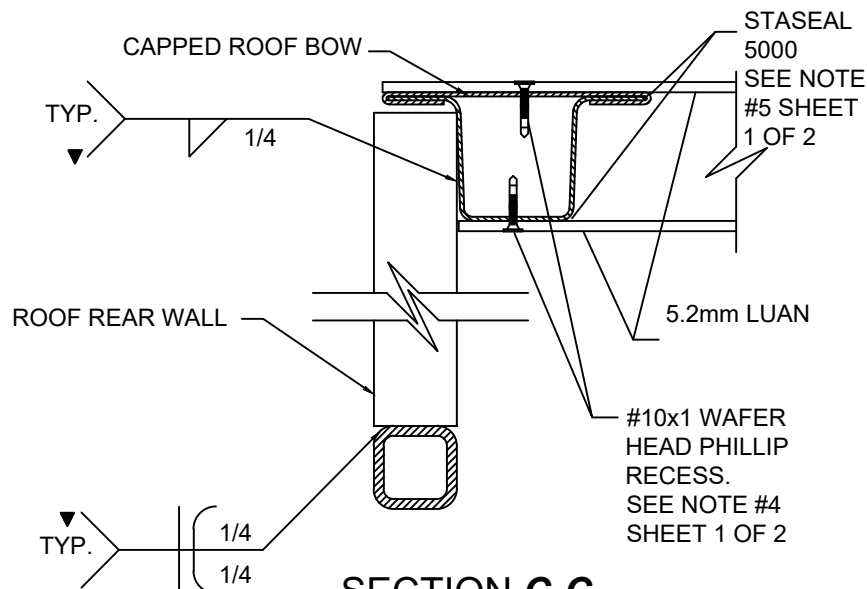
TITLE: 158" WHEEL BASE MODEL 24
ROOF FRAME, STD. ROOF, SINGLE HATCH

DWG. No.	32-13-0017-18
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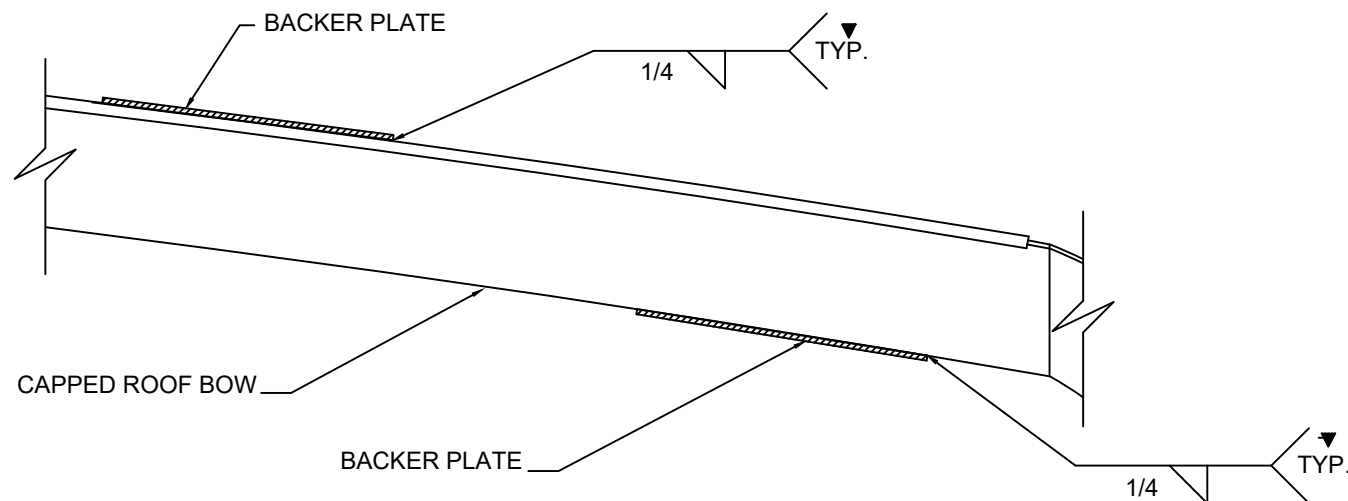
▼ CRITICAL CONTROL ITEM



SECTION A-A



SECTION C-C



SECTION B-B

T/A-71 NEW STYLE	33-5/8	30	10	12-1/4
ACC 23022 SERIES	38	20	10	14-3/4
ACC 23023 SERIES	33-5/8	28-3/4	10	14-3/4
T/A-77	18-1/4	59-1/2	10	10-3/8
T/A-73	28-1/4	39-1/2	10	9-1/2
T/A-71 OLD STYLE	33-5/8	28-3/4	10	12-1/4
T/A-70	36-3/4	22-1/2	10	11-5/8
T/A-30	31	34	10	9-1/2
EM-14 & RE-29	30-3/4	34-1/2	10	9-1/2
EM-6 & RE-10	36	24	10	9-1/2
EM-3 & RE-30	28-1/4	39-1/2	10	16
RE-15 & RE-20	28-1/4	39-1/2	10	9-1/2
EM-1 & EM-2	28-1/4	39-1/2	10	9-1/2
EM-7 GEN 5	36-1/8	23-3/4	10	9-1/2
EM-2 GEN 5	32-3/8	31-1/16	10	9-1/2
EM-1 GEN 5	28-3/16	39-5/8	10	9-1/2
EVAPORATOR MODEL	A-1	A-2	B-1	B-2

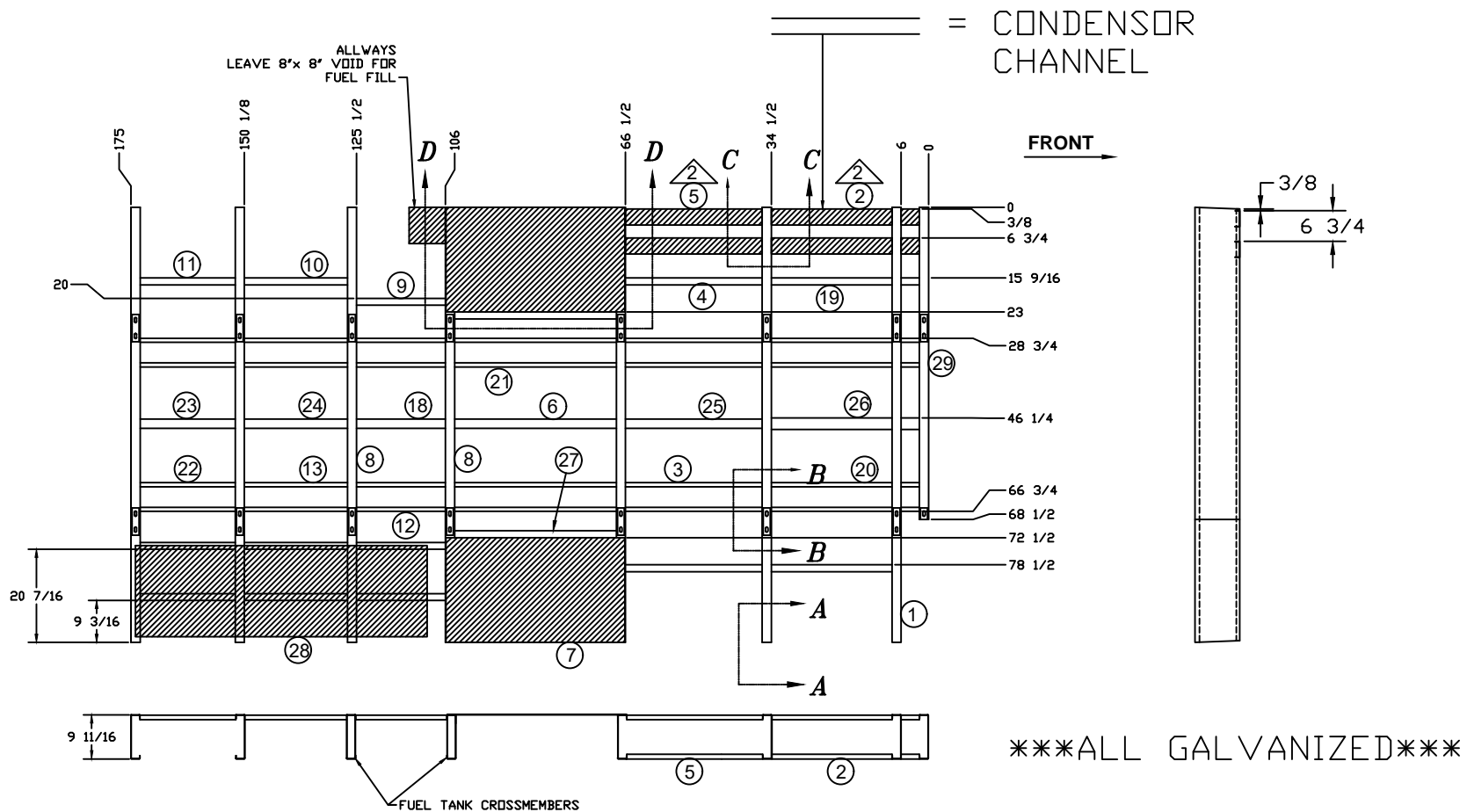
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REV.	LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		Glaval Bus a division of Forest River, Inc.	
WOOD	OTHER	DATE: 06/11/18	TITLE: 158" WHEEL BASE MODEL 24
± 1/8"	± 1/16"	NAME: MKLINE	ROOF FRAME, DETAILS SINGLE HATCH
± 1°	± 1/2°	DWG. No.	32-13-0017-18

▼ CRITICAL CONTROL ITEM


USAGE: FORD 158" WHEEL BASE, MODEL 24



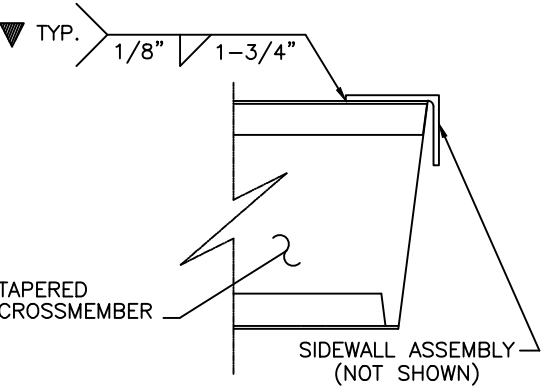
NOTES:

- 1- DRAWING VIEWED FROM INTERIOR SIDE OF UNIT.
- 2- LOCATION OF A/C BRACKETS: ONE MOUNT FLUSH WITH OUTSIDE EDGE OF CROSSMEMBER. THE OTHER MOUNTS 14-3/4" FROM OUTSIDE EDGE OF CROSSMEMBER.
- 3- SEE SHEET 2 OF 2 FOR DETAILS, TORQUE SPECIFICATIONS, SECTION VIEWS AND CUT LIST.

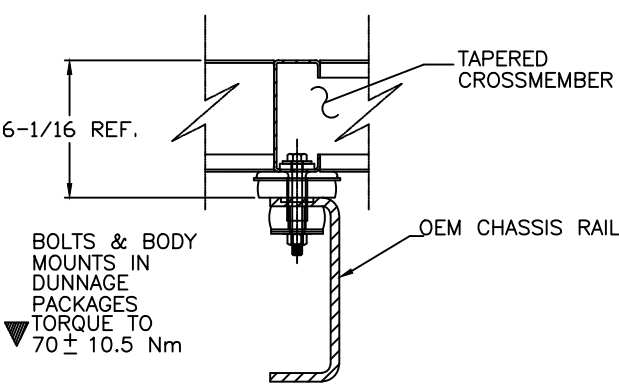
7	2	71002066	SHEET STEEL: 11ga. x 24" x 39-1/4" Lg. HRS
6	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 35-5/8" Lg.
5	2	70009046	"C" CHANNEL: 12ga. x 1" x 3-1/2" x 30" Lg.
4	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 30" Lg.
3	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 30" Lg. A-513
2	2		"C" CHANNEL: 12ga. x 1" x 3-1/2" x 26-1/2" Lg.
1	5	71009018	14ga. x 2 x 9-11/16 x 95-1/2 CROSSMEMBER A-365
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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REV. LET.						WOOD	OTHER	DATE 6/14/18	TITLE 158" WB MODEL 24 FLOOR FRAME, RAISED FLOOR
DESCRIPTION OF CHANGE						± 1/8"	± 1/16"	NAME: MKLINE	DWG. No. 32-13-0031-18 SPECIAL
BY						CHK	DATE	ECN No.	

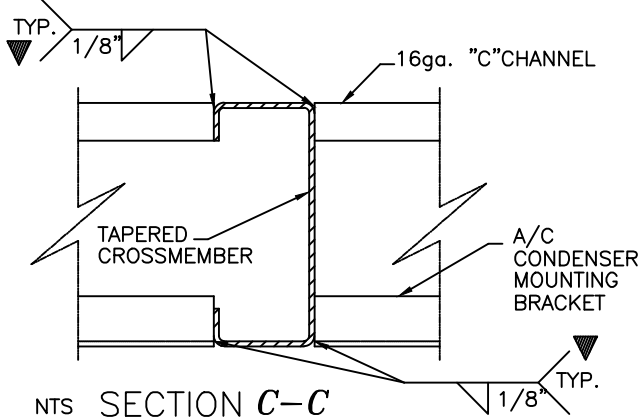
▼ CRITICAL CONTROL ITEM



NTS SECTION A-A



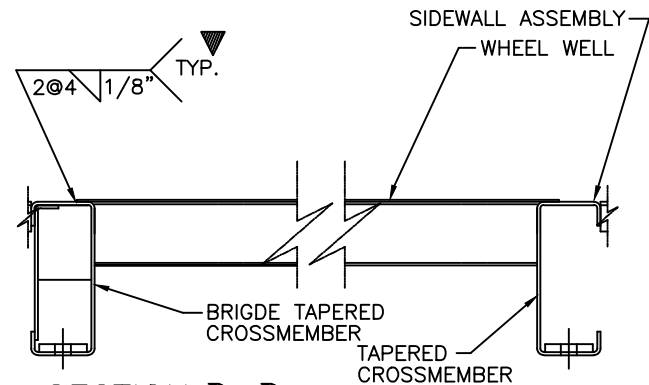
NTS SECTION B-B



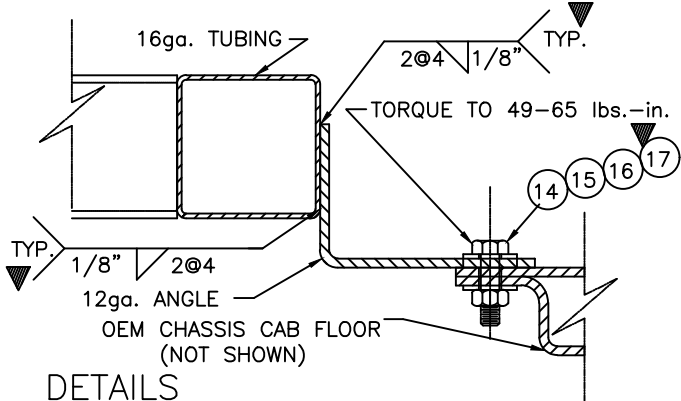
NTS SECTION C-C

ALL GALVANIZED

REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION
29	1		14ga. x 2 x 9-11/16 x 68-1/2 CROSSMEMBER A-365
28	2		PLATE: 11ga. 20" x 64" Lg.
27	2	71002028	TUBE: 16ga. x 1-1/2" x 1-1/2" x 35-5/8" Lg. A-513
26	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 26-1/2" Lg.
25	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 30" Lg.
24	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 22-3/8" Lg.
23	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 20-7/8" Lg.
22	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 20-7/8" Lg. A-513
21	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 35-5/8" Lg. A-513
20	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 26-1/2" Lg. A-513
19	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 26-1/2" Lg.
18	1		"U" CHANNEL: 16ga. 1" x 2" x 1" x 19-3/4" Lg.
17	7	80052007	NUT, HEX HEAD 3/8-16 UNC GRADE 5 ZINC
16	7	80042015	WASHER MED LOCK 3/8 ZINC
15	14	80042007	WASHER 3/8 USS ZINC
14	7	80112051	BOLT, HEX HEAD 3/8-16 X 1 UNC GRADE 5 ZINC
13	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 22-3/8" Lg. A-513
12	2	32-32-0060-11	HAT CHANNEL: 16ga. x 1" x 6-5/16" x 19-3/4" Lg. A-513
11	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 20-7/8" Lg.
10	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 22-3/8" Lg.
9	2		"C" CHANNEL: 16ga. 1" x 1-1/2" x 1" x 19-3/4" Lg.
8	2	70009055	14ga. x 2 x 4-13/16 x 95-1/2 bridge crossmember



NTS SECTION D-D



NTS DETAILS

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REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

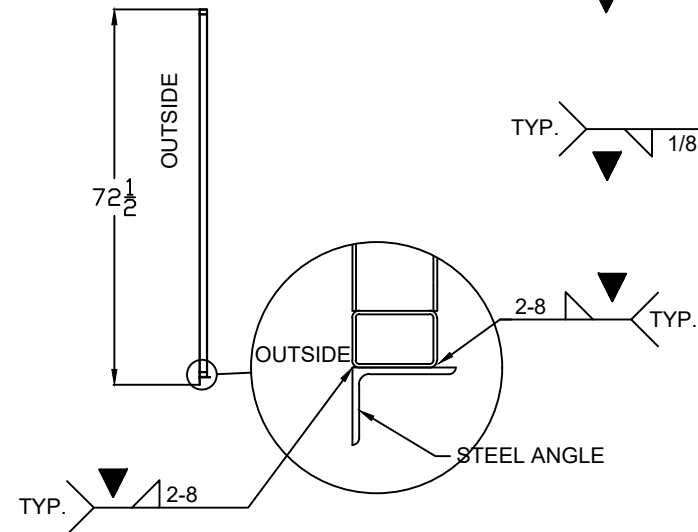
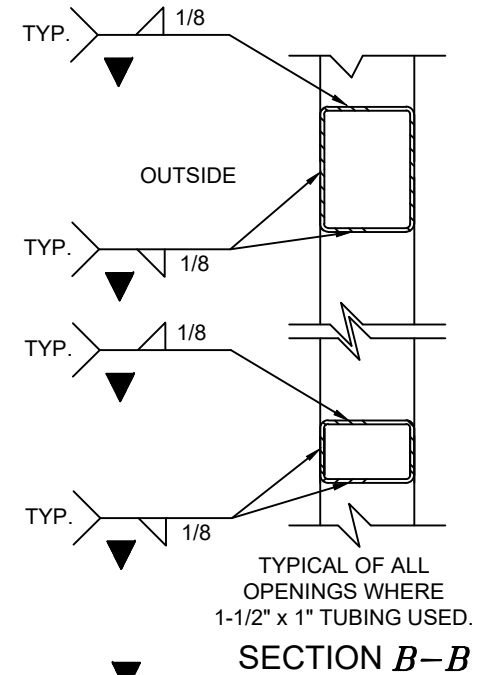
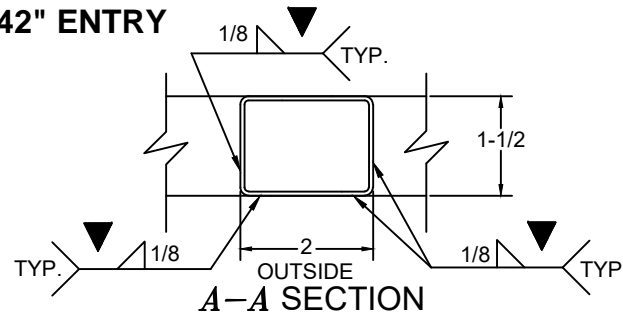
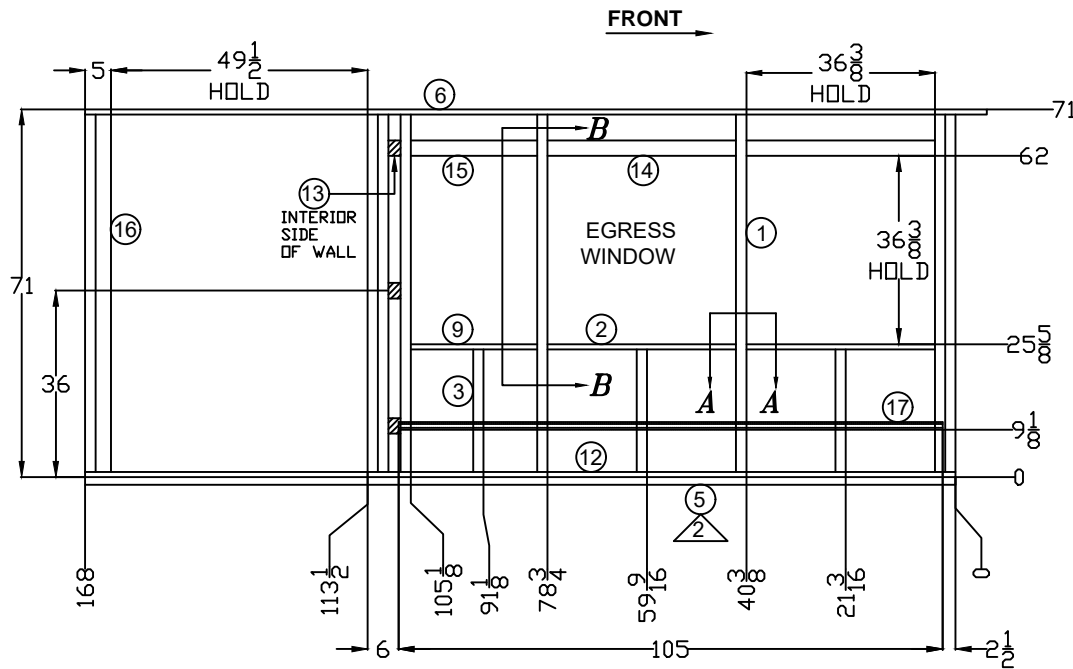
TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE 6/14/18		TITLE: 158' WB MODEL 24 FLOOR FRAME, RAISED FLOOR	
WOOD	OTHER	NAME: MKLINE		DWG. No.	32-13-0031-18 SPECIAL
± 1/8"	± 1/16"				
± 1"	± 1/2"				

▼ CRITICAL CONTROL ITEM

USAGE: FORD 158"WB/MODEL 24, 42" ENTRY

NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.



ALL MATERIALS GALVANIZED

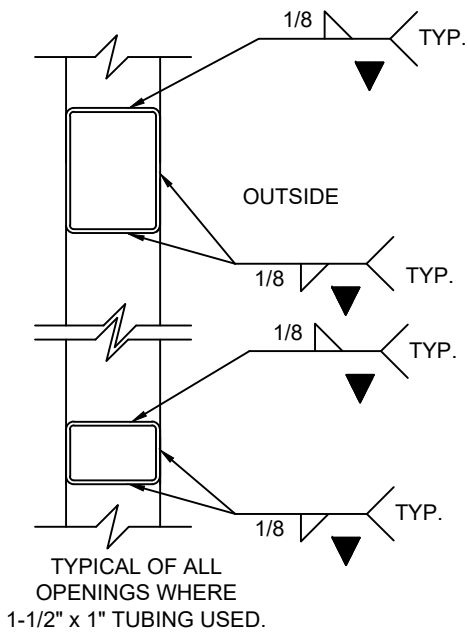
8	0		FRAME, SIDEWALL WHEEL WELL FORD	17	1		SEAT TRACK: 105-1/2"Lg.
7	0		TUBE: 18ga. x 1-1/2" x 2" x 66-13/16"Lg. A-513	16	1		TUBE: 18ga. x 1-1/2" x 3" x 69"Lg. A-513
6	1		TUBE: 16ga. x 1-1/2" x 1" x 174"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 168"Lg. A-513	14	2		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 46-3/4"Lg. A-513	13	3		STRAP: 11ga. x 3" x 2-3/8"Lg. A-513
3	4		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 168"Lg. A-513
2	2		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 65-3/4"Lg. A-513
1	8		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 64-3/4"Lg. A-513
				9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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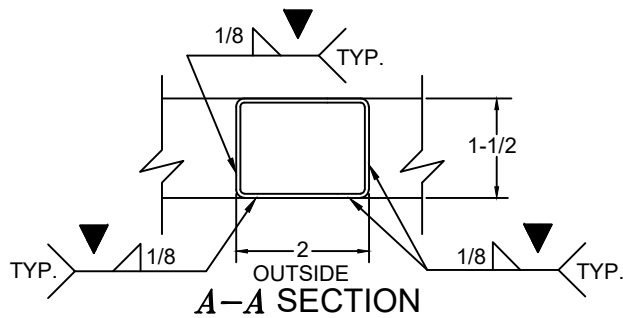
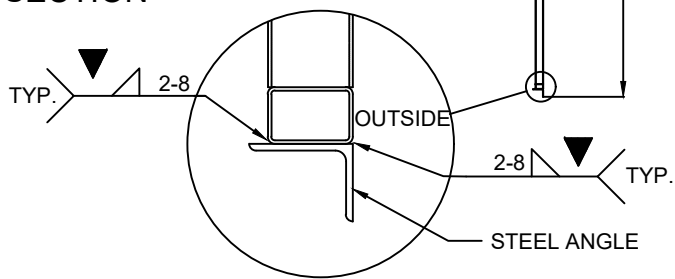
REV.	LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.	TOLERANCE UNLESS OTHERWISE SPECIFIED	WOOD	OTHER	DATE: 6/14/18	TITLE: 158" WB MODEL 24, 42" ENTRY SIDEWALL, R. LIFT, RAISED FLOOR
							± 1/8"	± 1/16"	NAME: MKLINE		
							± 1"	± 1/2"	DWG. No. 32-13-0030-18	SPECIAL 42 ENTRY	

▼ CRITICAL CONTROL ITEM

USAGE: FORD 158"WB/MODEL 24

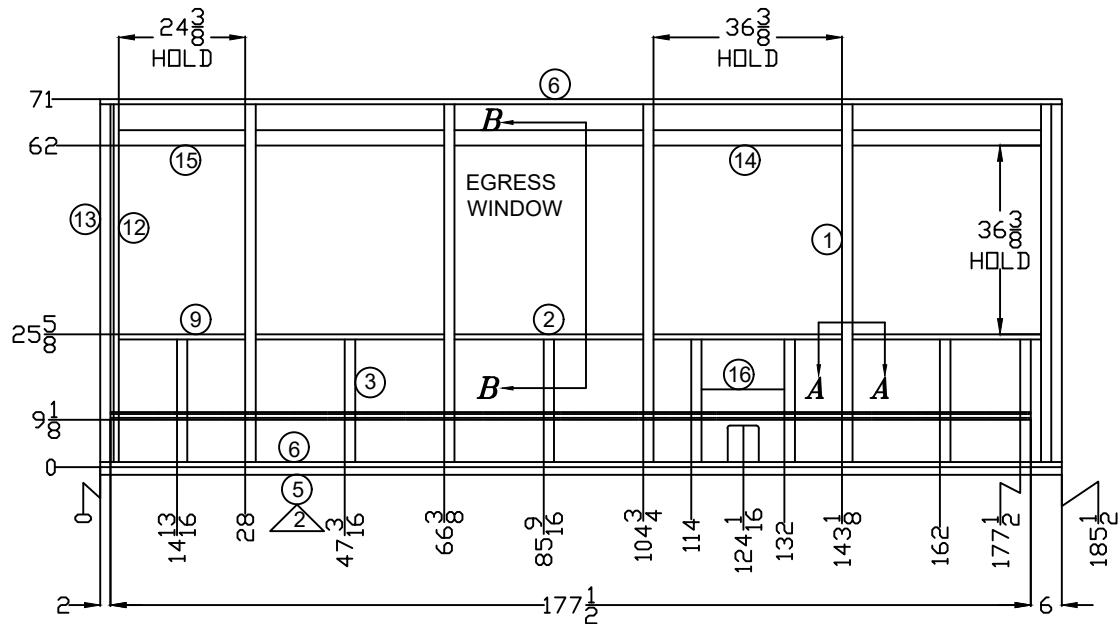


B-B SECTION



NOTES:

- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
- 2- ANGLE TO BE WELDED FLUSH WITH OUTSIDE EDGE OF WALL.



ALL MATERIALS GALVANIZED

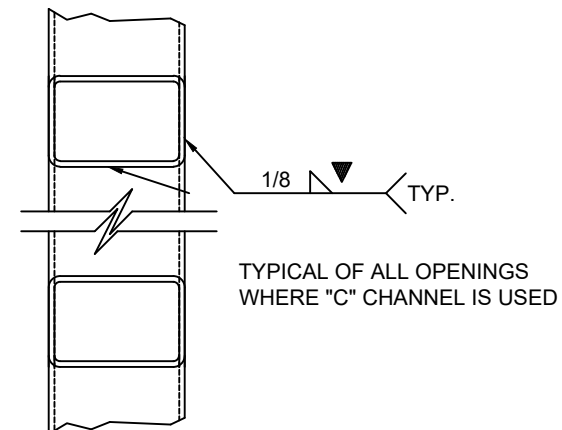
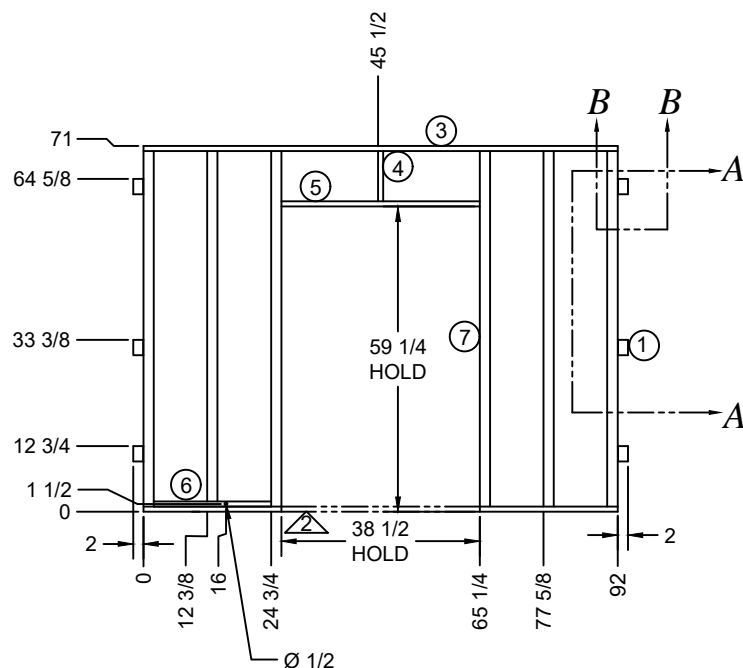
8	0		FRAME, SIDEWALL WHEEL WELL FORD	17	1		SEAT TRACK: 177-1/2"Lg.
7	0		TUBE: 18ga. x 1-1/2" x 2" x 70-7/8"Lg. A-513	16	1		FUEL FILL BACKER BOARD
6	2		TUBE: 16ga. x 1-1/2" x 1" x 185-1/2"Lg. A-513	15	1		TUBE: 16ga. x 1-1/2" x 3" x 24-3/8"Lg. A-513
5	1		ANGLE: 11ga. x 1-1/2" x 2" x 185-1/2"Lg. A-513	14	4		TUBE: 16ga. x 1-1/2" x 3" x 36-3/8"Lg. A-513
4	0		TUBE: 16ga. x 1-1/2" x 1" x 79-9/16"Lg. A-513	13	2		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
3	7		TUBE: 18ga. x 1-1/2" x 2" x 23-5/8"Lg. A-513	12	1		TUBE: 16ga. x 1-1/2" x 1" x 69"Lg. A-513
2	4		TUBE: 16ga. x 1-1/2" x 1" x 36-3/8"Lg. A-513	11	0		ANGLE: 11ga. x 1-1/2" x 2" x 70-3/16"Lg. A-513
1	5		TUBE: 18ga. x 1-1/2" x 2" x 69"Lg. A-513	10	0		TUBE: 16ga. x 1-1/2" x 1" x 70-3/16"Lg. A-513
				9	1		TUBE: 16ga. x 1-1/2" x 1" x 24-3/8"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION	REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

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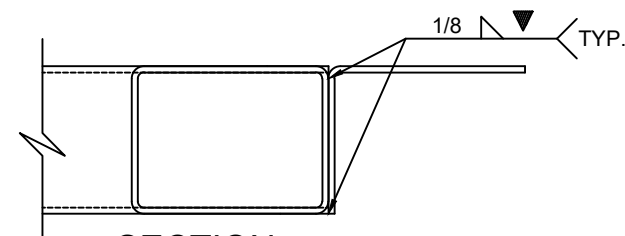
REV.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.
LET.					

TOLERANCE UNLESS OTHERWISE SPECIFIED	WOOD	OTHER	DATE: 6/13/18	TITLE: 158" WB MODEL 24, DR. SIDEWALL, ALL PASS, RAISED FLOOR
± 1/8"	± 1/16"	NAME: MKLINE	DWG. No. 32-13-0002-10	
± 1"	± 1/2"			

USAGE: Raised Floor w/ Rear Door, SPECIAL 1-1/2" THICK WALL




SECTION A-A

SECTION *B-B*

ALL MATERIALS aluminized

NOTES:

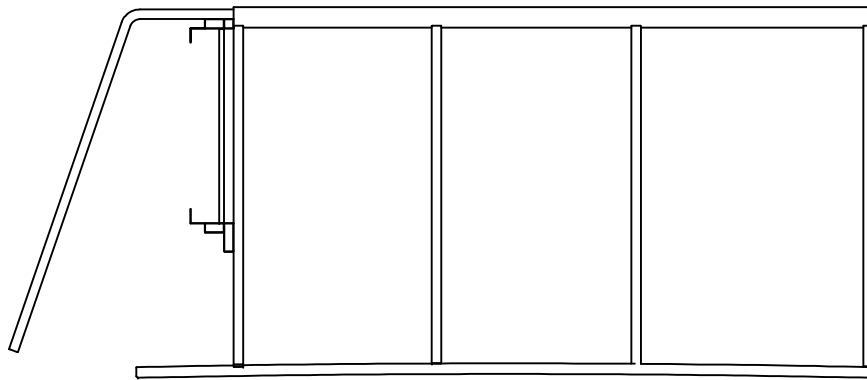
- 1- DRAWING VIEWED FROM EXTERIOR SIDE OF UNIT.
-  2- REMOVE STEEL TUBE IN DOOR AREA AFTER WALL MOUNT TO FLOOR BUT BEFORE INSTALLING DOOR JAM ASSEMBLY.

7	6		TUBE: 16ga. x 1-1/2" x 2" x 69"Lg. A-513
6	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 10-3/8"Lg. A-513
5	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 38-1/2"Lg. A-513
4	1	02071055	TUBE: 16ga. x 1-1/2" x 1" x 9-3/4"Lg. A-513
3	2	02071055	TUBE: 16ga. x 1-1/2" x 1" x 92"Lg. A-513
2	0		
1	6		ANGLE: 16ga. x 1" x 2" x 6"Lg. A-513
REF. No.	QTY.	PART No.	MATERIAL DESCRIPTION

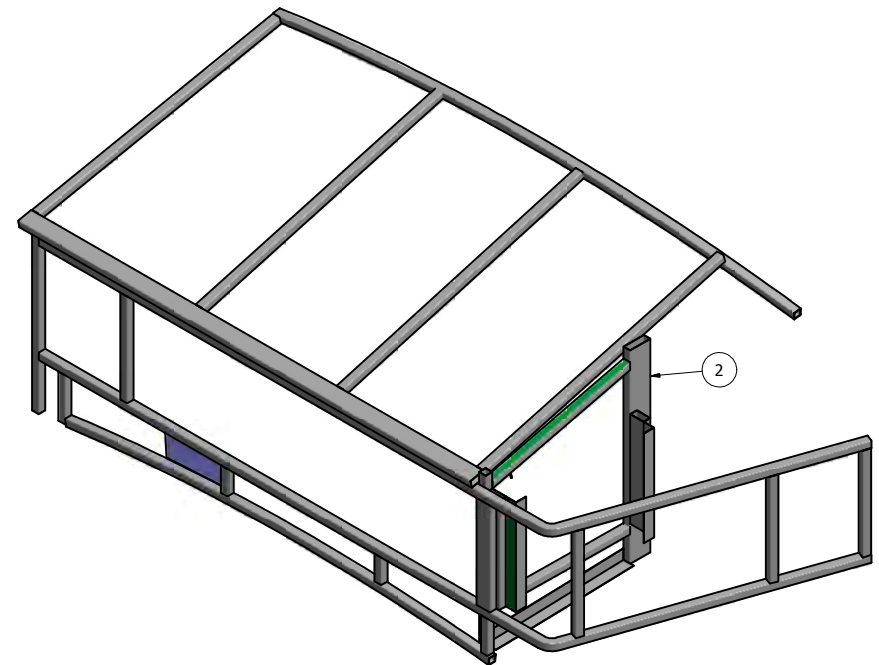


TOLERANCE UNLESS OTHERWISE SPECIFIED ± .00 ± .030 ± .000 ± .015 ± .0000 ± .005	DATE: 06/14/18	TITLE Frame, Rear Wall Raised Floor With Door	
	DFTSN: MKLINE		
	CHKR:		DWG. No.
	APRVD:	SCALE	31-28-0010-18 SPECIAL
		DISK No.	

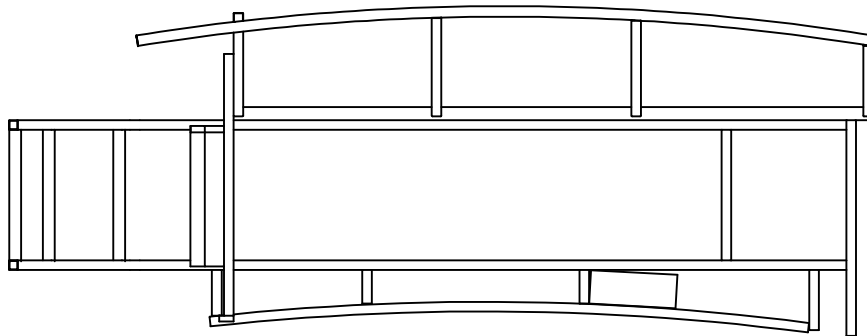
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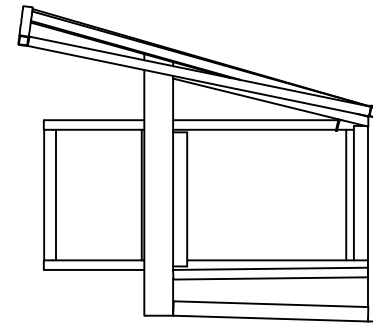
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



SIDE VIEW

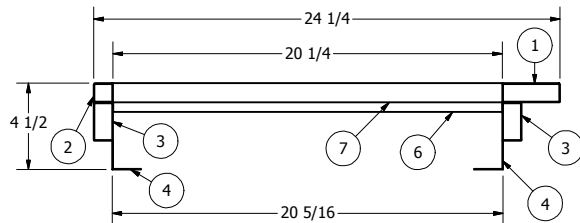
ALL MATERIALS ALUMINIZED

Note:

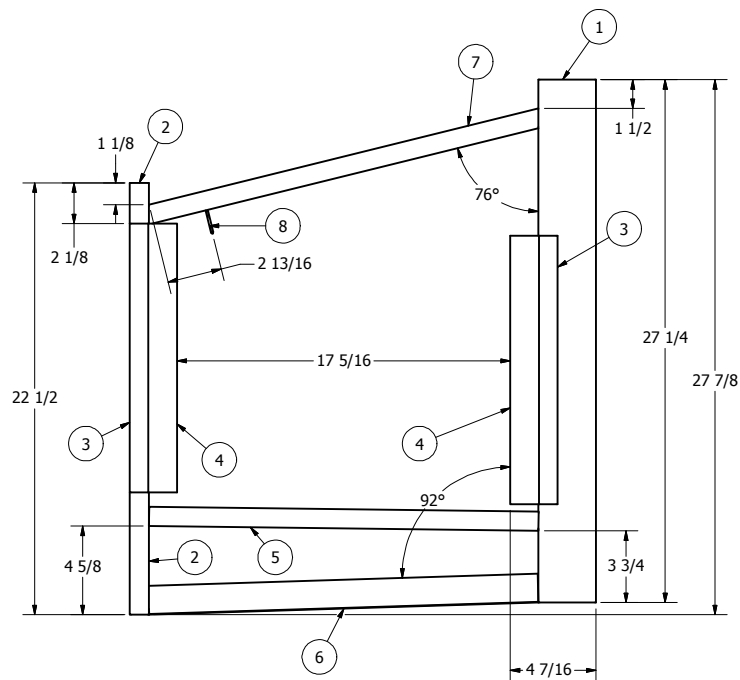
1). Viewed from Interior.

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	31-28-0307-11	FORD Front Cab Wrap Around
2	1	31-28-0299-11	Ford Electrical Panel Frame
3	1	31-28-0745-11	FORD Cab Overhead

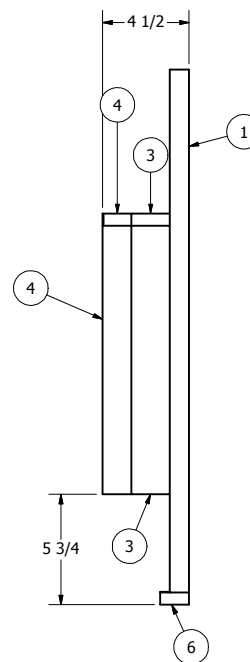
 Glaval Bus A Division Of Forest River, Inc.	
DFTSN: TAS	TITLE: Ford Front Cab, Over Head Cab, Electrical Panel Assembly
DATE: 02/04/15	DWG NO: 31-28-0993-15
SHEET 1 OF 1	



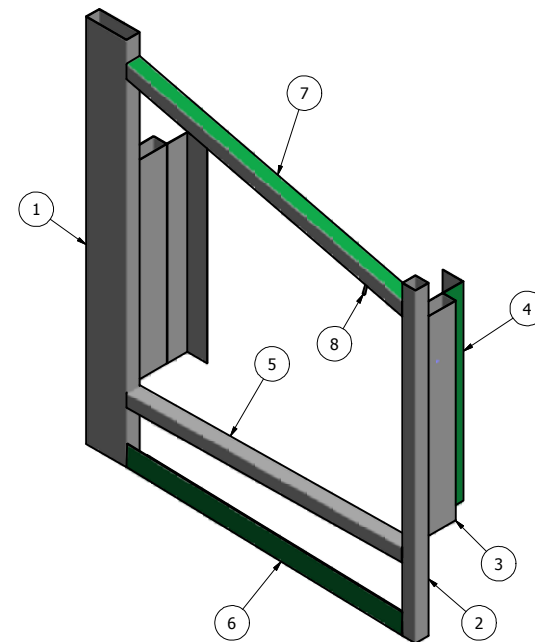
TOP VIEW



BACK VIEW



SIDE VIEW



ISOMETRIC VIEW

*** ALL MATERIALS ALUMINIZED ***

Note:

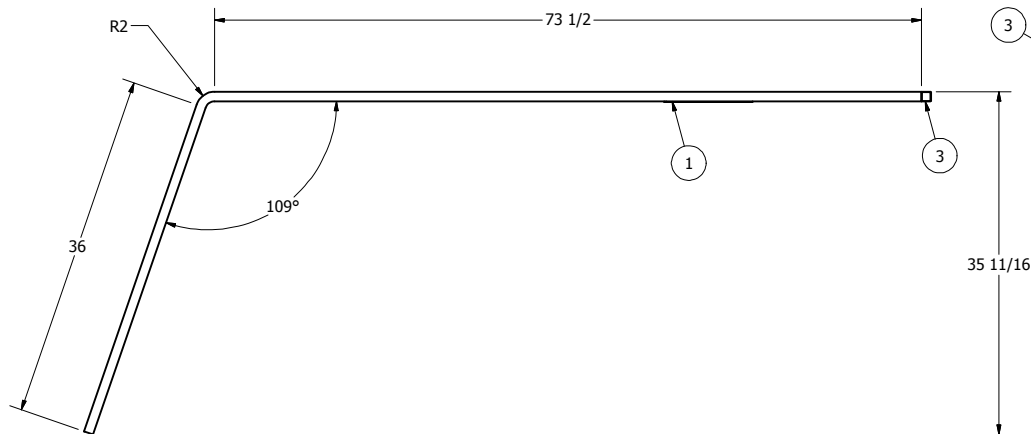
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Released For Production	9/21/07	ELF
31-28	"B"	Update From Auto Cad To Inventor... Updated To Match What Production Is Currently Building	11/14/07	TAS
31-28				

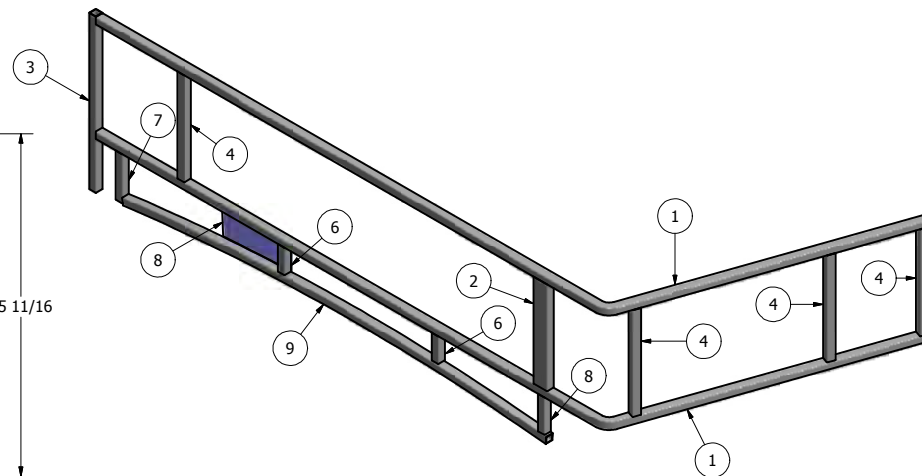
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1x3x27.25	Steel Tube 16ga. 1"x 3"x 27-1/4"
2	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
3	2	1x2x14	Steel Tube 16ga. 1"x 2"x 14"
4	2	02071056-14	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 14" Ig. A-513
5	1	1x1x20.25	Steel Tube 16ga. 1"x 1"x 20-1/4"
6	1	02071056-20.25	STEEL ANGLE 11ga.x 1-1/2"x 1-1/2"x 20-1/4" Ig. A-513
7	1	1x1x21.125 Angle Cut	Steel Tube 16 ga. 1"x 1"x 15-1/4" Angle Cut
8	1	.25-20 x 1.25 Stud Grade 8	1/2" 13 x 2" Grade 8 Hex Head Bolt



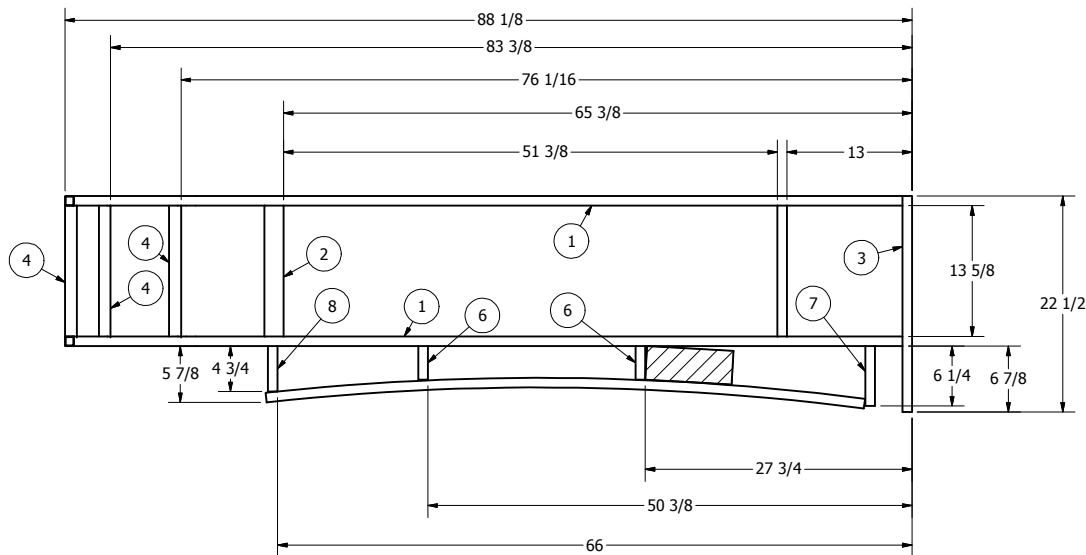
DFTSN:	TAS	TITLE	Ford Electrical Panel Frame
DATE:	11/07/11	DWG NO	31-28-0299-11
		SHEET	1 OF 1



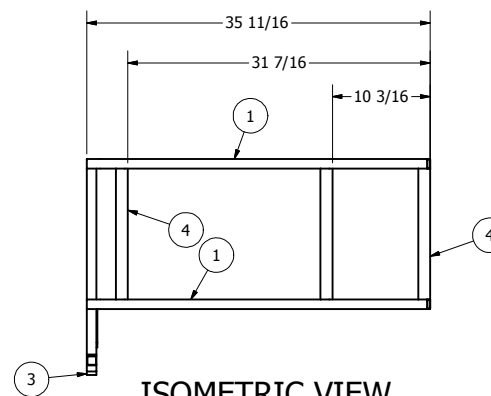
TOP VIEW



ISOMETRIC VIEW



BACK VIEW



ISOMETRIC VIEW

ALL MATERIALS ALUMINIZED

Note:

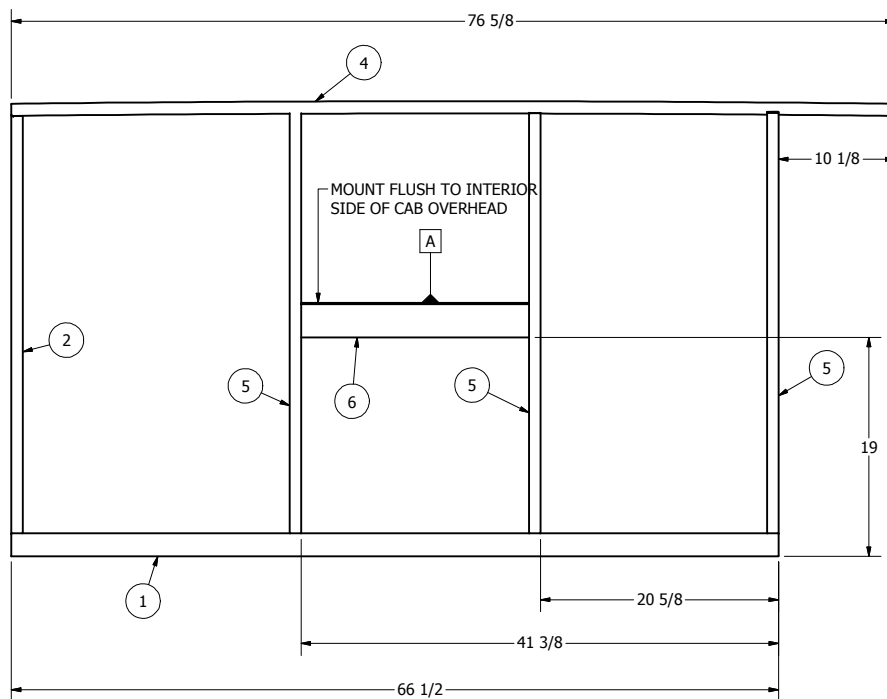
1). Viewed from Exterior.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	Release To Production	10/26/2007	ELF
31-28	"B"	Changed Length of The Wrap Around Tubes	04/28/09	MDK
31-28	"C"	Update From Auto Cad Ton Inventor.. Updated To Match What Production Is Currently Building	11/14/2011	TAS
31-28	"D"	New Revised Standard 2015 Halo	02/05/2015	TAS

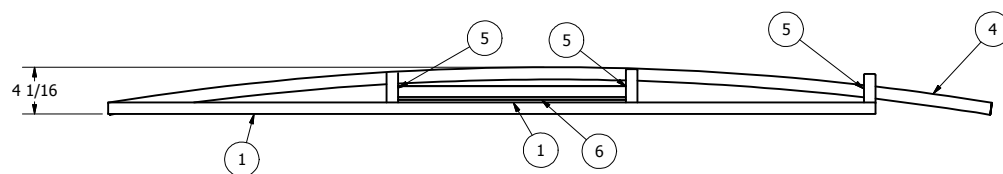
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	31-28-0747-11	Ford 1"x 1"x 16ga. Front Wrap Steel Tube
2	2	1x2x13.625	Steel Tube 16ga. 1"x 2"x 13-5/8"
3	1	1x1x22.5	Steel Tube 16ga. 1"x 1"x 22-1/2"
4	5	1x1x13.625	Steel Tube 16ga. 1"x 1-1"x 13-5/8"
5	1	1x1x15.625	Steel Tube 16ga. 1"x 1"x 15-5/8"
6	2	1x1x3.5	Steel Tube 16ga. 1"x 1"x 3-1/2"
7	1	1x1x6.25	Steel Tube 16ga. 1"x 1"x 6-1/4"
8	1	1x1x4.75	Steel Tube 16ga. 1"x 1"x 4-3/4"
9	1	1 x 1 66.25 CAB CURVE	Ford 1"x 1"x 62-1/4" Steel Cab Radius Tube
10	1	1x1x4.375	Steel Tube 16ga. 1"x 1"x 4-3/8"



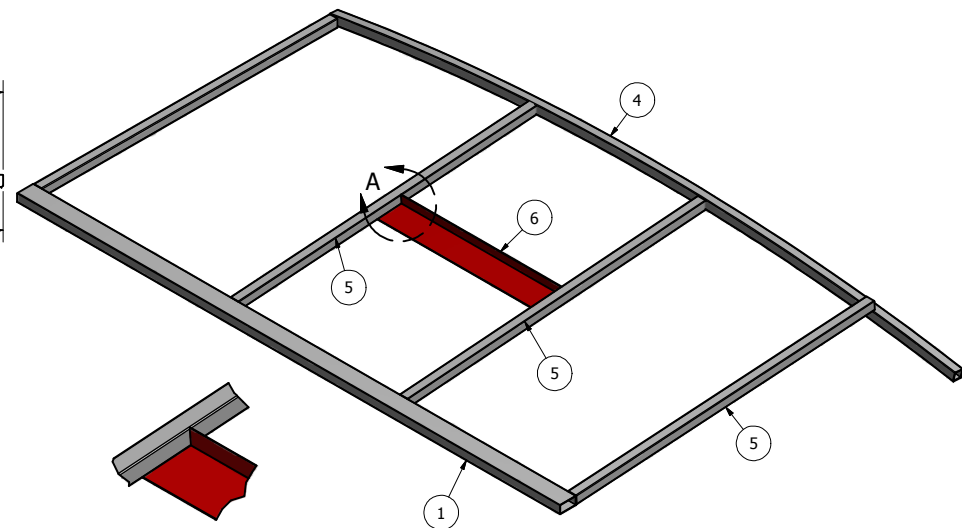
DFTSN:	TAS	TITLE	FORD Front Cab Wrap Around
DATE:	11/07/11	DWG NO	31-28-0307-11
		SHEET	1 OF 1



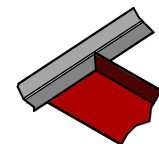
Top View



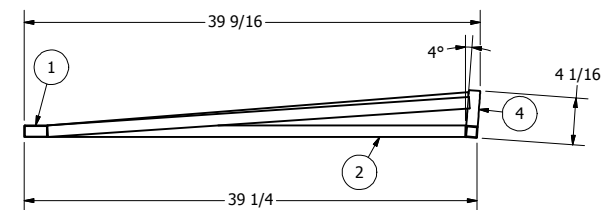
Front View



Isometric View



DETAIL A
SCALE 0.24 : 1




Side View

Note:

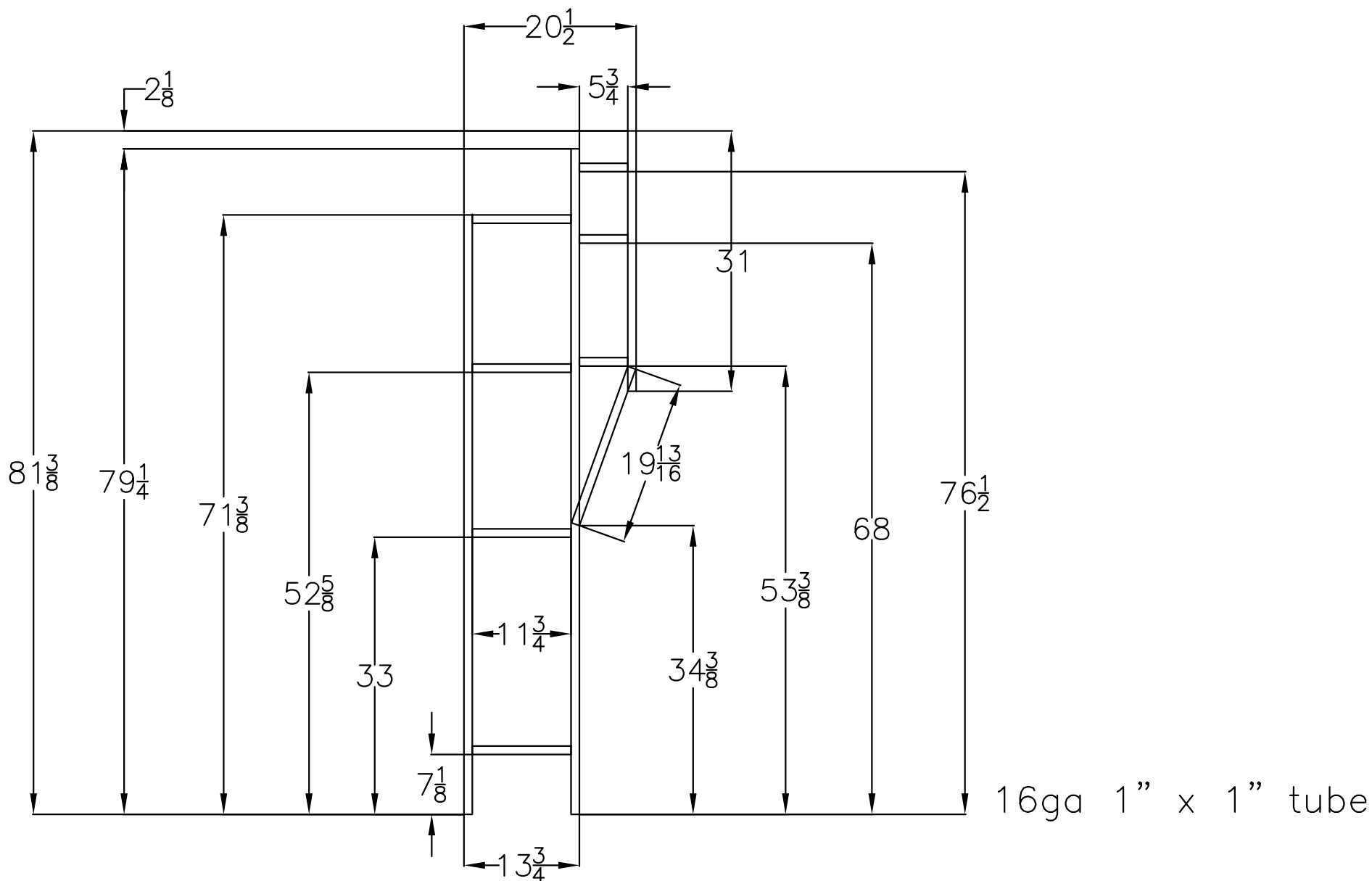
1). Viewed from Exterior.

ALL MATERIALS ALUMINIZED

Parts List				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	1x2x66.5	Steel Tube 16ga. 1"x 2"x 66-1/2"	
2	1	1x1x36.25	Tube 16ga. 1"x 1"x 36-1/4"	
3	1	1x3x7	Steel Tube 16ga. 1"x 3"x 7"	
4	1	31-28-0750-11	Ford Allstar Radius Tube 1"x 1"x 76-5/8"	
5	3	1x1x36.625	Aluminized Steel Tube 16ga. 1"x 1"x 36-5/8"	
6	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513	
11	1	3 x 1x 19.75	STEEL ANGLE 16ga.x 3"x 1"x 19-3/4" lg. A-513	

 <p>Glaval Bus A Division Of Forest River, Inc.</p>	
DFTSN: TAS	TITLE: FORD New Syle Cab Overhead
DATE: 11/07/11	DWG NO: 31-28-0745-11
	SHEET 1 OF 1

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
31-28	"A"	ADDED ANGLE FOR BACKER CENTER CEILING STRIPE	3/22/2015	TAS



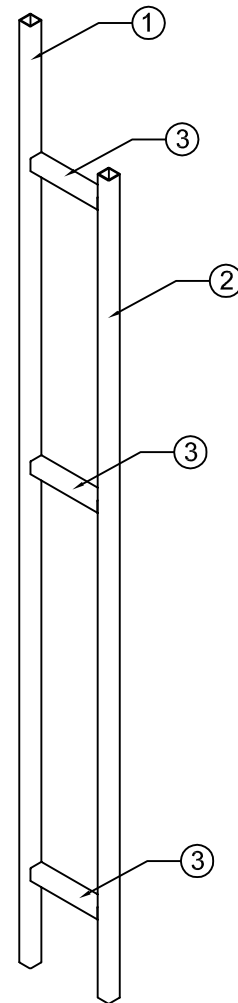
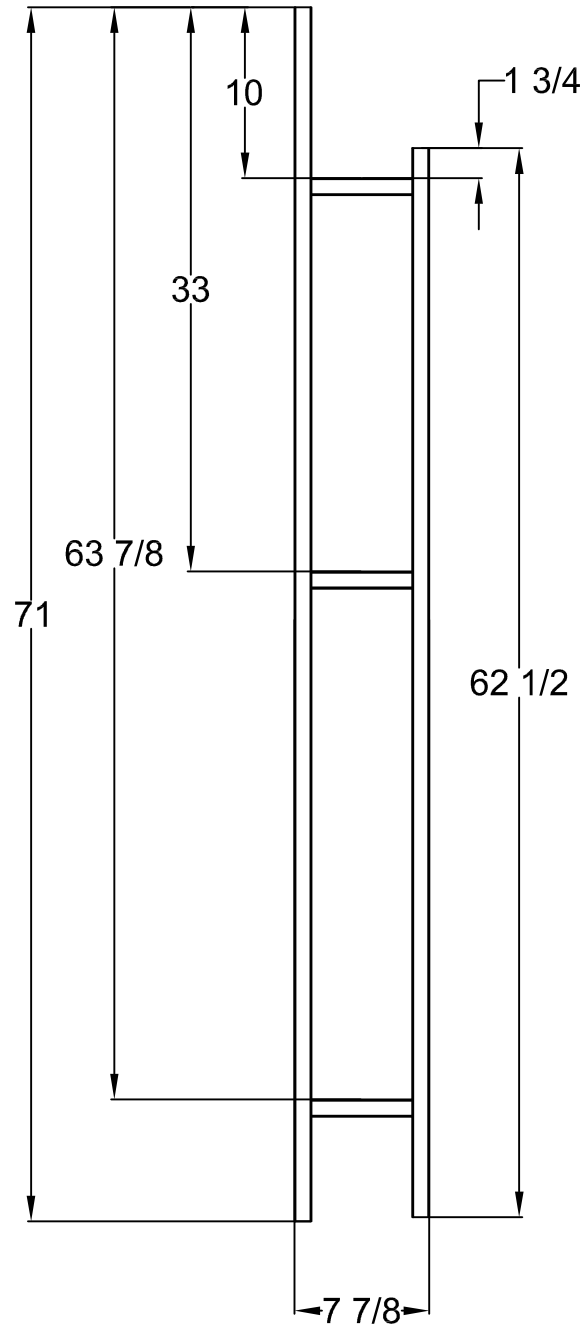
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REV. LET.	DESCRIPTION OF CHANGE	BY	CHK	DATE	ECN No.

TOLERANCE UNLESS OTHERWISE SPECIFIED		 Glaval Bus <small>a division of Forest River, Inc.</small>	
WOOD	OTHER	DATE: 7/27/17	TITLE:
± 1/8"	± 1/16"	NAME: MK	streetside pillar
± 1"	± 1/2"	DWG. No. 31-28-0955-14	





16ga 1" x 1" tube

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REV.
LET.

DESCRIPTION OF CHANGE

BY

CHK

DATE

ECN No.

± 1"

± 1/2"

TOLERANCE UNLESS
OTHERWISE SPECIFIED

WOOD

OTHER

± 1/8"

± 1/16"

DATE: 7/27/17

NAME: MK

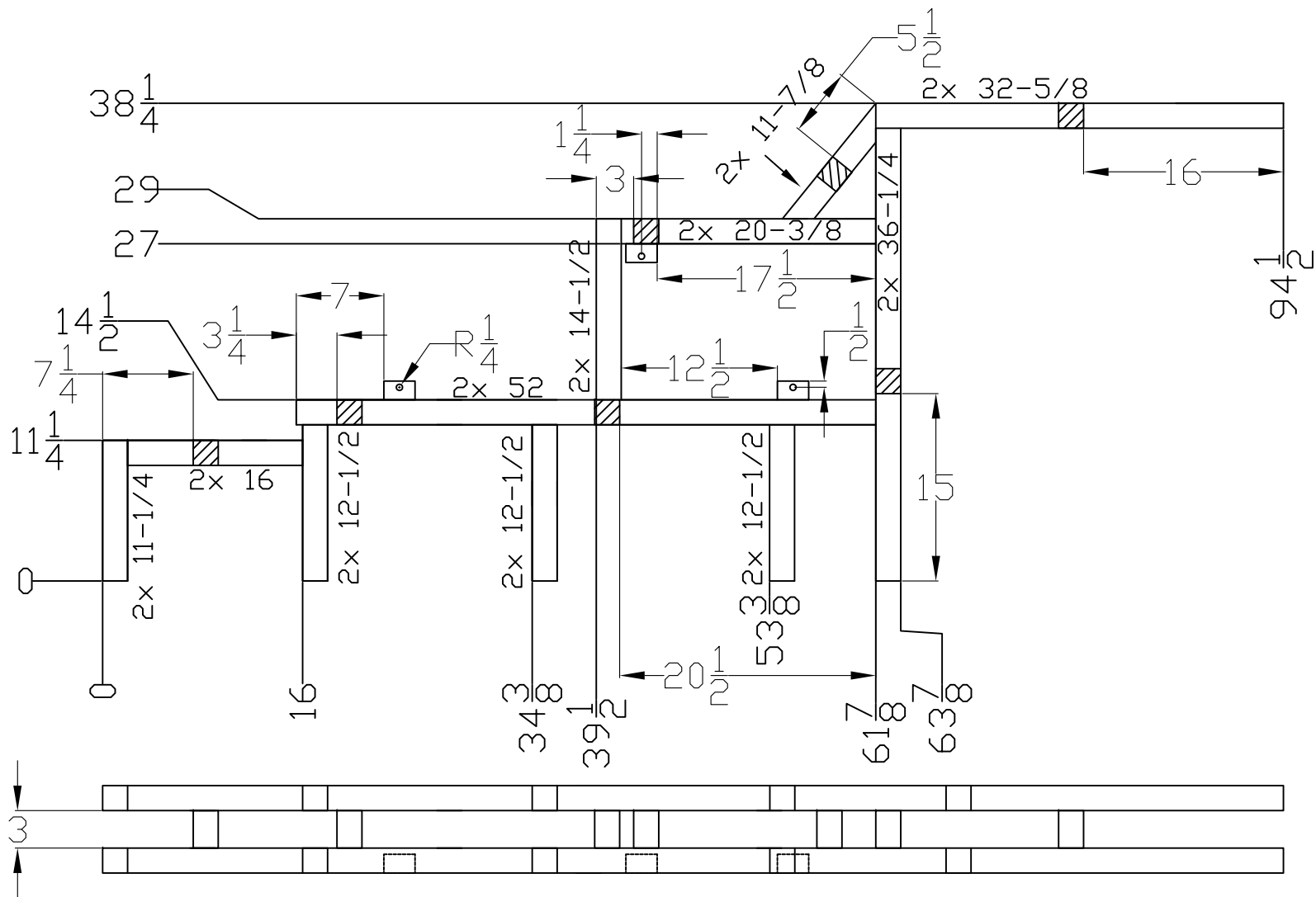
DWG. No.

Glaval Bus

a division of Forest River, Inc.

TITLE:

curbside pillar



MAT'L=2" x 2" x 16GA.

ALL MATERIALS ALUMINIZED

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REV. LET.	DESCRIPTION OF CHANGE	BY	DATE	ECN No.	TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE: 06/30/17	NAME: RTS	TITLE: RAISED FLOOR-3 STEP FALSE FLOOR ASSEMBLY
					WOOD	OTHER			
					± 1/8"	± 1/16"			
					± 1°	± 1/2°			
					DWG. No. 31-28-0531-17C				



a division of Forest River, Inc.



UNIVERSAL BODY FRAME CONSTRUCTION

The following information is submitted for all Glaval Bus products proposed on _____ as supporting documentation of the structural soundness and impact resistance of the bodies manufactured. All vehicles are built using virtually the same materials with some minor differences in the height and width of cross members due to entry floor heights and/or body width variations.

A representative set of construction prints provided by engineering supplements this verbal accounting of our materials and assembly specifications.

If, in the reviewing of these written technical specifications and engineering frame prints submitted any questions arise, please contact us immediately for any clarification or help in interpretation and understanding.

3.0 Body Construction – General Frame Construction

Manufactured from all aluminized steel products, the floor, roof, side walls, rear wall, driver halo assembly and entry door assembly are all wire welded (MIG) together to form an integral aluminized steel frame that is thoroughly coated in our primer paint shop, then mounted with specified hardware to the rubber body mount points (pucks) supplied by the chassis manufacturer. Once joined to the chassis, the bus finishing process begins.

3.0.1 Floor frame construction and assembly –

- 3.0.1.1 Cross Members -- The floor cross members form the base structural support for the rest of the frame components. Our cross members are constructed of 11 gauge aluminized steel, formed to a capital “C” shape. Cross members over the fuel tank are made to provide the clearance needed to conform with FMVSS301, and include formed internal reinforcements welded in place for additional strength. All additional longitudinal and latitudinal structure is flush welded in place to form a one piece floor upon completion.
- 3.0.1.2 Aluminized steel “Hat Posts” – 1”x1”x4” run the length of the floor between cross members and are welded into place. This extremely strong form is used to weld our HSLA steel seat track in place.
- 3.0.1.3 Aluminized steel C Channel – 1”x1.5” C channel is welded in between cross members the full length of the floor in 5 places. Coupled with the Hat Posts this provides a one-piece strong “ladder” type frame for the flooring.
- 3.0.1.4 Seat Track – 12 gauge roll formed high strength/low alloy steel is wire welded in place for seat mounting down each side of the bus, with lengths predicated on the floor plan chosen. This is yet another stiffener in our extensive construction process.



- 3.0.1.5 Wheel Wells -- Constructed of 14 gauge aluminized steel, wheel wells are also welded in during the floor construction process. All seams in the wheel well are welded to create a one piece water resistant wheel housing structure. The wheel wells also provide additional strength to the body assembly, when welded in place.
- 3.0.1.6 Structural Aluminized steel Angle – 1/8” thick 1.5” x 2.5” structural aluminized steel angle is used the full perimeter length of each floor assembly, welded to the ends of all floor cross members. This provides not only a flat plane for joining the sidewall assembly, but also ties all cross members together and provides additional side impact resistance.
- 3.0.1.7 Additional structure – When adding vertical stanchions, wheel chair lifts and/or tie down options, additional structure is welded into the floor at locations specified by our engineering department on CAD drawings.

3.0.2 Sidewall Construction –

- 3.0.2.1 Sidewall vertical member – The heart of our sidewall is the vertical structure, a roll formed 18 gauge aluminized steel capital “C” channel with 8 bends that create extreme strength and rigidity. The vertical member is installed in full lengths and in shorter sections below window frames. Additional vertical structure is used at both ends of the sidewall enabling the structure to withstand the forces applied by the vehicle when in motion. Using the open C member also enables a thorough primer application.
- 3.0.2.2 Aluminized steel Tubing – 1”x1” lower and 1”x3” upper 16 gauge aluminized steel tubing is welded in horizontally between vertical members to frame in window openings. This adds front to rear reinforcement as well.
- 3.0.2.3 Seat Track – 11 gauge high strength low alloy roll formed aluminized steel track is welded down each sidewall below the window frame. While serving as a seat attaching device, it adds excellent structure to the sidewall and also adds excellent side impact resistance.
- 3.0.2.4 Wheelchair Options – Add another layer of metal. Depending on track locations, another structure of 11 gauge thick aluminized steel is welded in place between each vertical member for attaching a shoulder belt mount. Also, additional structure is added to accommodate wheelchair door frames – either 1”x1” or 1”x2” 16 gauge wall aluminized steel tubing..
- 3.0.2.5 Full length aluminized steel tubing – 1”x1” 16 gauge aluminized steel tubing is stitch welded to the sidewall bottom and top at each vertical member for attaching to the floor and roof sections, respectively.

3.0.3 Rear Wall Construction –

- 3.0.3.1 Rear wall vertical member – The vertical sidewall capital “C” channel with 8 bends is also used in the rear wall assembly. Full length structure is used at varying places, depending on choice of rear window, or rear door. Shorter cut pieces are used above windows and doors. Additional side windows used with the rear door also change the configuration.



- 3.0.3.2 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is welded horizontally between vertical members to provide a window frame in the standard product, and used as an upper door frame in the optional rear assembly.
- 3.0.3.3 Full length aluminized steel tubing – 1"x1" 16 gauge aluminized steel tubing is stitch welded to the rear wall top and bottom as in the sidewall assembly.

3.0.4 Roof Construction –

- 3.0.4.1 Roof Bows – Radius formed one-piece 16 gauge aluminized steel roof bows formed as a modified hat post design with eight bends for exceptional strength and located on 16" centers (the closest in the industry), including 4 bends in the web similar to our vertical sidewall aluminized steel provide a roof structure capable of taking severe loads. They are then capped with top flat pieces from flange to flange to provide abundant surface area for securing the exterior roof material.
- 3.0.4.2 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is welded in horizontally to frame all lower window openings and 1" x 3" 16 gauge aluminized steel tubing to all upper window openings as required. A full perimeter is also welded on to mate the roof to the sidewall and rear wall, with short vertical pieces providing support on the front and rear ends. The 3" wide aluminized steel tube supplies a structural mounting surface for shoulder belt attachment and has been pull tested to federal standards.

3.0.5 Driver Compartment Overhead Halo –

- 3.0.5.1 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is cut and jig welded into an integrated one piece structure spanning from the front roof bow of the body to the newly cut roof line of the cab. Also created during the structure manufacture is the housing for mounting the electronic circuit board.
- 3.0.5.2 11 Gauge Aluminized steel – formed to make brackets used to mount to the chassis roof.

3.0.6 False Floor (Cab to body transition) –

- 3.0.6.1 Aluminized steel Tubing – 2" x2" (taller when needed) 16 gauge aluminized steel tubing is welded together forming a flat body floor transition from the step area back to the actual body area. An overhang on the curbside provides a secure attach point frontally for the entry door frame added later.
- 3.0.6.2 Structural aluminized steel angle – 11 gauge 1.5"x1.5" structural angle is added in short lengths five places to provide attachment points to the chassis floor.

3.0.7 Interior Vertical Transition Frames –

- 3.0.7.1 Aluminized steel Tubing – 1"x1" 16 gauge aluminized steel tubing is used vertically and a ladder type assembly is made welding the 1x 1 tube to .75"x.75" 11 gauge aluminized steel tube that is used horizontally in the assemblies. These pieces



transition from the body fronts on each side to the driver halo side assembly and the entry door frame assembly on the curbside.

3.0.8 Entry Door & Step Assembly Frame –

3.0.8.1 Aluminized steel Tubing – 1"x1" 16 gauge and .75"x.75" 11 gauge aluminized steel tube is cut to length and welded together in a ladder type construction forming a rigid frame for attaching the entry door/step assembly.

3.0.9 Entry Door/Step Assembly –

3.0.9.1 11 Gauge Aluminized steel – The step riser/tread piece is manufactured from one-piece 11 gauge aluminized steel and uses 90° bends at all risers and treads. The bottom tread also adds an additional 90° bend for additional strength and safety. Upper and lower side pieces are then attached and an 11 gauge flat plate with holes is used to bridge the lower and upper side pieces, then is stitch welded and plug welded to form a strong one piece assembly prior to inserting and welding to the entry step framing.

APPLICATION OF EXTERIOR SIDEWALL MATERIAL

GALVANIZED STEEL SIDEWALLS OR OPTIONAL FIBERGLASS/FRP/COMPOSITE SIDEWALLS

The exterior is .024" galvanized steel pre-painted white with an underlayment of 5/32" luan.

The interior is 5/32" luan covered with a light gray FRP or padded vinyl.

The foam filled aluminized steel cage is placed in the center and all layers are adhered using polyurethane hot melt adhesive. The entire assembly is then sent through a pressure application roller system to assure adhesion.

Composite FRP exterior sidewall panels are installed using the same method.

Should any further questions arise, please contact your Glaval Bus representative.

RAIN BOOTH INFORMATION

Constructed as part of a corporate-wide pre-delivery inspection facility, the Forest River 20' x 50' motorized vehicle rain booth utilized by Glaval Bus offers exceptional performance in the area of water leak detection.



The motorized vehicle rain booth adds front wall nozzles to the design of the towable rain booth, simulating the pelting of oncoming rain at highway speeds. Both booths include two 1200 gallon recycling tanks and utilize a 12Horsepower pump with multi-bank filters capable of delivering 40 – 60 p.s.i. That equates to 300 gallons per minute pushed through the spray heads, or the equivalent of a 24 inch-per-hour downpour!

With nozzles directed at the roof, sidewalls, front and undercarriage, nothing goes untouched in our quest for leak elimination. Using both velocity and volume in our test procedure ensures our valuable customers that we are doing the utmost to deliver a leak-free product to them.



Visitors are always welcome to witness the test booths whenever they are in operation.



Gateway



INTERMOTIVE
VEHICLE
CONTROLS

An ISO 9001:2015 Registered Company

Gateway

High Idle and Shift Interlock System

Overview

- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- System is fully compliant with FMVSS 403/404 and the Americans with Disabilities Act (ADA) for wheelchair lift interlocks
- Simple plug and play connections to the OEM chassis

Features

- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- Uses Intermittent Fault Filter™ (IFF) technology to eliminate erroneous lift door signals

Product features may vary by make, model or year. See instructions for complete details.

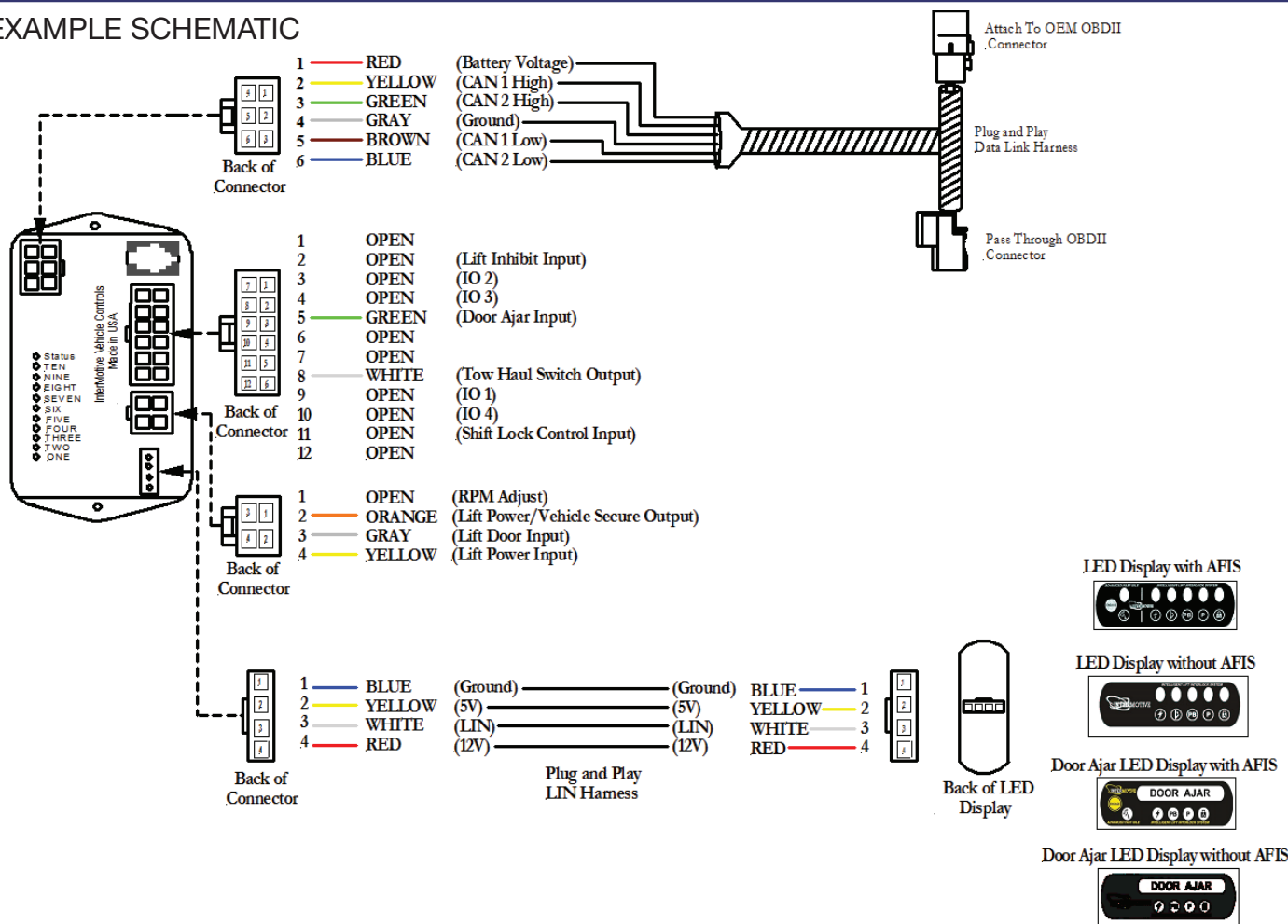
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AUTOMOTIVE TECHNOLOGIES

(775) 831-2002

Details

EXAMPLE SCHEMATIC



SPECIFICATIONS

Number of Inputs	Five inputs (lift inhibit, door ajar, shift lock, lift door and RPM adjust)
Number of Outputs	Four configurable outputs, plus one lift power/vehicle secure output and one tow haul switch output
Current Draw	~120 mA
Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

LEADING THE INDUSTRY IN REAR VISION SAFETY


STSK4750B KIT COMPONENTS:

MONITOR: STSM244

CAMERA: STSC130B

HARNESSES: STSH349 (49FT BLACK), STSH130 (ADAPTER HARNESS)

Forest River, Inc. bus manufacturing companies will be the industry's first to offer a rear backup safety camera as standard equipment on every bus in 2019... Setting the safety tone and trend in the commercial and school bus market.

Forest River's hard stance on safety with the new 2019 rear backup safety program has selected Rosco Vision Systems in NY as the manufacturers of the STSK4750B backup camera system.


STSM244 MONITOR SPECS

SCREEN SIZE	7"
RESOLUTION	800*480 pixels
MONITOR BRIGHTNESS	700cd/m2
NUMBER OF CAMERA INPUTS	1
INPUT FORMAT	13-pin
VIEWING ANGLES	L/75°, R/75°, UP/60°, DOWN/60°
SHOCK RATING	2G
VIBRATION RATING	6G
POWER SUPPLY	12 ~ 32 VDC
OPERATING TEMPERATURE RANGE	-4°F to 158°F -20°C to 70°C

STSC130B CAMERA SPECS

TV LINES	420 TVL
FIELD OF VIEW (DIAGONAL)	150°
MINIMUM ILLUMINATION	0.2 LUX
DUST/WATER RATING	IP69K
POWER SUPPLY	12 Vdc
OPERATING TEMPERATURE	-22°F to 140°F -30°C TO 65°C


1-800-227-2095




06/21/2017

MB#

Z GUARD™ 9902 STAR

A wax based undercoating intended to protect commercial vehicles from corrosion. The wax electrochemically inhibits the rate of corrosion and also, due to the film characteristics, provides a coating resistant to stone impingement and elevated temperatures.

PHYSICAL PROPERTIES

Appearance	Black Liquid
% NVM by WT.	50
Density	10.43 lb/gal
Viscosity (after reduction with water) per Brookfield RVT #5 Spindle 20RPM	2500
Viscosity per #4 Zahn cup	26 sec.
Mechanical Stability	Excellent
Heat Stability	Excellent
V.O.C.	0.00 lbs/gal
D.O.T. Flammability Rating	>200q F
pH	8.5
Cryptometer/#2 Wedge, ASTM D1212	15
60° Gloss	< 5 matt finish)
Sag (mils)	>15

Z TECHNOLOGIES CORPORATION

World Leaders in Corrosion Protection

26500 Capitol Avenue, Redford, Michigan 48239-2597
Telephone (313) 937-0710 · Fax (313) 937-1470

Z GUARD 9902 STAR Film Properties

Performance testing reflects coating on unpolished Q panels with four day air-dried films at 3.0 – 4.0 mils dry.

Dry to touch at R.T., ASTM D 1640	10 ± 2 minutes
Dry-to-Handle at R.T., ASTM D 1640	20 ± 5 minutes
Pencil Hardness	6B
Flexibility 180° bend over conical mandral	Pass
Salt Spray, ASTM B 117, 1000 hours	Field, scribe, edge clean; slight blistering
Salt Fog Resistance (463PB-10-01), 240 hours.	Pass (No rust)
◆ 500 F x 16 hours plus 240 hrs salt fog	Pass (No rust)
◆ 325 F x 16 hours plus 16 hours humidity.	Pass (No rust, nor blisters)
Salt Fog Resistance (WSS-M2P178-A), 240 hours.	
◆ 662°F x 1 hour; 1°C water quench; plus 240 hrs salt fog.	Pass (#8-9 corrosion rating or <0.1% surface rust per ASTM D 610-95)
Salt Water Immersion, 5% NaCl, 100° F, 96 Hours	Pass
Detergent Immersion, 100° F, 48 Hours	Pass
Gravelometer, ASTM D 3170, -20° F	Good(8A)
Poultice, GM 998-5470, 20 cycles	Pass
Q.U.V., ASTM G 53, 3000 Hours	Pass
Q.U.V., 100 Hours + Salt Spray, 336 Hours	Pass
Q.C.T., 3000 Hours	Pass
Humidity Resistance, ASTM D 2247, 2000 Hours	Pass
Sag resistance	≥5 mils
Impact (direct & reverse) ASTM D 3281	160/40 inch-lbs.
Adhesion (FLTM B 1 6-1 B) cross Hatch	5A Pass
Scab corrosion resistance, 20 cycles	Pass

APPLICATION

For ultimate protection, apply films to clean metals at a thickness of at least four (4) mils dry, by any of the following methods:

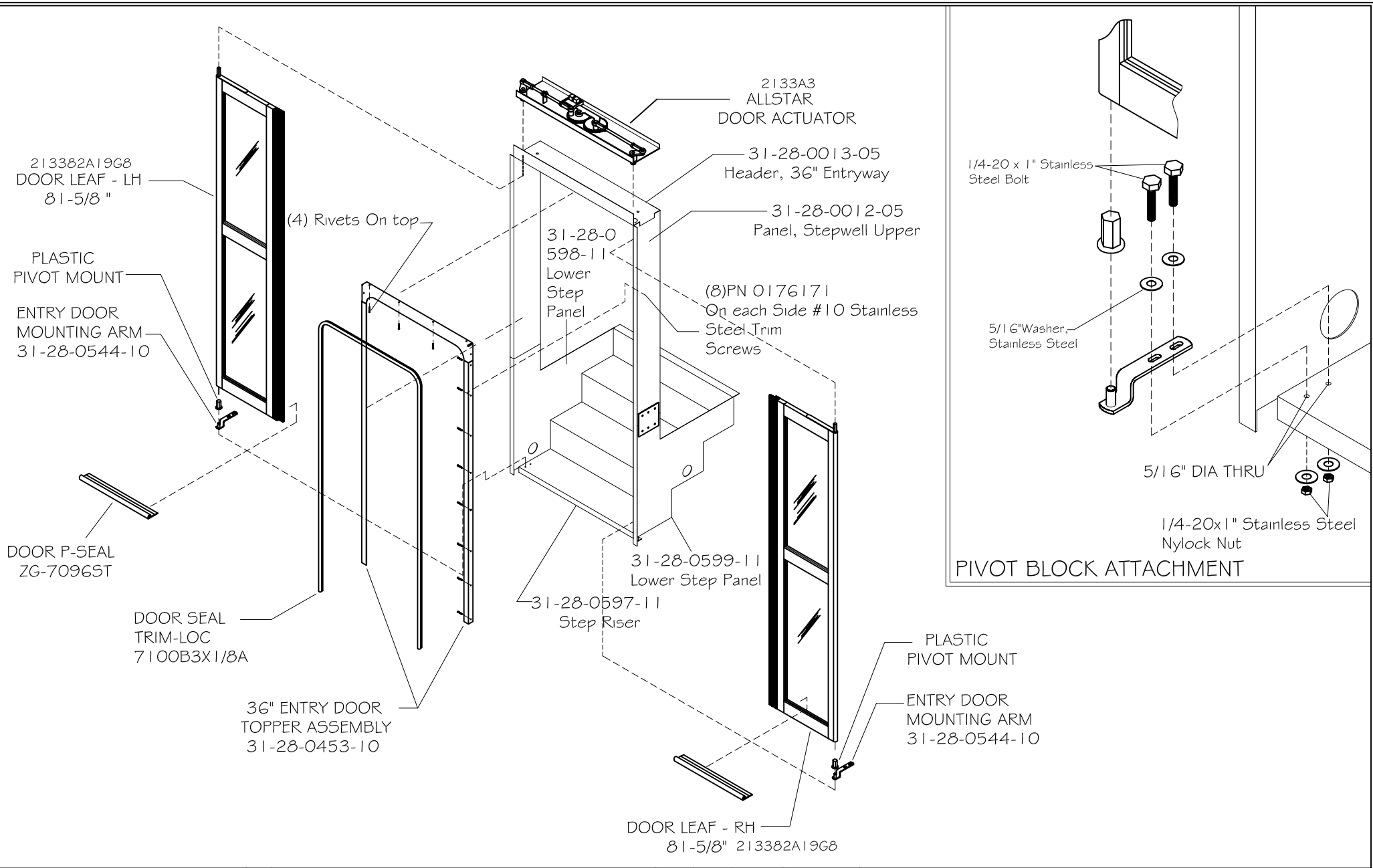
Airless spray, with a 33:1 1.5 - 3.5 GPM, .013 - .026 tip at 50-75 psi line pressure, 20 - 40 fan

www.ztechprotection.com

Z TECHNOLOGIES CORPORATION

World Leaders in Corrosion Protection

26500 Capitol Avenue, Redford, Michigan 48239-2597
Telephone (313) 937-0710 • Fax (313) 937-1470



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						TOLERANCE UNLESS OTHERWISE SPECIFIED		DATE: 2-25-13	TITLE
						± .00	± .030	DFTSN: MDK	INST'L 36" ENTRYWAY
						± .000	± .015	CHKR:	RAISED FLOOR ALLSTAR
REV. LET.	A	MODIFIED EDT DRAWING OF A STANDARD FLOOR	MDK	2/25/13	ECN No.	± .0000	± .005	APRVD:	DWG. No. 31-28-0880-13
		DESCRIPTION OF CHANGE	BY	CHK	DATE			SCALE	SHEET OF

UNDERCOAT PROCESS INFORMATION

Forest River Bus includes an undercoat application with every vehicle produced. The undercoating protects the unit's most exposed areas from moisture, dirt, grime, salt and other weather-related elements. Trained technicians within two undercoating bays apply the undercoating.

Each vehicle is raised using a drive-on ramp lift system in one of the two undercoating bays. Various areas of the body conversion are masked off including, but not limited to: fuel fills, mud flaps, wheel wells, etc. A rust preventative is also added to the bottom edge of the metal skirts if applicable. A spray foam is applied for additional noise reduction as well as body seam sealing. The underbody is then sprayed with a tough, pliable, corrosion protectant material, which incorporates a sound-deadening property at a pressure of 40 psi. The application runs between 45 minutes to 1.5 hours pending vehicle length.

Forest River Bus follows the strict guidelines established by QVM. No undercoating is sprayed within 12" of the exhaust system or on fuel tank(s), brake lines, AC/heater hoses, heat shield, wire harnesses, driveshaft(s), rear suspension or OEM frame rail.

Undercoating data is available upon request.



FOREST RIVER BUS

2367 Century Drive • Goshen, Indiana 46528 • 800.348.7440 • www.forestriverinc.com

[About](#)[Products](#)[Support Resources](#)[Service Request](#)[Suggestions](#)

Electric Door Actuators



Product Features

- ┌ Low-profile design
- ┌ Powder-coated base plate
- ┌ Plated push rods
- ┌ Permanently lubricated pivot points
- ┌ [Motor Control PC Board](#)
- ┌ [Proprietary, heavy-duty motor](#)
- ┌ [Available remote control](#)
- ┌ 1-year warranty
- ┌ New! Optional Auto Reopen Switch

Harmony of Movement

- ┌ Our design produces completely [perpendicular door opening](#)--always.
- ┌ Forward door opens first and closes last--always.
- ┌ No need to rely on spring-loaded push-pull rods--ever.

Secure Closing

- ┌ Our design ensure an unequalled, strong closing.
- ┌ The actuator will reliably hold the door shut, even at highway speeds.

Serviceability

- ┌ The reliability of the design,
- ┌ together with the ease-of-access,
- ┌ and the documentation tools we provide,
- ┌ work together to create unparalleled serviceability.

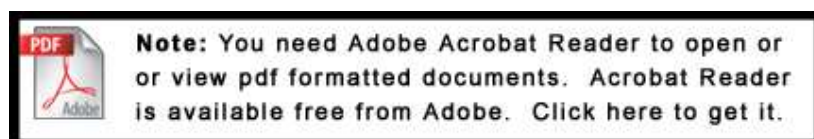
Maintenance

Minimal periodic maintenance of this product is recommended. The frequency varies, of course, by climate and use. Periodically **inspect** the entire mechanism.

As a rule, **lubricate** all moving parts on a semi-annual basis using a white, lithium, aerosol grease.

Support Documentation

- └ [DOC00066, A&M Systems Header Option Chart and Details](#) (pdf, 326 KB)
- └ Parts Lists
 - └ [Model 1000E Family](#) (pdf, 1.10 MB)
 - └ [Model 1100E Family](#) (pdf, 1.08 MB)
 - └ [Model 1200E Family](#) (pdf, 1.08 MB)
 - └ [Model 1300E Family](#) (pdf, 1.08 MB)
 - └ [Model 1400E Family](#) (pdf, 1.08 MB)
 - └ [Model 1500E Family](#) (pdf, 1.08 MB)
 - └ [Model 1600E Family](#) (pdf, 1.08 MB)
 - └ [Model 2100E Family](#) (pdf, 1.10 MB)
 - └ [Model 2100.1E Family](#) (pdf, 346 KB)
 - └ [Model 2200E Family](#) (pdf, 1.08 MB)
 - └ [Model 2300E Family](#) (pdf, 1.08 MB)
 - └ [Model 2400E Family](#) (pdf, 1.18 MB)
 - └ [Model 2729.X Family](#) (pdf, .81 MB)
 - └ [Model 2800E Family](#) (pdf, 1.08 MB)
 - └ [Model 2800.1E Family](#) (pdf, 1.00 MB)
 - └ [Model 3000E Family](#) (pdf, 362 KB)
 - └ [Model 3400E Family](#) (pdf, 1.08 MB)
 - └ [Model 3500E Family](#) (pdf, 931 KB)
 - └ [Model 3501E](#) (pdf, 461 KB)
 - └ [Model 3600E Family](#) (pdf, 1.43 MB)
 - └ [Model 4000E Family](#) (pdf, 679 KB)
 - └ [Model 4400E Family](#) (pdf, 678 KB)
 - └ [Model 5142E Family](#) (pdf, 834 KB)
 - └ [Model 5300E Family](#) (pdf, 637 KB)
 - └ [Model 5500E Family](#) (pdf, 362 KB)
 - └ [Model 6200E Family](#) (pdf, 535 KB)
 - └ [***NEW - PC Board and Wires Chart](#) (pdf, 171 KB)
- └ [Assembly & Rigging Instructions](#) (pdf, 98 KB)
- └ Replacements
 - └ [Actuator Arm Replacement](#) (pdf, 21 KB)
 - └ [Emergency Release Lever Replacement](#) (pdf, 21 KB)
 - └ [Forward Gear Replacement](#) (pdf, 21 KB)
 - └ [Motor Replacement](#) (pdf, 20 KB)
 - └ [PC Board Replacement, Quick Check™ Enabled](#) (pdf, 21 KB)
 - └ [PC Board Replacement, Standard](#) (pdf, 21 KB)
- └ Troubleshooting
 - └ [Motor Control PC Board with Auto Reopen](#) (pdf, 10 KB)
- └ [Simplified Schematic](#) (pdf, 75 KB)
- └ [Wireless remote option flyer](#) (pdf, 158 KB)



[About](#)

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Door Leaves



Product Features

- ┌ Distinctive door leaf design
- ┌ [Key-lock joint](#)
- ┌ Corrosion resistance through use of aluminum, stainless steel, and zinc plating
- ┌ [Torque arm](#) on upper hinge
- ┌ [Tempered glass](#)
- ┌ Tough, clear coat, anodized finish (204 R1 rated)
- ┌ [Radiused edge](#) for clean mating to seal
- ┌ Ambidextrous! (Use in either forward or aft position)

Harmony of Movement

- ┌ Our design produces completely [perpendicular door opening](#)--always.
- ┌ Forward door opens first and closes last--always.
- ┌ No need to rely on spring-loaded push-pull rods--ever.

Secure Closing

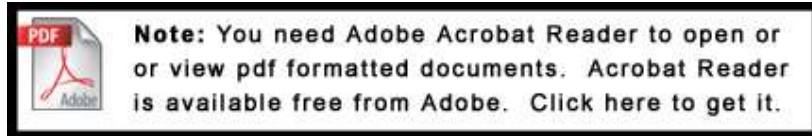
- ┌ Our design ensure an unequalled, strong closing.
- ┌ The actuator will reliably hold the door shut, even at highway speeds.

Serviceability

- ┌ The reliability of the design,
- ┌ together with the ease-of-access,
- ┌ and the documentation tools we provide,
- ┌ work together to create unparalleled serviceability.

Support Documentation

- ┌ [DOC00065, A&M Systems Door Option Chart and Details.pdf](#) (pdf, 1128 KB)
- ┌ [Glass Replacement](#) (pdf, 20 KB)
- ┌ [Door Parts List](#) (pdf, 262 KB)
- ┌ [D.O.T. Window Retention Certification](#) (pdf, 912 KB)



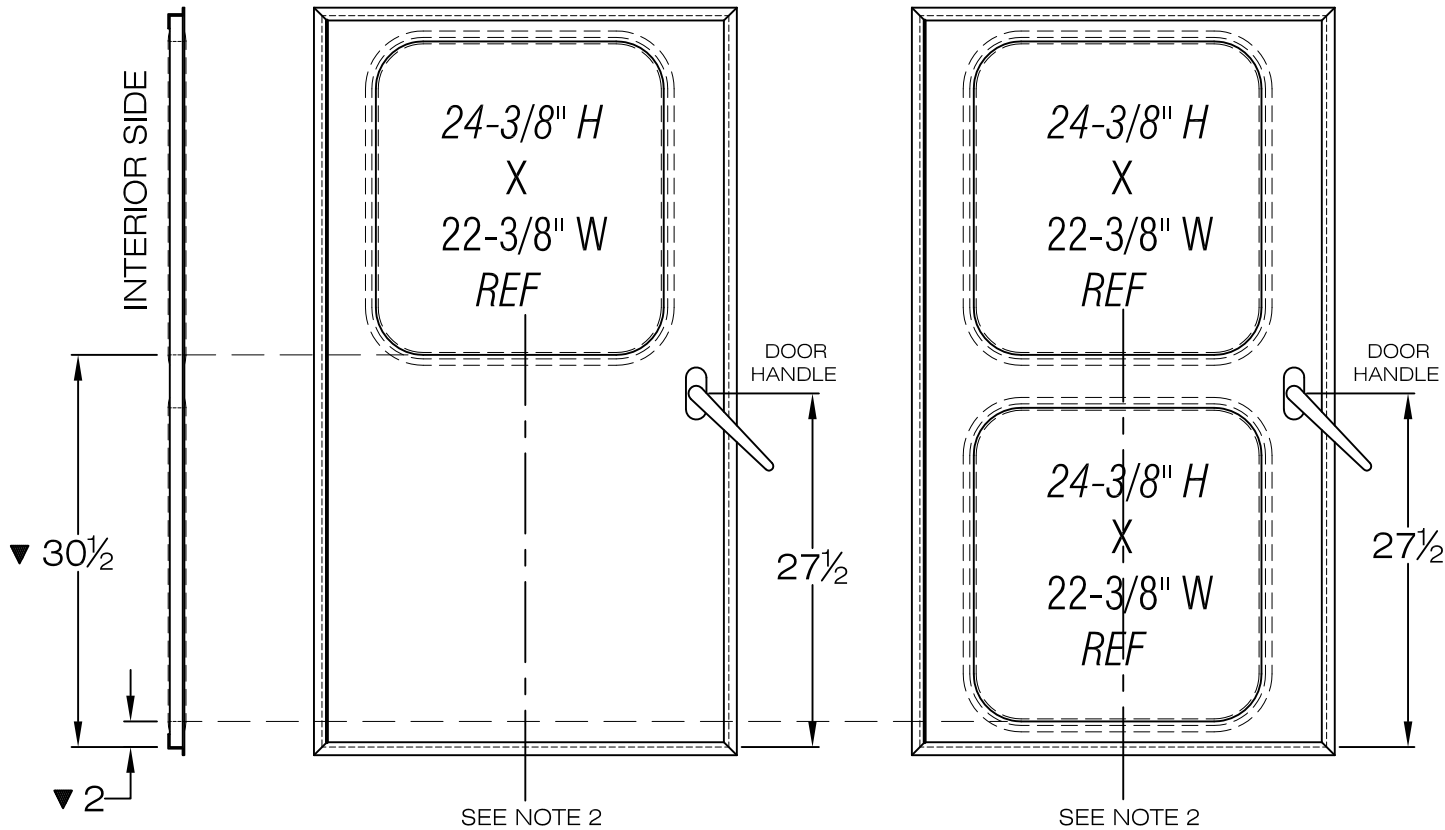
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REAR DOOR

SINGLE WINDOW

DOUBLE WINDOW



REAR DOOR ROUGH FRAME OPENING $38\frac{1}{2}$ " X 59"

NOTES:

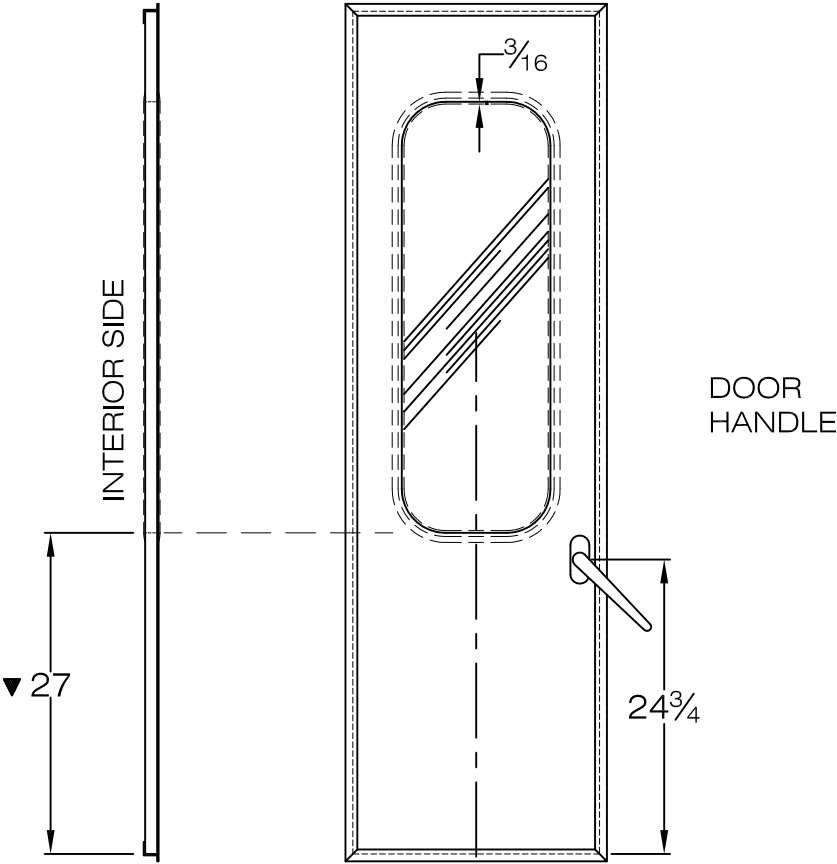
- 1- DIMENSIONS FOR THE WINDOW CUTOUT
DO NOT INCLUDE DOOR OR WINDOW TRIM.
- 2 - CENTER WINDOW HORIZONTALLY IN DOOR.
- 3 - TWO (2) PANELS ARE REQUIRED FOR W/C DOOR.

▼ CRITICAL CONTROL ITEM

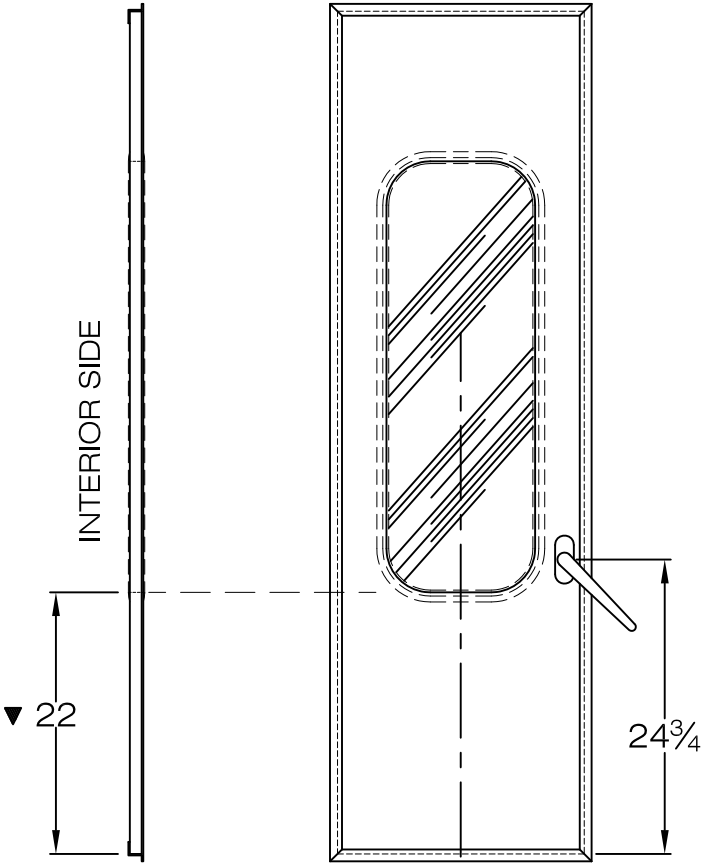
CAD DRAWING: DO NOT SCALE OR MANUALLY REVISE

TOLERANCE UNLESS OTHERWISE SPECIFIED		Forest River Bus	
WOOD	OTHER	DATE: 4-6-2006	TITLE: LOCATION, RR DR WINDOW
$\pm 1/8"$	$\pm 1/16"$	NAME: ET	
$\pm 1"$	$\pm 1/2"$	DWG. No. 31-28-0108-06	

STANDARD WIDE BODY BUS



NARROW BODY BUS AND
RAISED FLOOR WIDE BODY BUS



NOTES:

- 1- DIMENSIONS FOR THE WINDOW CUTOUT
DO NOT INCLUDE DOOR OR WINDOW TRIM.
- 2 - 36 1/4" X 12 1/2" ROUGH WINDOW OPENING
- 3 - CENTER WINDOW HORIZONTALLY IN DOOR.

SEE NOTE 3

Rough Opening for 33-34" Lifts 47.5" x 71.88"
Rough Opening for 37" Lifts 49.9" x 71.88"
Offset hinges are utilized, maximizing clear
opening available.

SEE NOTE 3

▼ CRITICAL CONTROL ITEM

CAD DRAWING: DO NOT SCALE OR MANUALLY REVISE

TOLERANCE UNLESS OTHERWISE SPECIFIED		Forest River Bus	
WOOD	OTHER	DATE: 3-8-06	TITLE: LOCATION, W/C DOOR WINDOW
± 1/8"	± 1/16"	NAME: EDT	
± 1"	± 1/2"	DWG. No.	31-28-0105-06



Gateway



INTERMOTIVE
VEHICLE
CONTROLS

An ISO 9001:2015 Registered Company

Gateway

High Idle and Shift Interlock System

Overview

- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- System is fully compliant with FMVSS 403/404 and the Americans with Disabilities Act (ADA) for wheelchair lift interlocks
- Simple plug and play connections to the OEM chassis

Features

- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- Uses Intermittent Fault Filter™ (IFF) technology to eliminate erroneous lift door signals

Product features may vary by make, model or year. See instructions for complete details.

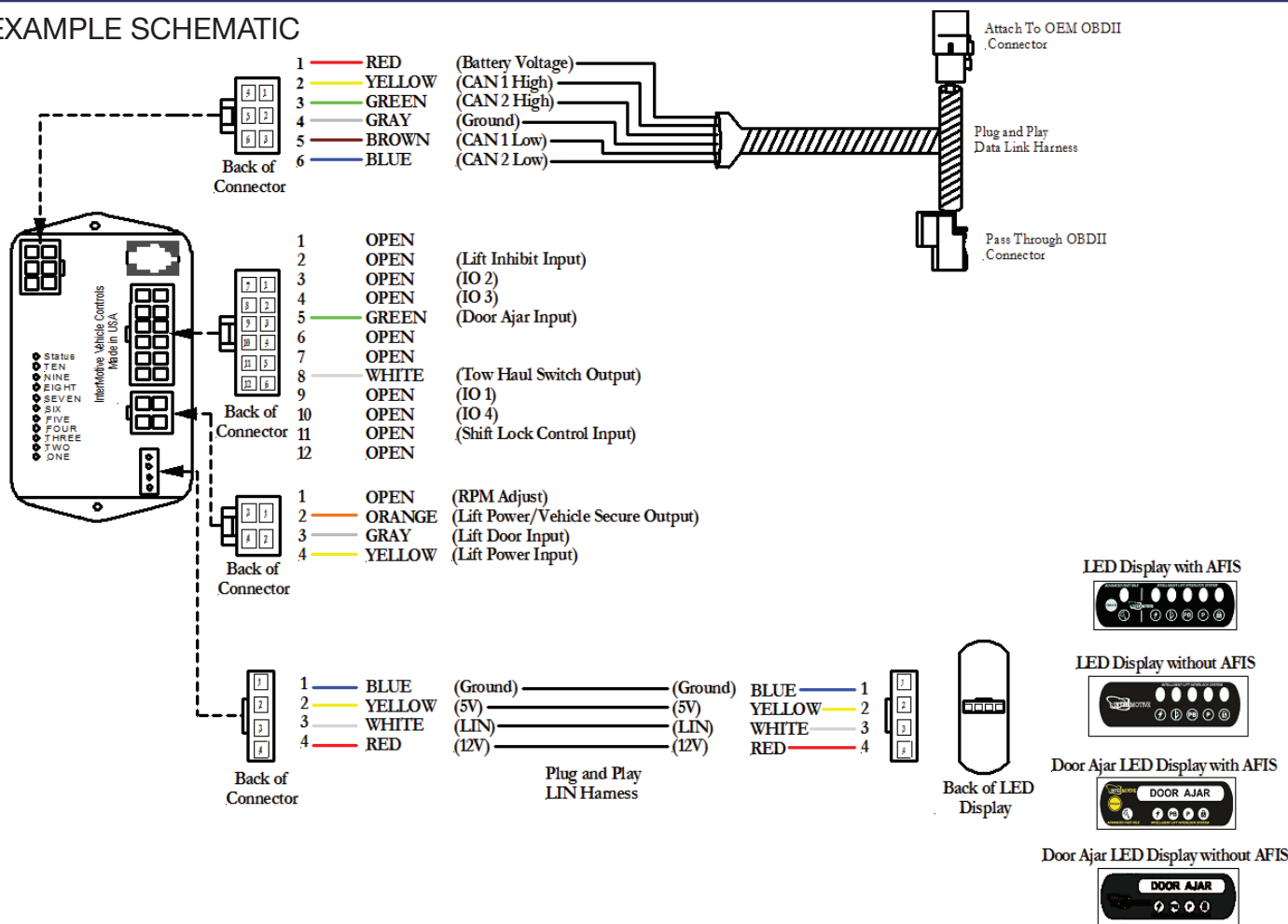
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Details

EXAMPLE SCHEMATIC



SPECIFICATIONS

Number of Inputs	Five inputs (lift inhibit, door ajar, shift lock, lift door and RPM adjust)
Number of Outputs	Four configurable outputs, plus one lift power/vehicle secure output and one tow haul switch output
Current Draw	~120 mA
Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

HEAVY DUTY ENERGY ABSORBING BUMPERS

PROTECTS VEHICLE IN LOW SPEED IMPACTS

TRANSPEC[®]
A Safe Fleet Brand



SAFETY

Protects vehicle from damage in low speed collisions



EXTREME TEMP

Specified on buses in extreme climates



CORROSION RESISTANT

Withstands years of harsh elements and road chemicals



OPTIONS

Available in various widths and custom end trims



IMPACT AND SCRATCH RESISTANT

Durable skin is puncture and tear resistant



WARRANTY

1 year

- **Outer Skin Can be Painted to Match or Compliment the Vehicle**
- **Two piece construction offers exchangeable symmetrical halves**
- **Less Parts Reduces Inventory Requirements and Cost**
- **Widths Available from 96" to 102**

13501 S Ridge Dr. • Charlotte, NC 28273 • Tel: 800 . 951 . 7867 • Fax: 704 . 889 . 2760 • sales@smiglobal.net
W W W . S M I G L O B A L . N E T

NCL-7.2-6006 | Rev A | 6-18-15 | ISO 9001 Certified

MEDIUM DUTY ENERGY ABSORBING BUMPERS

PROTECTS VEHICLE IN LOW SPEED IMPACTS

TRANSPEC[®]
A Safe Fleet Brand



SAFETY

Protects vehicle from damage in low speed collisions



EXTREME TEMP

Specified on buses in extreme climates



CORROSION RESISTANT

Withstands years of harsh elements and road chemicals



OPTIONS

Available in various widths and custom end trims



IMPACT AND SCRATCH RESISTANT

Durable skin is puncture and tear resistant



WARRANTY

1 year

- **Two Piece Construction offers Exchangeable - Symmetrical Halves**
- **Fewer Parts Reduces Inventory Requirements and Cost**
- **Less Weight = Higher Fuel Efficiency**
- **Widths available 80" to 96"**

13501 S Ridge Dr. • Charlotte, NC 28273 • Tel: 800 . 951 . 7867 • Fax: 704 . 889 . 2760 • sales@smiglobal.net
W W W . S M I G L O B A L . N E T

NCL-7.2-6006 | Rev A | 6-18-15 | ISO 9001 Certified



CENTURY SERIES NCL1000-2 WHEELCHAIR LIFTS

THE ONE-STOP-SHOP FOR ALL YOUR MOBILITY TRANSPORTATION NEEDS

Since 1963, BraunAbility® has been the trusted industry leader. Our wheelchair accessible vehicles and lifts are designed to meet your specific needs, with performance, safety, and reliability that will keep your fleet up and running day after day, year after year. With the most diverse product portfolio of any mobility vehicle company in the industry, BraunAbility delivers the right solution to every commercial mobility need.

NCL1000-2 CENTURY SERIES WHEELCHAIR LIFT

STANDARD FEATURES

- **1,000-pound lifting capacity**
- NHTSA-compliant
- Fully automatic FMVSS 403-compliant lift, operated by an attendant
- Interfaces with OEM interlocks
- Long-lasting LED lift-mounted lights
- Side or rear door application*
- Platform options up to 37" wide
- Floor to ground lift heights up to 48"
- Made in the USA

* Vehicle suspension dynamics affect body roll and FMVSS 404 platform tilt allowance. Before selecting a lift with a 1000# rated capacity, ensure this load does not induce excessive platform tilt.

SAFETY FEATURES

- Locking mechanical Inboard Barrier (IB), powder coated yellow for safety and high visibility, prevents operation if occupied
- Visual and audible warnings alert both passengers and attendants to unsafe conditions
- Interlocked gas spring activated outer barrier
- Dual handrails for security and convenience
- Pump design prevents platform folding when occupied

EASE OF USE FEATURES

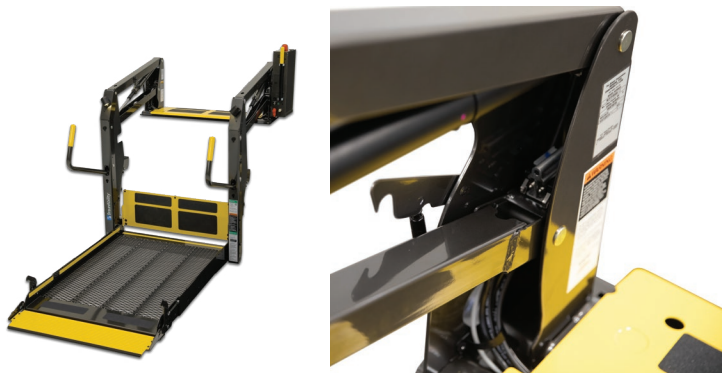
- Hand-held control box with illuminated functions
- Durable redesigned baseplate reduces lift weight, and allows for quicker and easier service
- Bridging feature permits the wheelchair user to board the lift from sidewalks
- Equipped with an adjustable anti-rattle feature
- Lift-Tite™ system stows the lift platform securely while the vehicle is in transit
- Pump module with removable cover offers easy access to all components
- Integrated back-up pump

BRAUNABILITY'S UNRIVALED SERVICE

Every BraunAbility® commercial mobility product comes with our team of commercial mobility experts. They will work to find the ideal mobility transportation solution, no matter the requirements, complexity, or scale. And after you make a purchase, they will continue to work just as hard to offer you all the service and repair support you need.

The NCL1000-2 Century Series Wheelchair Lift from BraunAbility

With dual hydraulic lift arms, and a design that has withstood the test of time, the Century Series offers all the benefits and quality of a BraunAbility wheelchair lift in a streamlined, economical package. The simplified electrical system offers trouble-free operation, while the non-hydraulic spring-loaded outer barrier keeps the wheelchair safely and securely on the wheelchair lift platform throughout the lifting cycle. In addition to all these standard features, the NCL1000-2 also comes equipped with an increased lifting capacity of 1000 pounds.



The NCL1000-2 Century Series also features new and improved inboard barriers, baseplates, vertical channels, and lower parallel arms for a more rigid and stable ride.

BraunAbility offers several models of the Century 2 Wheelchair Lift to address the right application, including usable platforms of 33" x 51", 34" x 51", 34" x 54", as well as 37" x 51" and 37" x 54". The models also vary based on the placement of the front or rear pump module, the lifting capacity (1,000 pounds), and the overall floor-to-ground lift height (up to 48"). The Century 2 Wheelchair Lift is available with or without the handrail belt. See your BraunAbility dealer or braunability.com for lift models available for your specific application.



MADE IN THE USA

631 West 11th Street • Winamac, IN 46996
(574) 946-6153 | 1-800-THE-LIFT
www.braunability.com/commercial

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Gateway



INTERMOTIVE
VEHICLE
CONTROLS

An ISO 9001:2015 Registered Company

Gateway

High Idle and Shift Interlock System

Overview

- All-in-one wheelchair interlock and high idle system to ensure full functionality of the vehicle's systems while using the lift
- Provides battery charge protection and improves air conditioning performance
- System is fully compliant with FMVSS 403/404 and the Americans with Disabilities Act (ADA) for wheelchair lift interlocks
- Simple plug and play connections to the OEM chassis

Features

- Prevents vehicle movement while the lift is in use by locking the shifter in Park
- Monitors OEM sensor inputs from the transmission, engine, charging system and ambient air temperature
- Programmable RPM for high idle
- Prevents driving with the park brake set
- Can provide real-time chassis data
- Diagnostic trouble codes available
- Optional BrakeMax add-on: automatically places vehicle in "tow haul" mode for reduced brake wear
- Uses Intermittent Fault Filter™ (IFF) technology to eliminate erroneous lift door signals

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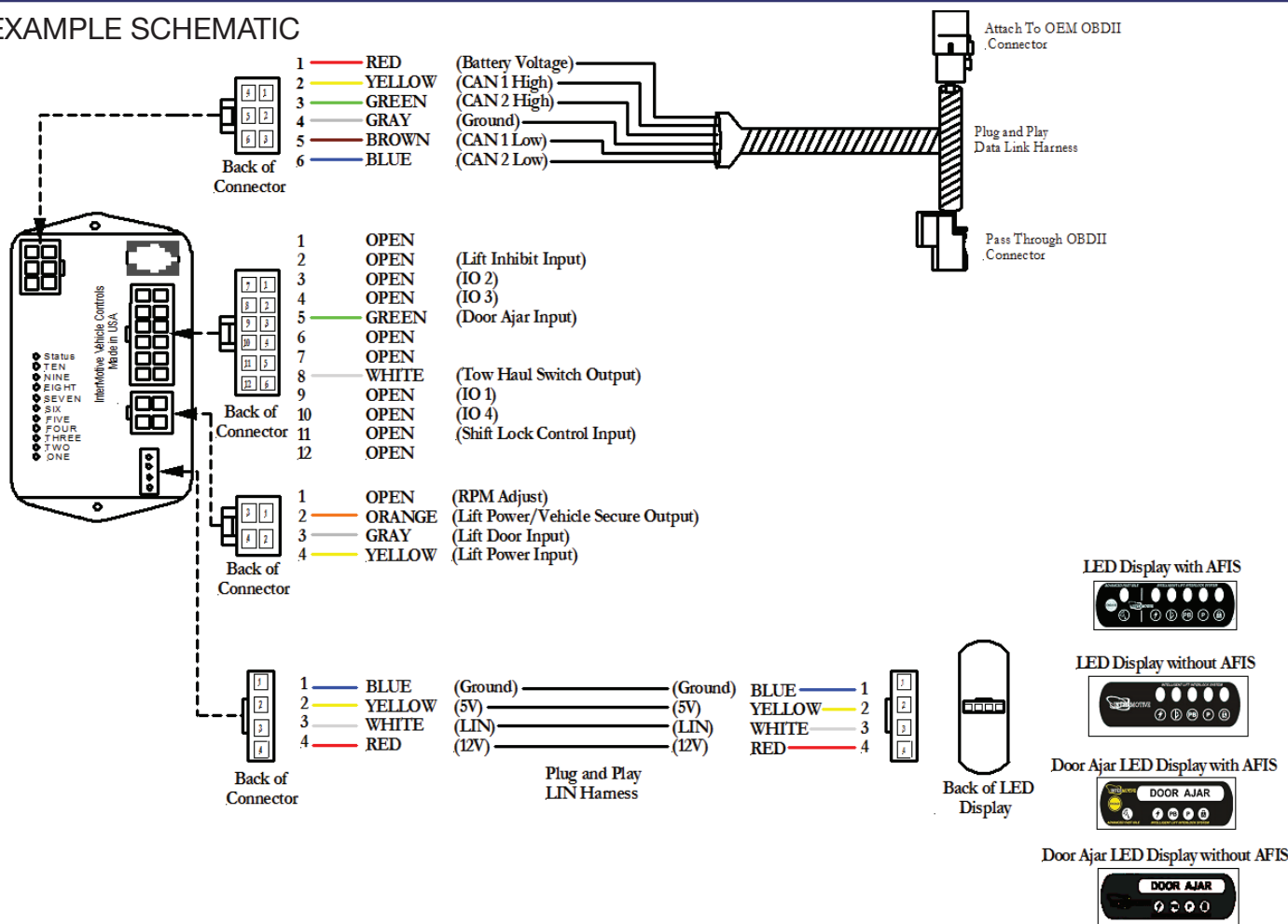
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Details

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SPECIFICATIONS

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Quiescent Draw	~2 mA (sleep current)
CAN Speed	High and medium speed
Temperature Range	-40°C to 80°C
Dimensions	4" L x 2" W x 1" H

SMC Condensers

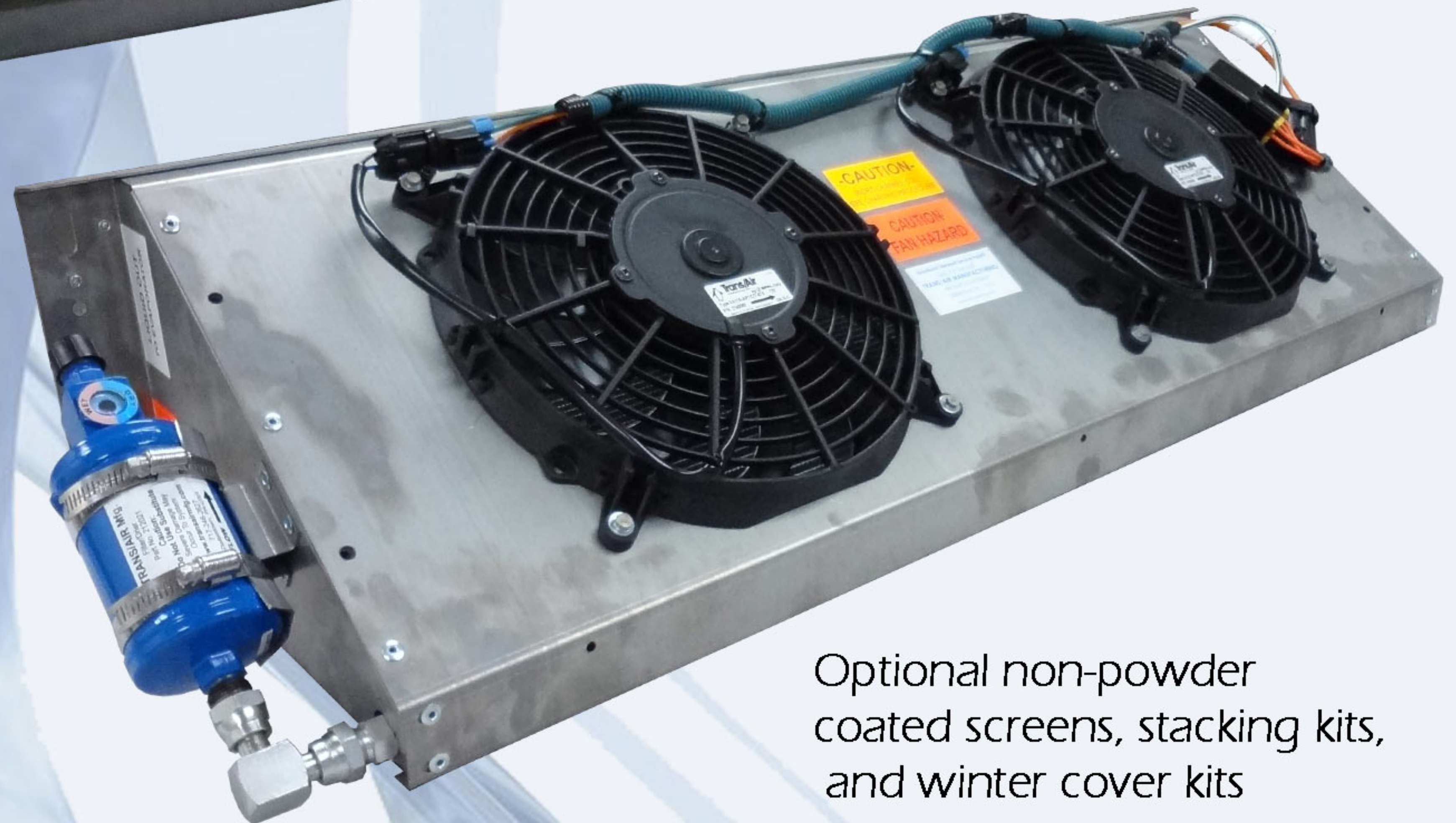
SMC3L & SMC2S microchannel skirt mounted condensers that can be used with almost every standard Trans/Air evaporator / compressor combination to complete an optimal climate control system.



Constructed of corrosion-resistant powder-coated galvanized steel

Stainless steel housing option is also available (Stainless Steel SMC2S pictured below)

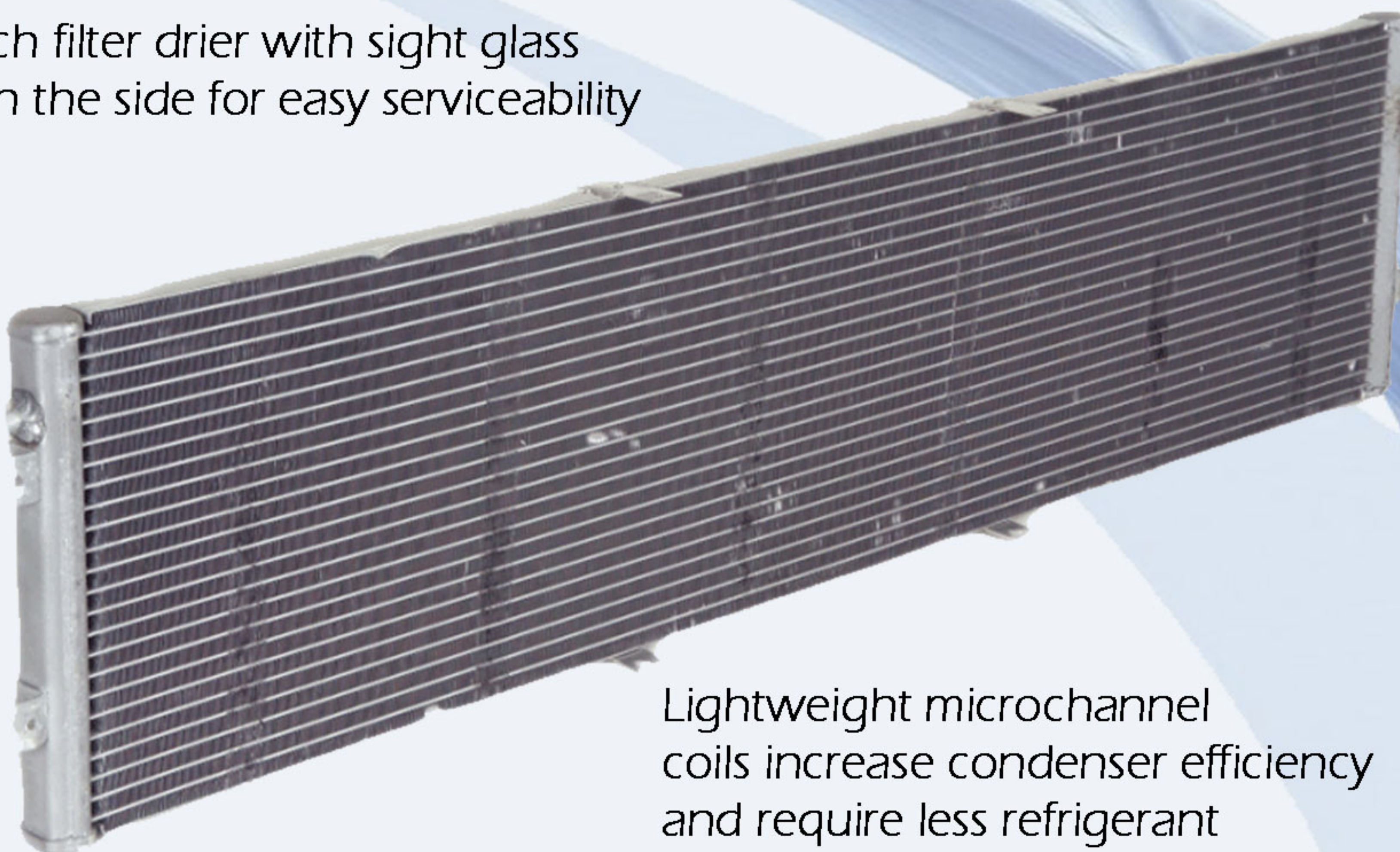
Flexible mounting pattern (optional channels available to attach condenser to vehicle stringer in lieu of standard floor mounting)



Optional non-powder coated screens, stacking kits, and winter cover kits



16 cubic inch filter drier with sight glass mounted on the side for easy serviceability



Lightweight microchannel coils increase condenser efficiency and require less refrigerant

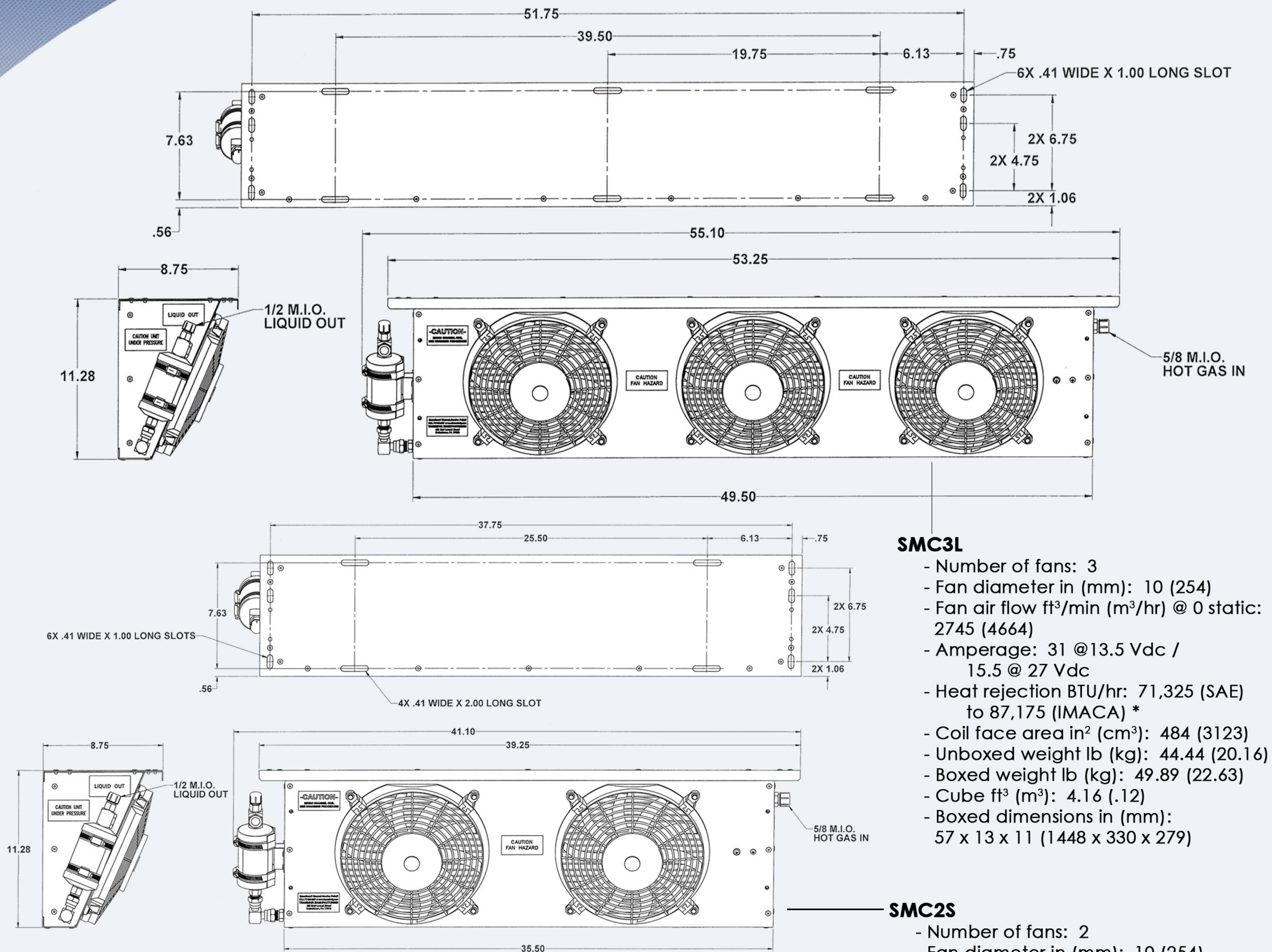


10" weather-proof condenser fans provide maximum air flow

School & Commercial Bus Climate Control Design | Manufacture | Install | Service

Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing world class climate control products and services to the bus and commercial vehicle markets.

SMC Condensers



SMC3L

- Number of fans: 3
- Fan diameter in (mm): 10 (254)
- Fan air flow ft³/min (m³/hr) @ 0 static: 2745 (4664)
- Amperage: 31 @13.5 Vdc / 15.5 @ 27 Vdc
- Heat rejection BTU/hr: 71,325 (SAE) to 87,175 (IMACA) *
- Coil face area in² (cm²): 484 (3123)
- Unboxed weight lb (kg): 44.44 (20.16)
- Boxed weight lb (kg): 49.89 (22.63)
- Cube ft³ (m³): 4.16 (.12)
- Boxed dimensions in (mm): 57 x 13 x 11 (1448 x 330 x 279)

SMC2S

- Number of fans: 2
- Fan diameter in (mm): 10 (254)
- Fan air flow ft³/min (m³/hr) @ 0 static: 1830 (3109)
- Amperage: 21.3 @13.5 Vdc / 10.7 @ 27 Vdc
- Heat rejection BTU/hr: 48,364 (SAE) to 59,112 (IMACA) *
- Coil face area in² (cm²): 363 (2342)
- Unboxed weight lb (kg): 33.82 (15.33)
- Boxed weight lb (kg): 38.58 (17.50)
- Cube ft³ (m³): 3.09 (.09)
- Boxed dimensions in (mm): 43 x 13 x 11 (1092 x 330 x 279)

General (SMC2S & SMC3L)

- Skirt mounted
- Housing: powder-coated galvanealed steel (stainless steel optional)
- 92% flow-through aluminum grill
- Coil fins: 0.008 in thick
- Filter drier: 16 in³

Fan Motor Assembly (SMC2S & SMC3L)

- Low profile surface mount
- Closed permanent magnet motor with ball bearings

Sight Glass (SMC2S & SMC3L)

- Moisture indicator
- Visible from outside of vehicle

Warranty

- 2 year unlimited mileage limited warranty within the continental U.S. and Canada. Terms of Trans/Air's domestic and export warranty policies are available upon request.

*** Actual BTU/hr is dependant on system combination and rating conditions used**

- Specifications subject to change without notice
- All measurements in standard
- Contact Trans/Air for more information

TA77 Evaporator

Industry
exclusive 2
year, unlimited
mileage, limited
warranty

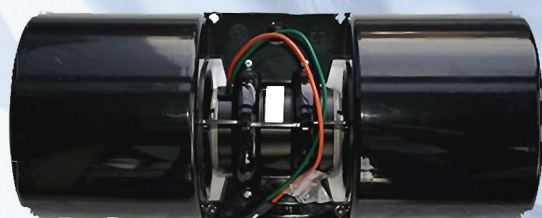
**A rear mounted
freeblow
evaporator that
can be used as
a tie-in with OEM
components
or as part of a
complete
Trans/Air system**



Durable ABS cover with unique drain pan that promotes proper condensate removal (available in white, gray, and spring white)



Enhanced tube
& fin design provides
highest
capacity



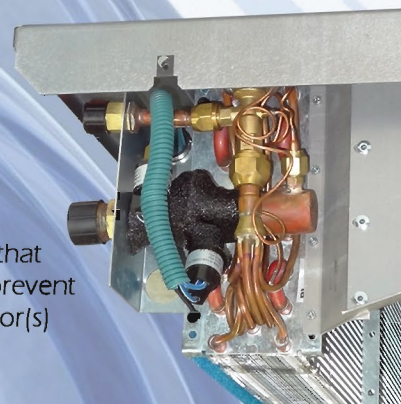
Blower assemblies come equipped
with larger blower wheels for maximum
air flow and motors utilize custom
wound armatures for lower current
draw and greater efficiency



Heavy Duty galvanized
steel enclosure for reduced
air leakage and maximum
durability



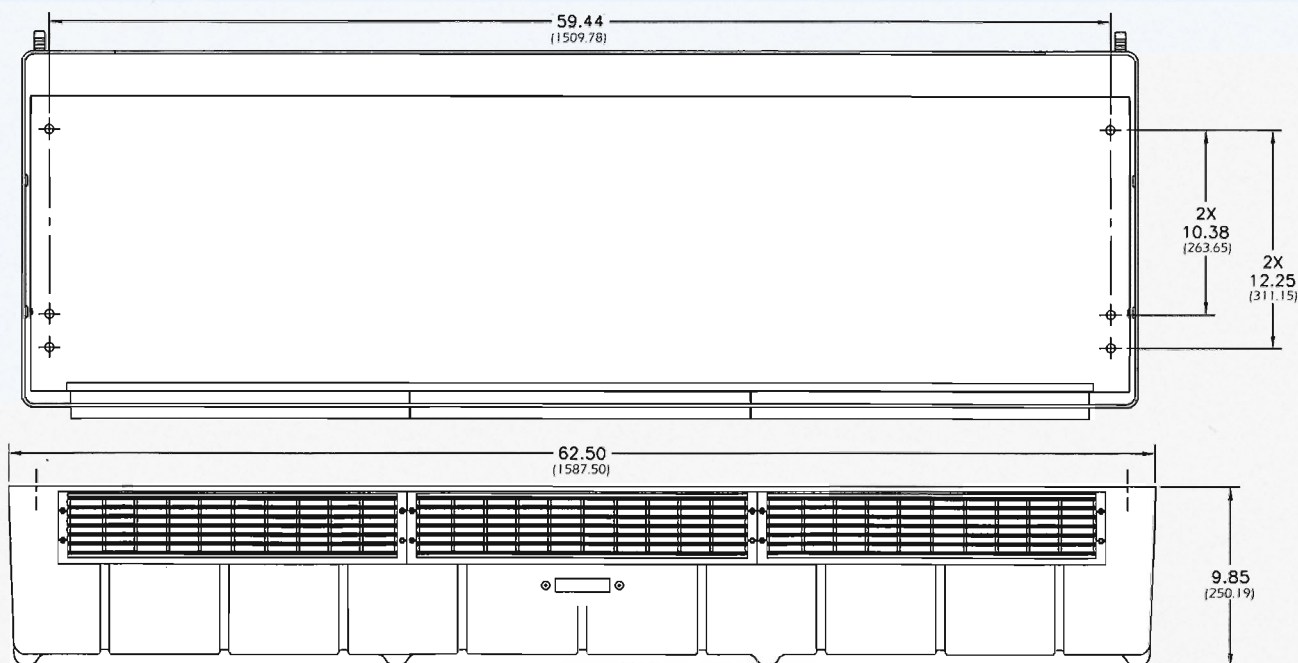
4 Ton externally equalized,
thermostatic expansion valves that
precisely control refrigerant and prevent
liquid slugging to the compressor(s)
or starved evaporator(s)



School & Commercial Bus Climate Control Design | Manufacture | Install | Service

Trans/Air Manufacturing Corporation is an ISO 9001 registered firm committed to providing world class climate control products and services to the bus and commercial vehicle markets.

TA77 Evaporator



General

- Freeblow air distribution
- Weight lb (kg): 100 (45)
- Box Size in (mm): 66 x 20 x 16 (1676 x 508 x 406)
- Cube ft³ (m³): 12.22 (.34)

Cooling Capacity

- BTU/hr: 57,458 (SAE) to 96,826 (IMACA) *

Heating Capacity

- BTU/hr: 67,374 (Actual capacity varies based on engine operating temperature and hot water flow rate)

Cover

- ABS cover
- Integral drain pan
- (3) Multi-directional louvers
- Washable / reusable filter
- (2) 5/8 in ID drain hoses

Blower Assemblies

- (6) 4.5 in diameter blower wheels
- Amperage draw: 20.0 Amps @ 13.5 Vdc (10.0 Amps @ 27 Vdc)
- Total air flow 2220 ft³/min (3772 m³/hr) @ 0 static
- (3) Double shafted, single speed, permanent magnet motors

Evaporator Coil

- (2) Coils
- Each coil face area in² (cm²): 204 (1316)
- 3/8 in enhanced copper tubing
- Fins: 0.006 in raised lance, 10 FPI
- (3) Row

Electrical

- Color coded in fire retardant loom
- Low and high pressure switches

Expansion Valve

- (2) 4 Ton externally equalized thermostatic type

Available Options

- Metal cover for use with OEM installation
- Heat coil used with positive isolator valve. Isolator valve and heater hose not included.
- Coil corrosion protection

Warranty

- 2 year unlimited mileage limited warranty within the continental U.S. and Canada. Terms of Trans/Air's domestic and export warranty policies are available upon request.

* Actual BTU/hr is dependent on system combination and rating conditions used

- Specifications subject to change without notice
- All measurements in standard (metric)
- Contact Trans/Air for more information

TECHNICAL DATA SHEET



COMPONENT SPECIFICATIONS

ProAir 435 / 445 / 465 Low Profile Heaters

Where a smaller height is required and high heat is of utmost importance the 435, 445 and 465 Low Profile auxiliary heaters deliver maximum BTUs with outstanding CFMs.

Features: Long Life Motor, 3 Year Warranty, Standard Plug-In on Harness and Filter Option Available

435 / 445 Heater Performance

35,000 Btu/hr 435 Heater and 45,000 Btu/hr 445 Heater Capacity

Power Requirement

12 Volts DC

Draw is 5.0 Amps @ 13.5 Volts

Air Flow

313 CFM @ 0 static Pressure

Weight

8 Lbs. 435 Heater 9 Lbs. 445 Heater

Physical Size

W 10.25" x H 7.5" x D 9.5"



465 Heater Performance

65,000 Btu/hr Heating Capacity

Power Requirement

12 Volts DC

Draw is 10.0 Amps @ 13.5 Volts

Air Flow

640 CFM @ 0 static Pressure

Weight

15 Lbs.

Physical Size

W 21" x H 7.5" x D 9.5"



Warranty

ProAir systems are covered by an industry-leading two-year warranty. Complete terms are outlined in our Warranty Statement, Consult ProAir for detailed information.

TARABUS

TARABUS NT Specification Sheet

Product description and composition:

- The flooring shall be specially designed for buses.
- The flooring shall be flexible PVC flooring in 2.25 mm thickness, composed of a compact plasticized wear layer.
- The wear layer shall contain inlaid silicon carbide particles to improve slip resistance.
- The wear layer shall not contain aluminium oxide particles or quartz granules to prevent from maintenance and cleaning issues.
- The wear layer shall not contain fillers (fillers<5phr).
- The design shall be inlaid through the whole thickness of the wear layer.
- The intermediate layer of the flooring shall be made of a glass fibre grid, providing outstanding dimensional stability: $\leq 0.2\%$ according to EN 434.
- The flooring shall have a special textile backing designed for public transport vehicles, to enable bonding with acrylic glues onto plywood substrates or plywood with phenolic film substrates or aluminium.
- The flooring shall not crack and no white line shall appear when bended by 180 degrees.
- The welding rods shall be manufactured by the flooring manufacturer to enable a perfect weld.

Environment:

- The flooring shall be free from heavy metals (Lead, Cadmium, Barium, Tin, Chromium...).
- The flooring shall be free from DEHP plasticizer.
- The manufacturer of the floor covering must be in possession of a valid ISO 14001 certificate.

Technical characteristics:

- Fire class: the flooring material shall conform to the European Directive 95/28/EC
- Fire class: the flooring material shall conform to the FMVSS/CMVSS 302
- Fire class: the flooring shall have been tested to UTAC ST 18502/1 (Type A) and ISO 3795/76 (0mm/mn)
- Fire class: the flooring shall obtain CRF>0.50 W/cm² when tested according to NFPA 253 – ASTM E648
- The manufacturer of the floor covering must be in possession of a valid quality systems certificate, showing compliance with ISO 9001.

Installation:

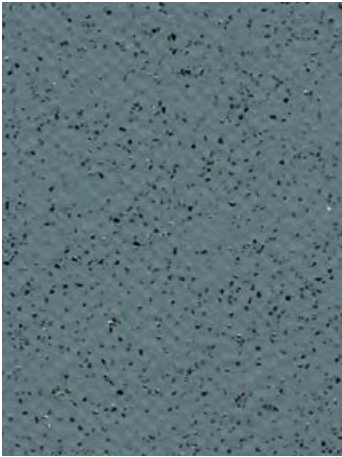
- All joints must be welded using a hot welding gun and PVC welding rods. To ensure the right watertightness of the flooring system, no sealant shall be used between 2 flooring sheets.

SIRIUS



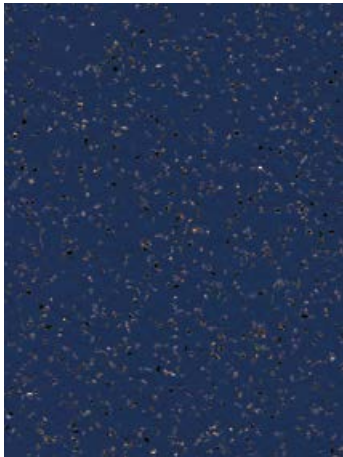
6768 Griffon

NT



6782 Dune

NT



6451 Corsaire

NT



6727 Anthracite

NT



6801 Graphite

NT

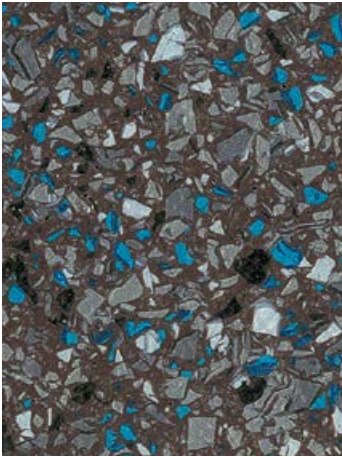
APOLLO



4776 Masan

MK

NT



4479 Kilimanjaro

MK

NT

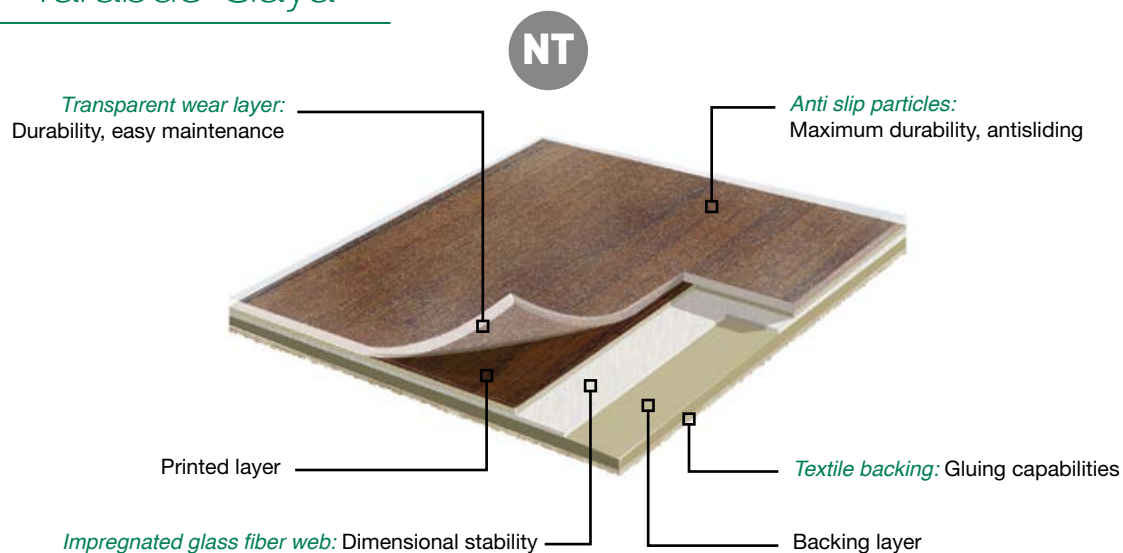


4517 Fuji

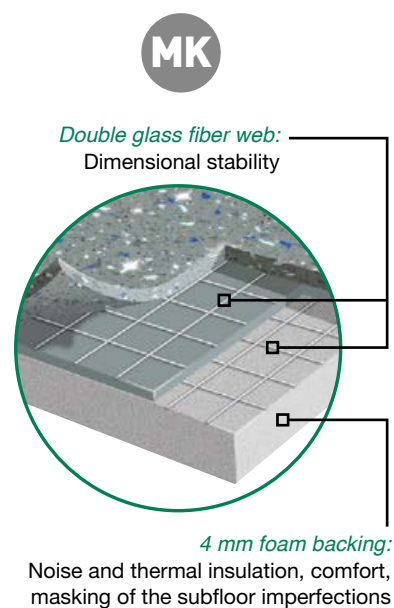
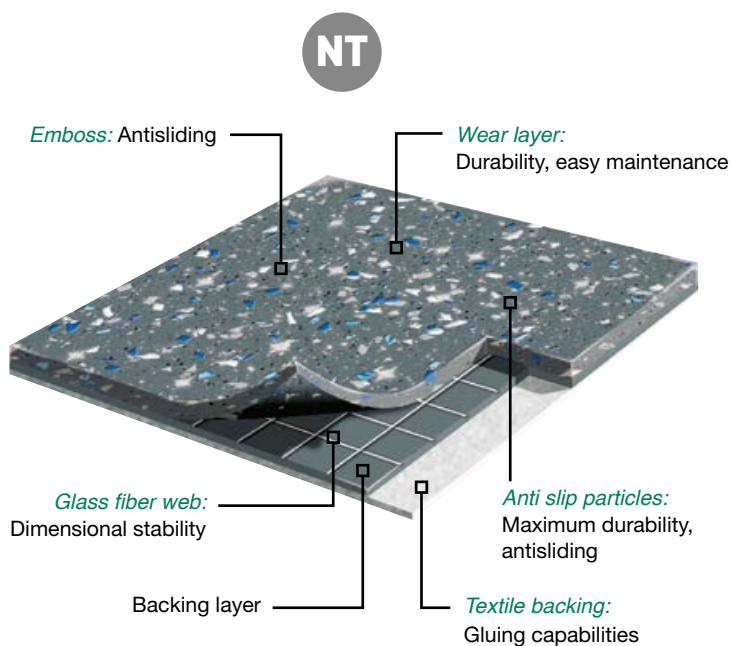
MK

NT

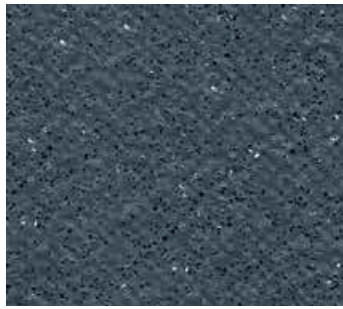
► Tarabus Gaya



► Tarabus standard



► Safebus X'tra



6822 Dark Grey

NT

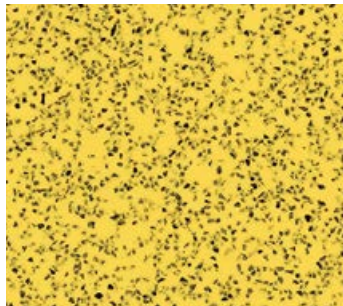
► Venus



6727 Anthracite

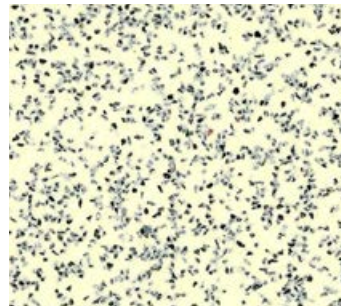
NT

► Safebus



6602 Caledonia

NT



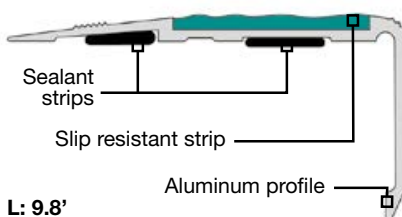
6203 Borneo

MK

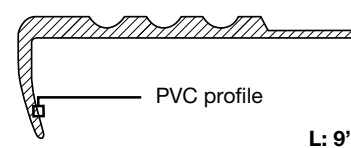
NT



► Stepbus



► Step nosing



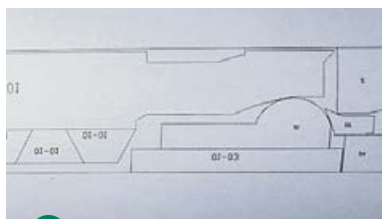
Yellow



White

KIT System

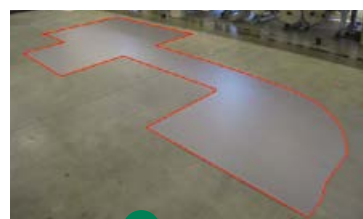
Pre-cut and pre-welded **TARABUS** floor covering system according to your drawings



1 Send us your floor plan layout



2 We cut with high precision



3 ...and pre-weld if required

TARABUS Self-Adhesive



TARABUS floor covering with self-adhesive backing

- > Environmental friendly bonding
- > Ready to bond
- > No curing time
- > Safer work conditions
- > Easy to use

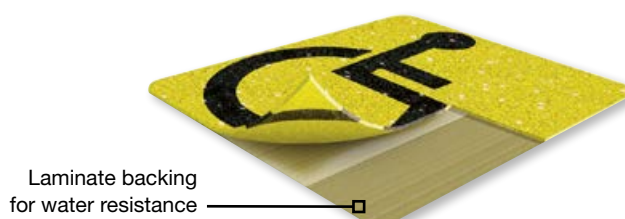
TIME SAVING

► TARABUS LOGO

- Location for person with reduced mobility
- Advertising & Promotion



Almost unlimited possibilities of water-resistant logos



Laminate backing for water resistance



Warranty Registration

TO REGISTER YOUR PRODUCT WARRANTY under the terms of Gerflor's North America Limited Product Warranty, please complete the form below and mail to:

Gerflor USA Inc
595 Supreme Dr
Bensenville 60106 IL USA.

I acknowledge having received and read GERFLOR's technical documents and specifications concerning the product warranty:

Product Type: _____

Roll numbers & Quantity (sq.yds/m²): _____

Installation Date: _____

Transit Authority: _____

Address: _____

State/Prov: _____ Zip/Postal Code: _____

OEM: _____

Address: _____

State/Prov: _____ Zip/Postal Code: _____

Represented by: _____

Signature: _____

TARABUS PRODUCT WARRANTY



TARABUS
TREND BOOK



TARABUS FLOORCOVERINGS LIMITED WARRANTY AGREEMENT

Warranty Terms and Conditions

GERFLOR, as a manufacturer, expressly warrants that TARABUS floorcoverings for buses and coaches are conform to the technical data sheet in force at the time of delivery.

GERFLOR further expressly warrants that the wear layer of TARABUS floorcoverings shall be free from defects in material for **12 years (twelve years)** from the date of sale, provided such floorcoverings are exclusively subject to normal use and service, and are installed and maintained in accordance exactly with GERFLOR's recommendations that the buyer declares to be aware of.

The wear layer consists of the material above the glass fiber web in the floorcovering. GERFLOR expressly warrants that the glass fiber web will not appear in the floorcovering for **12 years (twelve years)** from the date of sale.

This entire warranty will become null and void if conditions of the subflooring and method of installation do not conform exactly to GERFLOR's specifications.

This entire warranty does not cover damage caused, in whole or in part, by conditions beyond the control of GERFLOR, including but not limited to:

- Use for which material is not designated.
- Fire, explosion, or natural disasters.
- Faulty installation
- Casualties
- Ordinary wear and tear
- Abuse
- Faulty design or construction of the vehicles.
- Failure of the adhesive to adhere to the subfloor because of presence of moisture.
- Fault in the subfloor.
- Failure of the welding



- Uneven wear of sections of the floorcovering.
- Alteration of the initial appearance of the floorcovering, particularly in high traffic areas exposed to extreme heavy wear.
- Damage caused by negligent or improper maintenance procedures and other causes not specified but beyond the control of GERFLOR.
- Fading or discoloration from sunlight or heat.
- Mechanical damages, burns, chemical soiling or damage due to clamp or inadequate cleaning, not recommended by GERFLOR.

The presence of moisture between the TARABUS and the subfloor shall be considered proof of subfloor failure or faulty design or construction.

This warranty will be applied only if the product is admitted to be the only cause of disorder.

The sole and exclusive remedy against GERFLOR arising from the purchase or use of TARABUS is limited to supply of material in replacement of the sole defective part of material (after examination, verification and approval by GERFLOR) with material of equivalent quality –(colour shade between brand new material and existing one will be accepted by the owner)-. All other compensation of whatever nature will be excluded.

If the claim is accepted by GERFLOR, with respect to the warranty of the wear layer, for the first 2 (two) years from the date of sale, GERFLOR will supply the material, in replacement of defective one, free of charge. More than 2 (two) years from the date of sale, until the expiration of this express warranty of the wear layer, a depreciation of 7% (seven per cent) per year of the cost of supplied material will apply.

WARRANTY AND LIABILITY LIMITS

THE ABOVE EXPRESSED MANUFACTURER'S WARRANTY SHALL BE THE EXCLUSIVE WARRANTY AND LIMITED TO THE QUALITY OF THE PRODUCT, AND GERFLOR MAKES NO OTHER WARRANTIES. GERFLOR EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

IT IS AGREED THAT GERFLOR SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, including but not limited to, loss of income, loss of use, damage to other property, the cost of removing and reinstalling TARABUS floorcoverings, attorney's fees, and any liability you may have with respect to any other person.



TIME LIMIT FOR PLACING A CLAIM

To be admissible, all claims by means of this warranty contract must be carried out by **registered letter with return receipt** addressed to GERFLOR, at the address indicated at the top of this warranty contract, **accompanied by the purchase invoice** for the Product, within THIRTY DAYS following finding of irregularities and within the aforementioned warranty contract time limit. If any clauses of this Warranty Agreement conflicted with the law or a given jurisdiction, only said clause would be considered inapplicable, the remaining text of the Agreement remaining unaffected.

This Limited Warranty shall be governed and construed in accordance with the laws of the State of Illinois without regard to any choice of law principles: All disputes that may arise between You and GERFLOR relating in any way to this Limited Warranty Agreement, to the extent such disputes cannot be resolved by negotiation between You and GERFLOR, shall be decided by arbitration carried out in accordance with the Federal Arbitration Act and the Commercial Arbitration Rules of the American Arbitration Association. In the event of such a dispute, arbitration may be initiated by a request for arbitration by either party hereto addressed to the other party, and shall be completed within sixty (60) days of such request unless extended because of unavailability of an arbitrator or other events beyond the control either party. The arbitrator shall be chosen by mutual agreement of the parties and, in the event the parties cannot so agree, either party may file a written application to have the arbitrator designated by the American Arbitration Association. The arbitration proceeding shall take place in Chicago, Illinois or such other location as the parties shall agree and shall be conducted in accordance with the Commercial Arbitration "Expedited" Rules of the American Arbitration Association. The arbitrator shall have all powers necessary to determine the issues presented, including without limitation, but subject to the terms of this Limited Warranty, any damages. The decision of the arbitrator shall be final and conclusive, both as to costs and the merits, and the parties agree that they shall be bound by this decision.



Taller and wider headrest
with decreased backset.

FREEDMAN
SEATING COMPANY

The industry's
preferred driver
seat for truck and
buses, including
Ford & Chevy
cutaways.

Heavy duty recliner mechanism and
4-position adjustable lumbar support.

Optional
Lemans Armrest

Automotive grade 4-spring seat flex-o-lator
for even load support and long life.

SHIELD DRIVER | RECLINER SEAT

COMMERCIAL BUS / DELIVERY TRUCK

Shield driver seats are designed and tested to meet all applicable safety standards including 202A for superior head and neck support while providing superior comfort and style. The Shield recliner is the preferred driver seat for truck and buses, including 2011 and later Ford & Chevy cutaway buses. The Shield recliner mounts directly to the OEM base & slides on seat delete chassis.

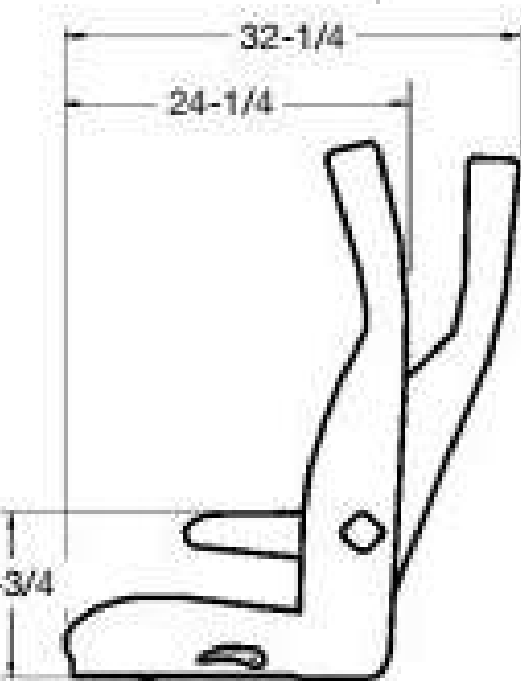
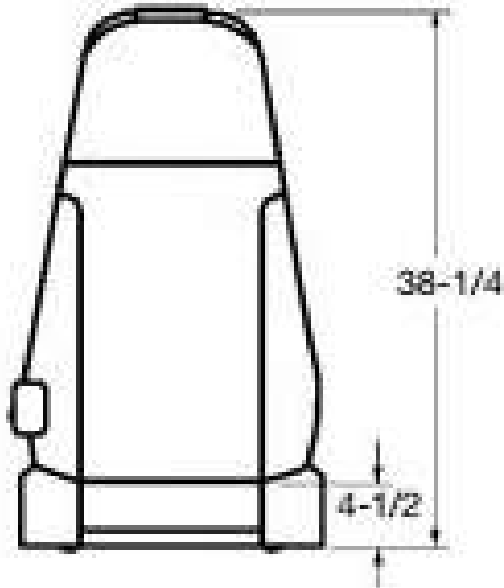
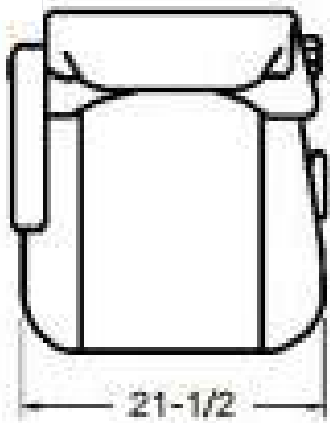


features

- Meets FMVSS 207/210/202a
- Designed and tested to comply with all applicable FMVSS requirements including 202A headrest standard
- Taller and wider headrest with decreased backset
- 'Cushier' headrest for dynamic impact headrest absorption
- Automotive grade 4-spring seat flex-o-lator for even load support and long life
- J-clip upholstery fastening for quick change out with no special tools
- High quality molded polyurethane seat and back cushions
- 4-position adjustable lumbar support
- Heavy duty recliner mechanism
- Mounting brackets to fit Ford E-series and Chevy Cutaway seat delete bases
- Modified vinyl seat cover to accommodate substantial usage in the field.

options

- Shield or Lemans armrest
- Mesh map pockets
- Vertical Stitching
- Choice of fabric or vinyl
- Fore/Aft slide tracks, required for universal mounting
- Heater (seat mounted controls)
- Flame Blocker D-90 encapsulated cover
- Mesh Map Pocket
- Adnik Height Adjustable Power Pedestal Slides
- Driver Skirt for Power Pedestal



FREEDMAN[®]
SEATING COMPANY

4545 W. Augusta Blvd., Chicago, IL 60651
(773) 524-2440 (800) 443-4540 Fax (773) 252-7450
freedmanseating.com | info@freedmanseating.com



Freedman Seating is committed to lessening our impact on the planet. For your convenience, materials are now available online to download at www.freedmanseating.com.



We are constantly updating and improving our seats; therefore we reserve the right to change or modify specifications or materials without notice. All Freedman Seating Company seats meet or exceed FMVSS standards

QRT-360[®]



PREMIUM
HEAVY-DUTY
WHEELCHAIR RETRACTOR



QRT-360[®]

Introducing the QRT-3 SERIES Wheelchair and Occupant Securement System

The first 4-point, heavy duty, fully automatic retractable tie-downs **built to withstand the higher loads of the WC18 standard** and be compatible with WC19 wheelchairs



Meets all requirements of the newest WC18 standards.
Also compatible with WC19 Wheelchairs.

WC18/WC19 at a Glance

As WC19 wheelchairs become increasingly popular, new higher standards have been recommended for wheelchair tie-downs to be fully compatible.

The revised RESNA WC18 standard for Wheelchair Tie-downs and Occupant Restraint Systems (WTORS) was instituted in 2015 and is now in effect.

The most significant implication of the revised standard is that wheelchair tie-downs must be stronger. WC19 covers the design and testing of wheelchairs for use in passenger transportation, and it brings about much needed passenger protection as well as some challenges for WTORS manufacturers.

These crash tested wheelchairs will feature lap belts that are integrally mounted onto the wheelchair frame, as opposed to relying on traditional WTORS equipment where the passenger belts are mounted separately. During a collision, this new dynamic produces loads on the WTORS up to 60% higher.

An All-New Design from the Floor Up

Stronger than any previous retractor, QRT-360 utilizes innovative energy management designs and material technologies to deliver the system's full strength for maximum load capacity.

QRT-360 retractors achieve a surrogate wheelchair rating that meets the requirements of WC18 with an energy-absorbing steel frame, new high strength 58mm webbing with fine-adjust self tensioning, and 25 high-strength teeth. A re-engineered Positive Locking Interface contributes to the system's ability to secure extremely heavy loads.



A More Secure Connection, Every Time

With Q'STRAIT J-hook attachments, operators can achieve a secure attachment on virtually any wheelchair. An updated Positive Lock Indicator provides the operator with clear and certain visual confirmation that the retractor is locked and the vehicle is ready to go. Our patented design eliminates the guesswork when passenger safety is involved.

Automatic Tightening Increases Safety

Q'STRAIT's industry-leading self-tensioning system automatically tightens the straps to eliminate any slack created by small wheelchair movements. The belts continue to tighten during low-g vehicle movements, which reduce the potential for dangerous excursions in the event of a collision.

Automatic Release Makes it Easy to Use

Securement is simplified by the compact and ergonomically designed knob. Thanks to Q'STRAIT auto-release, operators and attendants can pull and secure the wheelchair hook in one step without having to press a release button.

Compatible with Most Vehicles and Chairs

Like other Q'STRAIT systems, the QRT-360 is compatible with the widest variety of wheelchairs and scooters.





WWW.QSTRAINT.COM/QRT360

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Email: qstraint@qstraint.com

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21 Shoebury Street,
Rocklea, Australia, QLD. 4106
Tel: +61 7 3892 2311
Fax: +61 7 3892 1819
Email: info@tramanco.com.au

AccuStyle® 815 Series

Features and Benefits

- Lightweight, vibration reducing design.
- Certified by OEMs to meet FMVSS-111 requirements.
- Same model can be mounted as upright, overhang or two point mount.
- Reduces inventory of replacement parts.
- Aerodynamic, wind tunnel tested profile has lower drag coefficient for increased fuel economy.
- Available motorized or hand adjustable.
- Available with heated and LED turn signal options
- Each motorized mirror lens is four way adjustable.
- Hidden wire and connectors.
- Black or chrome finish is available.
- Full height rear entry cap allows for simple installation and ease of maintenance, including access to all wires and harnesses.



Model 815U
Shown with EZ Bracket
combination assembly

AccuStyle® 815 series 8"x15" Dual Mirrors

PART NO.	DESCRIPTION
815	8" x 15" dual mirror, two point mount, motorized, 12 volt
815ELU / 815ERU	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right external signal LEDs
815OG	8" x 15" dual mirror, overhang mount, motorized, 12 volt
815SL / 815SR	8" x 15" dual mirror, two point mount, motorized 12 volt with left or right mirror lens signal LEDs
815SLU / 815SRU	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right mirror lens signal LEDs
815SLOG / 815SROG	8" x 15" dual mirror, overhang mount, motorized 12 volt with left or right mirror lens signal LEDs
815U	8" x 15" dual mirror, upright mount, motorized, 12 volt
CBL815U	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right integrated camera
CBR815U	8" x 15" dual mirror, upright mount, motorized 12 volt with left or right integrated camera
M815	8" x 15" dual mirror, two point mount, hand adjustable
M815OG	8" x 15" dual mirror, overhang mount, hand adjustable
M815U	8" x 15" dual mirror, upright mount, hand adjustable

For Heated Mirrors, Add "H" to the End of All Part Numbers Without a "/"
or Add "H" in Front of the "/" When Present.

Custom Wire Harnessing

- Harnesses can have custom lengths.
- Conductors available in various gauges.
- Durable connection systems for superior harnessing between mirror, arm and switch.
- Weather proof connectors are available and grommets pre-installed on harnesses.
- Connectors from various companies, including: Tyco/AMP JTT Canon, Delphi Packard and Deutsch, as well as others.
- In house high speed termination equipment provides fast turnaround.
- UL certified wire.
- Miniature connectors allow smaller holes in vehicle body.
- Multi-conductor cabling available in 2-lead for heating only, 4-lead for single motor control and 8-lead for dual motor control and heating.

Harness Types

1. Arm Harness- Concealed inside arm. Can be made very short to plug into a flush mount connector on the exterior of the vehicle or to pass just inside the vehicle skin. Can be made longer to be run all the way to the control switch.
2. Intermediate Harness- Joins the arm harness to the switch harness. Advantageous because it can be run before installation of the arm on the vehicle assembly line. Also allows arm to be removed from bus by disconnecting a connector instead of cutting a longer wire. More commonly used on passenger side.
3. Switch Harness- Attached to control switch. Often integrates heater control switch. Has leads for power and mirror heater circuits. Usually very short in length.

Mirror Systems Testing For Compliance to FMVSS-111

Our AccuStyle® and EuroStyle® rearview mirror systems and front cross view mirror systems (Eye-Max® LP, HD, Hawk-Eye®), have been certified for compliance to FMVSS-111 by all the major school bus body builders. Companies including IC Corporation, Thomas Built Buses, Blue-Bird, Collins and Girardin, have shown time and again that Rosco mirrors not only meet, but exceed the requirements of FMVSS-111. However, we continue to test and improve our mirrors to make sure that they cover areas around the bus, beyond the requirements of FMVSS-111. We can not rest in this regard, because we know that the safety of our children depends on it.



Proper School Bus Mirror Adjustment

You know your buses are being manufactured with FMVSS-111 compliant mirrors, but how do you know that your mirrors are being properly adjusted? Can you be sure that your drivers are seeing the blind areas around the bus? Are there blind areas around the bus beyond the FMVSS-111 mandated coverage? If these questions are bothering you, then you need to see "Field of Vision", the first video which teaches you how to keep your mirrors properly adjusted at all times. This free video guideline is a perfect addition to your driver training program. It not only shows how to keep your mirrors adjusted in compliance with FMVSS-111, but also how to see blind areas beyond FMVSS-111 regulations. Email us for your free copy: info@roscomirrors.com



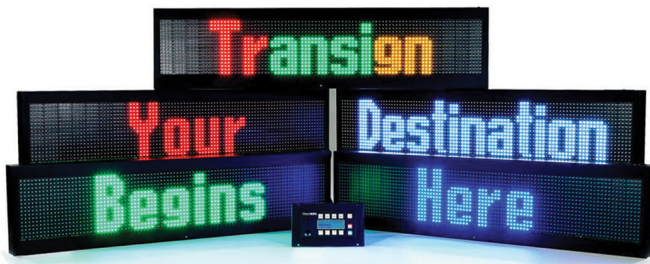
FIELD OF VISION
A video guide to proper school bus
mirror adjustment in accordance with
FMVSS-111

TRAN SIGN®

YOUR DESTINATION BEGINS HERE



The LED Destinator® Series - perfect for fleets of all types - is available in a variety of sizes and colors to fit your installation and display needs. These versatile and highly adaptive signs offer full integration into Destination, Route, and Next Stop announcement services, always keeping your customers pointed towards their next destination.

**STANDARD FEATURES**

- Destination Messages
- Next Stop Announcements
- Public Relations Messaging
- Scrolling/Flashing/Stacked Messages

SOFTWARE AND PROGRAMMING

Our signs and control modules are pre-programmed and include FREE software. Advanced controllers are available for J1708/J1587 system integration and Hands-Free operation, ensuring the safest and most reliable performance for any fleet.

**AVAILABLE ADVANCED FEATURES INCLUDE:**

- Automated GPS message progression
- Hands-Free operation for safety
- Voice Announcements
- J1708/J1587 integration compatible
- Automatic brightness control
- Basic programming software included (USB)
- Maintenance free- ZERO cost of ownership
- Many OCU options to suit your needs

**BUY AMERICA - MADE IN U.S.A.**

Using the highest quality parts, our LED Destinator® Signs are proudly made in Detroit, Michigan USA in full compliance with the Buy America Act.

LED DESTINATOR™ WARRANTY INFO

With a lifetime warranty that outlasts the lifetime of most vehicles (100,000 hours at full brightness), our signs will exceed your expectations in reliability and performance.

**ABOUT TRANSIGN**

Established in 1959, Transign is a leading provider of high-quality signage for the transit industry. We remain committed to providing world-class U.S. based customer service and technical support.

Transign®, 281 Collier Road, Auburn Hills, Michigan 48326
Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930
www.transignllc.com

LED Destinator® Electronic Signs - Dimensions

Signs	Pixel Count H x W (pixels)	Display H x W (in)	Enclosure H x W x D (in)
LD16160	16 x 160	6 1/2 x 63 1/8	9 1/2 x 64 5/8 x 2 3/8
LD16128	16 x 128	6 1/2 x 50 1/2	9 1/2 x 52 x 2 3/8
LD16112	16 x 112	6 1/2 x 44 1/8	9 1/2 x 45 3/4 x 2 3/8
LD1696	16 x 96	6 1/2 x 37 7/8	9 1/2 x 39 3/8 x 2 3/8
LD1680	16 x 80	6 1/2 x 31 5/8	9 1/2 x 33 x 2 3/8
LD1632	16 x 32	6 1/2 x 12 3/4	9 1/2 x 14 x 2 3/8
LD12112	12 x 112	4 7/8 x 44 1/8	8 x 45 3/4 x 2 3/8
LD1280	12 x 80	4 7/8 x 31 5/8	8 x 33 1/8 x 2 3/8
LD1232	12 x 32	4 3/4 x 12 3/4	8 x 14 x 2 3/8
LD896	8 x 96	3 1/4 x 37 7/8	6 3/8 x 39 3/8 x 2 3/8
LD864	8 x 64	3 1/4 x 25 1/4	6 3/8 x 26 3/4 x 2 3/8

Be sure to check out our other great products!



Stop Request Signs

- Flush, ceiling or surface mount
- Any font/color combination
- Back-lit by efficient LED's



Interior Passenger Information Sign

- Easy to install
- ADA compliant
- LED's rated at 100K hours



Roller Curtain Signs

- High-res logos & graphics
- Perfect for large fleets
- Virtually maintenance free
- Reliable, efficient LED backlight
- Available in 12 and 24 VDC
- Up to 120 destinations



Run Number Box

- Metal or plastic frame
- Available in 2, 3, or 4 digits
- Easy to read 4" lettering
- Spring loaded return
- Reliable, efficient LED backlight
- Virtually maintenance free



LED Run Number Box

- Steel enclosure
- ADA compliant
- Reliable LED's
- Multiple colors
- Automatic brightness
- 12 and 24 VDC

Join Our Mailing List

www.transignllc.com/subscribe

Transign®, 281 Collier Road, Auburn Hills, Michigan 48326
Toll Free: 855.535.7446 | Main: 248.623.6400 | Fax: 248.623.2930
www.transignllc.com

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ADA STOP REQUEST INFORMATION

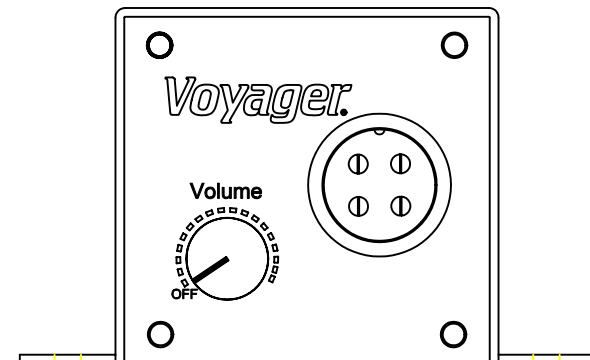


The ADA Occupant Stop Request Lights the Blue Side of the Sign and Signals Driver of an ADA Stop Request via Touch Tape Switches.

Ambulatory Stop Requests Light the Red Side of the Sign and Signals the Driver via Pull Cords.

Voyager®

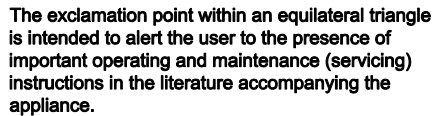
PA500 Owner's/Installation Manual



Universal Public Address System
for use with Vehicle Radios

Revision: B
Date: 5/17/01

Audiovox Specialized Applications, LLC
23319 Cooper Dr.
Elkhart, IN 46514
1-800-688-3135
www.asaelectronics.com



Optional Product List:

Televisions

AVT988 9' Color Television with Remote (12V)	AVT988
AVT1498 13" Color Television with Remote (12V)	AVT1498

VCP and DVD Players for use with TV's and LCD

AVP7000 Video Cassette Player (12V)	AVP7000
AVP7285 Video Cassette Player (12V)	AVP7285
Single Disc DVD Player	DVD2101

Headphones

Wireless Headphones	WHRF01
Headphones with Pivoting Earcup	HP175
Headphones with Volume Control on Cord	HP275
Studio Quality Headphones	HP375

Miscellaneous

Remote Controls	Please Call
Wallmount Family Radio Service with 4 Handsets	FRS4WM
Replacement Handset	FRS100Y
12V Corded Vacuum	VAC21
Rechargeable Flashlight	AVF1
Window Mount TV Antenna	AN350
2-Amp Adapter for use with AVP7000/7285 VCP	0891436
4-Amp Adapter for use with AVT988 9" & AVT1498 13" TV	0891412

Wallmount Radios

AM/FM Wallmount Manual Tune w/Cassette Player	AWM710
AM/FM Wallmount Electronic Tune w/Cassette Player	AWM820
AM/FM Wallmount Stereo w/CD Player	AWM930

Marine

AM/FM Stereo with CD Player	MS1000
AM/FM Weatherband Stereo w/Cassette Player	MS407
AM/FM Stereo w/Cassette Player (Analog Tuner)	MS220
AM/FM Stereo w/Cassette Player (Analog Tuner)	MS306
Weatherproof Housing	MRH211
50 Watt 6 1/2" Speakers (White/Black)	AMS6
30 Watt 5" Speakers (White/Black)	AMS5
30 Watt 4" Speakers	AMS4
Marine Radio Antenna	AN125

To order any of these products, please call 800-688-3135

OR

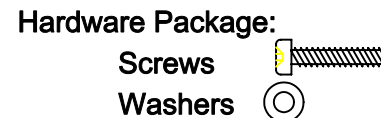
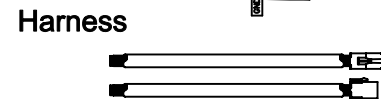
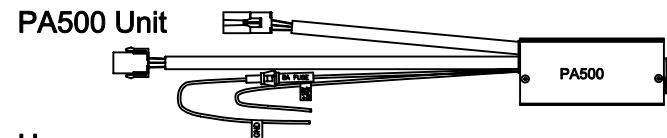
Visit our website at: www.asaelectronics.com

Manual Contents:

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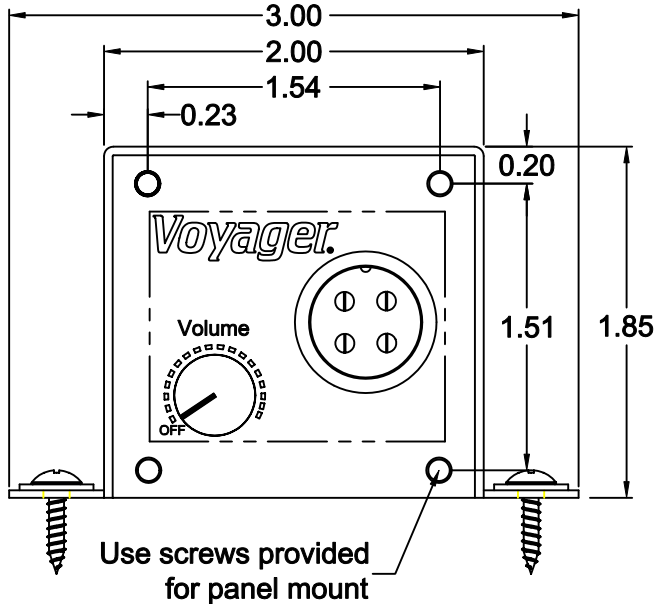
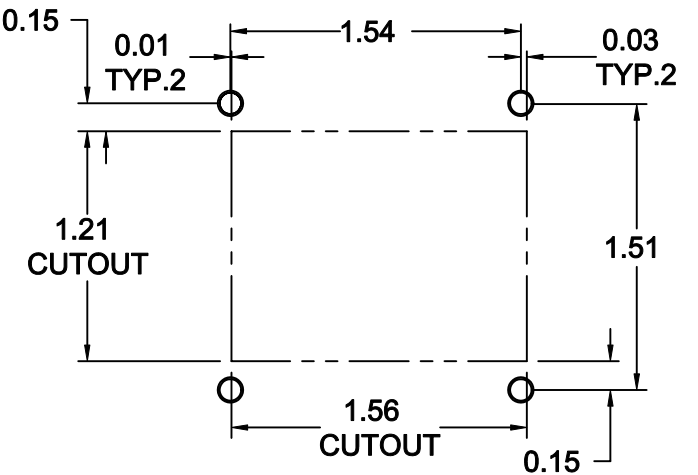
Package Contents:

	Qty.
PA500 Unit	1
Harness	2
Hardware Package:	
Screws	4
Washers	4
Manual	1



Panel Cutout (Optional Installation):

The PA500 may also be mounted through a panel (as shown below). In this method, the microphone volume may be adjusted or turned on/off to meet the operator's preference.



Troubleshooting:

Symptom	Possible Cause	Possible Solution
Has audio from radio but not PA500 (With BVMB02) No audio, has popping sound on speakers	<ul style="list-style-type: none">- PA not turned on- Volume set too low on PA- In-line fuse blown- Input and output wired backwards- Phantom PCB (P/N 8515245) not installed	<ul style="list-style-type: none">- Turn PA on- Adjust volume of PA to higher level- Check and replace in-line fuse- Reverse input and output wiring- Need to install Phantom PCB
High pitched squeal (feed back)	<ul style="list-style-type: none">- Volume on PA set too high	<ul style="list-style-type: none">- Turn volume on PA down
Hand held MIC keyed and gets feed back	<ul style="list-style-type: none">- Volume on PA set too high- Volume on MIC set too high	<ul style="list-style-type: none">- Turn volume on PA down- Turn volume down on MIC
PA500 will not turn on, (does not have power)	<ul style="list-style-type: none">- In-line fuse on PA blown	<ul style="list-style-type: none">- Replace fuse

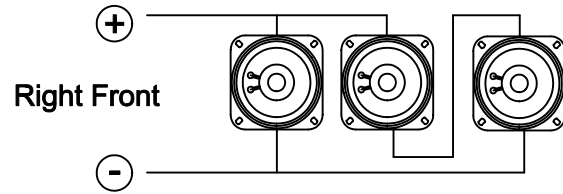
Specifications:

4 Channels	22 Watts per channel, 4 ohm load
Current Draw	7 Amp Max.
Frequency Response	100-10,000
Size	3.08" x 1.85" x 4.0" (W x H x D)
Weight	15 oz.

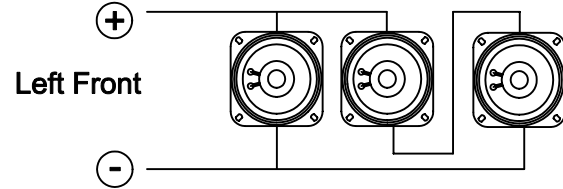
Speaker Connections:

3 Pair- 4 Ohm Speakers

Curb Side
6 Ohm
Total Impedance



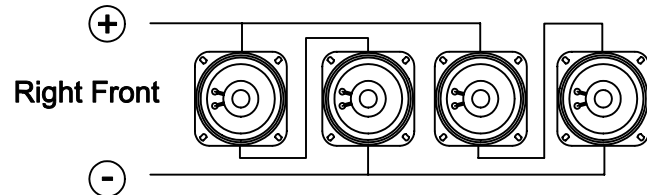
Driver Side
6 Ohm
Total Impedance



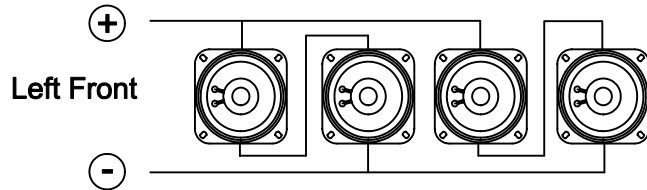
Align Speakers with "+" on top and "-" on bottom as shown

4 Pair- 4 Ohm Speakers

Curb Side
4 Ohm
Total Impedance



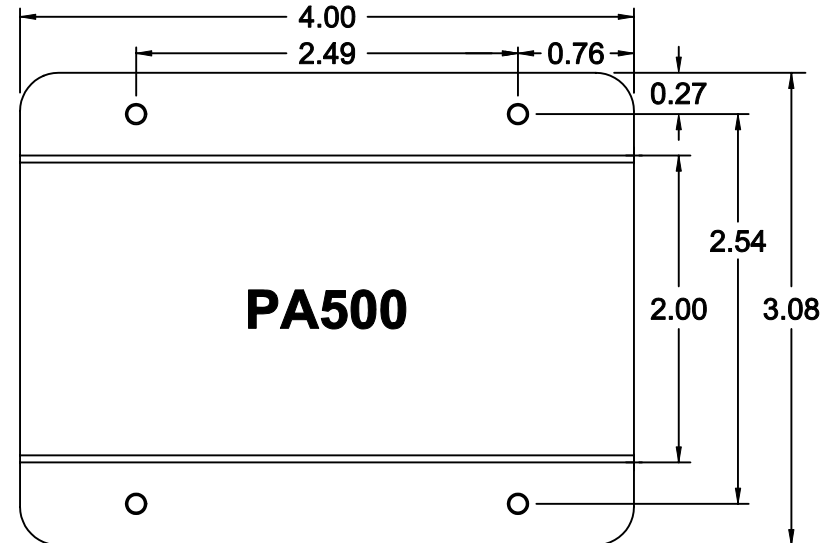
Driver Side
4 Ohm
Total Impedance



Align Speakers with "+" on top and "-" on bottom

Optional Flange Mount Installation:

The PA500 may also be mounted in a "blind" location, using the mounting holes on the flanges. In this case, the microphone volume must be pre-set by the installer prior to the completion of the installation. The 30 ft. microphone extension/adaptor cable (P/N 1401035) or the 36" microphone extension/adaptor cable (P/N 1401040), is to be used to allow connection of a PTT (Push To Talk) type microphone by the operator.



Typical Wiring Connections:

INPUT NOTES:

Wire Radio according to Manufacturer Spec.

PA500 can accept any radio (up to 4 Channels).

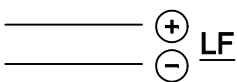
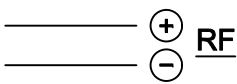
Maintain appropriate load requirements.
(4 ohm minimum suggested)

Radio to PA500

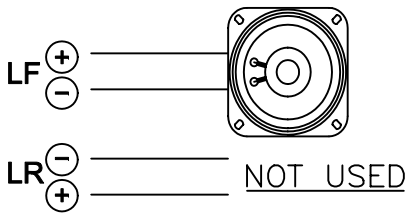
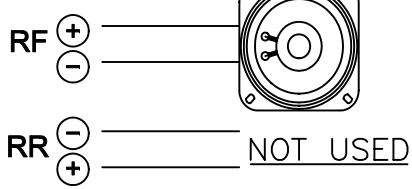
RA RF +	Gray
RA RF -	Gray/Black
RA LF +	White
RA LF -	White/Black
RA RR +	Violet
RA RR -	Violet/Black
RA LR +	Green
RA LR -	Green/Black

Optional Examples:

INPUT 4 Wire

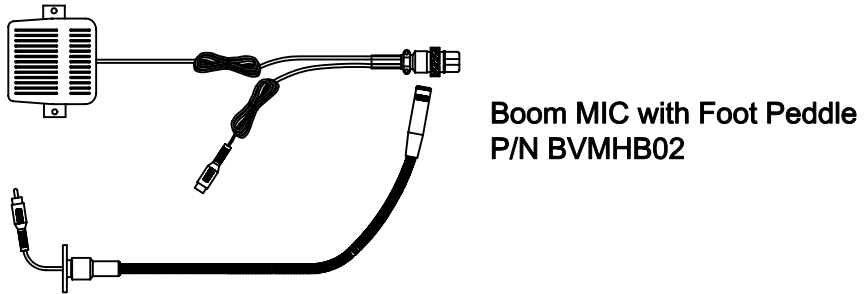
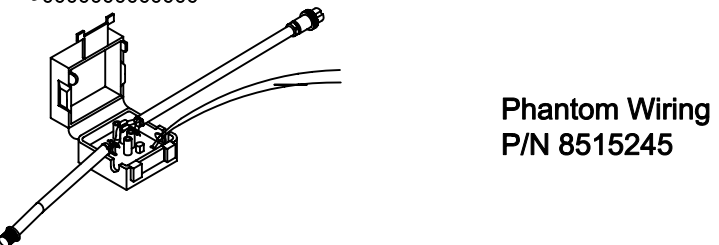


OUTPUT 2 Speaker



PA500 Applications con't.:

The PA500 may be used with the BVMH22 hand held microphone and either the 30' extension/adapter cable (P/N 1401035) or the 36" extension/ adapter cable(P/N 1401040). If the Boom MIC with Foot Peddle (P/N BVMH02) is used, the Phantom Wiring Harness (P/N 8515245) is required.



PA500 Applications:

The PA500 may be used directly with the following microphones:

BVMH01 Hand Held Microphone

BVMH28 Boom Microphone

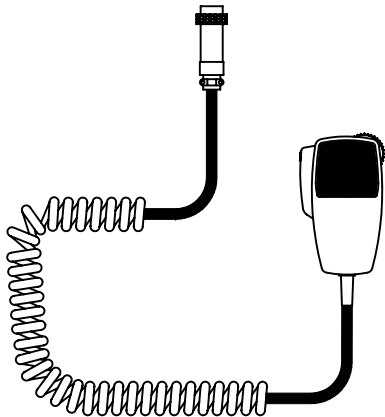
In applications which require remote mounting of the PA500, either the 20 foot extension/adaptor (P/N 1401003) or the 36" extension/adaptor cable (P/N 1401020) may be used



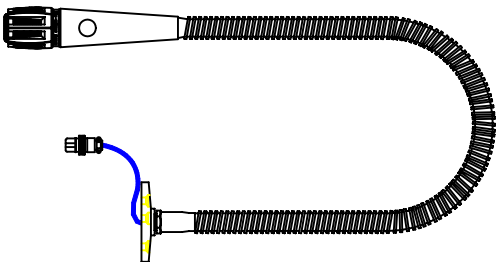
20 Ft Extension Cable
P/N 1401003



36" Extension Cable
P/N 1401020



Hand Held Microphone
P/N BVMH01



28" Boom Microphone
P/N BVMH28

To PA500 Speakers

SP RF +
SP RF -
SP LF +
SP LF -
SP RR +
SP RR -
SP LR +
SP LR -

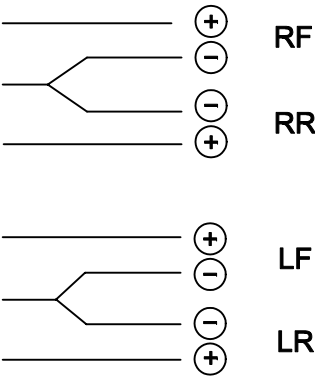
OUTPUT NOTES:

Do not ground any leads.

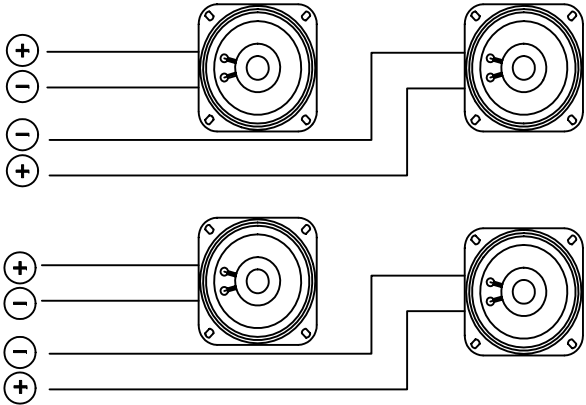
Do not tie output leads together.

It is permissible to use only Front or Rear Inputs and Outputs in 2 speaker /4 Wire Systems

INPUT 6 WIRE



OUTPUT 4 SPEAKER



PA500 Wiring:

Wiring Chart for Radio and Speaker Connections

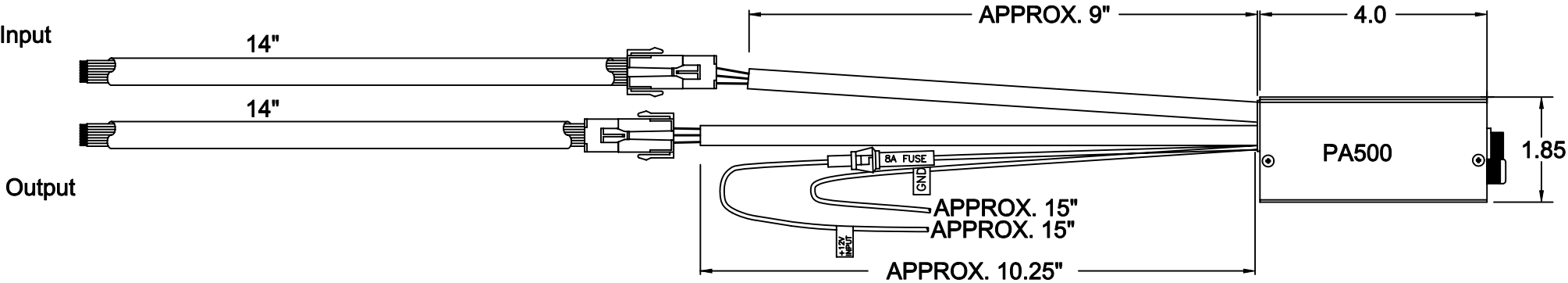
Wire Color	Speaker Connection
Gray	Right Front +
Gray/Black	Right Front -
White	Left Front +
White/Black	Left Front -
Violet	Right Rear +
Violet/Black	Right Rear -
Green	Left Rear +
Green/Black	Left Rear -

Hardware Kit:

Quantity- Type
4- M5 x 13mm Philips PH Tapping Screw



4- M3.5 Flat Washer



BEACONS

3000 Series Strobe

4" High Model w/ clear lens is our standard option



REPLACE (x) AND (xx) IN ORDER NUMBER FOR PERSONALIZED SELECTIONS

Product Number: 3 (xx) 7 (x) (x) (x)

Watt Options: 1Ø = 10 Watt or 2Ø = 20 Watt

Flash: 7 = Double and Quad (included in product number)

Height Options: L = Low, 4" Dome or H = High, 6" Dome

Mounting Options: C = Flat/Pipe or M = Magnetic

LED Color/Dome Color Options: ● A = Amber LEDs/Amber Lens ○ C = White LEDs/Clear Lens

Features

- > Lens with UV inhibitor prevents sun fade
- > Rated to last 20,000+ hours
- > Advanced circuitry designed tolerate high vibration applications

accessories

Branch Guard and Dust Cover (Beacon not included)



Branch Guards (6" shown)

4" Height #PESB41BG4

6" Height #PESB41BG6



Dust Cover

6" Height #E36ØDC6

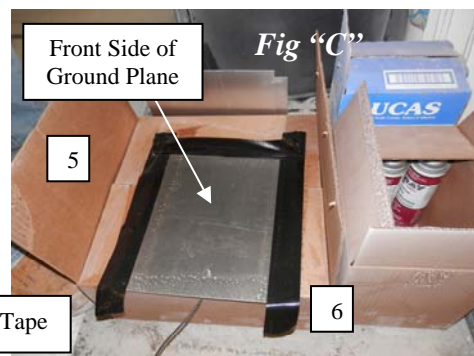
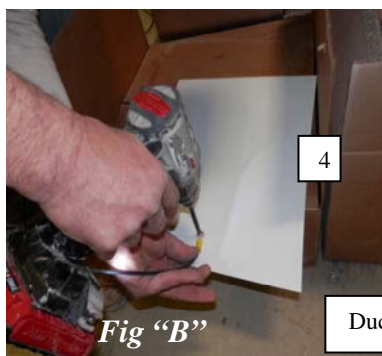
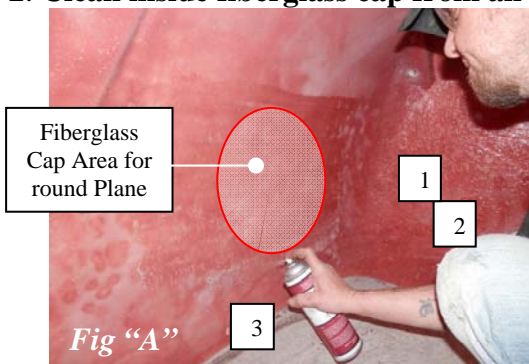
TECHNICAL SPECIFICATIONS

FLASH PATTERNS	2 flash patterns - double or quad (user selectable)
TECHNOLOGY	Xenon Helix Strobe Tube
INPUT VOLTAGE	10-30 Vdc
CURRENT DRAW	10 Watts: 1 Amp @ 12 Vdc, 0.5 Amps @ 24 Vdc or 20 Watts: 2 Amps @ 12 Vdc, 1 Amp @ 24 Vdc
OPERATING TEMPERATURE	-40° C to 50° C
DIMENSIONS	4" Dome with base: 4.75" (12 cm) H 6" Dome with base: 6.7" (17 cm) H x 6.3" (16 cm) base diameter
MOUNTING	Permanent or Magnetic mount (polycarbonate lens and black base)
CERTIFICATIONS	SAE J 1318 Class 2 certified
WARRANTY	Two-year (strobe tube, one-year)

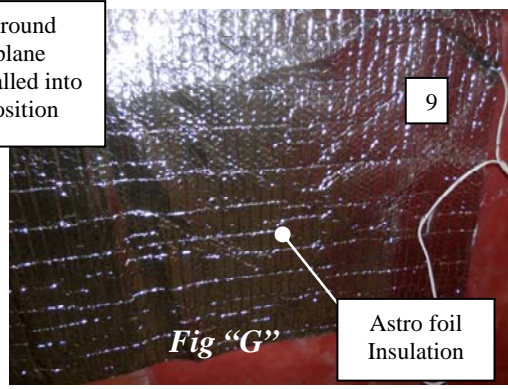
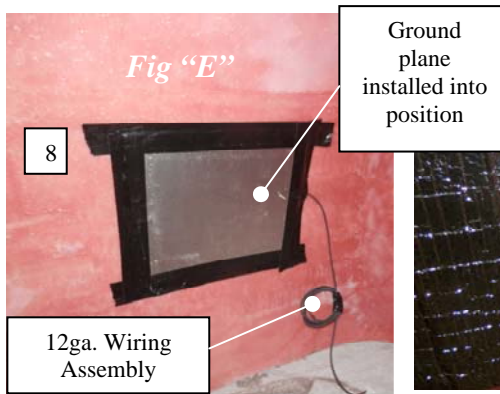
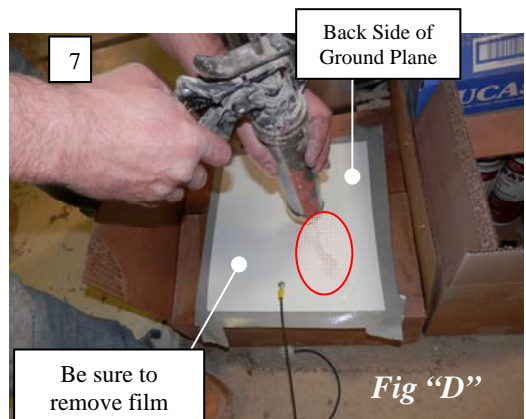
Rev. B		No. 32-01-0006-19
Implementation: 004/05/2019	Title: FRONT CAP GROUND PLANE	Written by: Tim Smart
Models Affected:	All	
Tools Necessary:	Screw Gun, 12"x 12" .063 Aluminum, Grinder, Duck Tape, Lucas Sealant, All-Purpose Spray Adhesive, Caulk Gun, 31-28-1023-15 Ground Plane Print	Total Pages: 01

Process:

1. Begin process by locating ground plane location for installation.
2. Clean inside fiberglass cap from all debris with air hose.



3. Spray all-purpose adhesive to interior side of fiberglass cap where ground plane will be located.
4. Let adhesive tack up, apply 12ga. wire assembly to 12" aluminum ground plane with self-tapper. *Fig "B"*
5. Apply all-purpose adhesive spray to backside all 4 outside edges of 12" aluminum.
6. Apply duct tape to backside all 4 outside edges of 12" aluminum.



7. Turn 12" aluminum over and apply lucas caulk to backside of ground plane. *Fig "D"*
8. Install ground plane as shown, run 12ga. wiring assembly to grounding plug in electrical box
9. Apply Astro foil insulation to front cap covering ground plane.
10. After cap installation a conduit w/ pull wire is ran from ground plane area down the B-pillar to behind the driver seat so a future antenna cable can be pulled through.
11. After completion of cab area, to complete this process circular access panel is installed in the cab ceiling immediately below the ground plane.

Vulcan™ Series V12 HD/IP Mobile DVR

12-CHANNEL DVR

DIMENSIONS

- Height: 3.5 inches
- Width: 8.7 inches
- Depth: 11.6 inches
- Weight: 5.7 pounds

TWELVE (12) A/V INPUTS

- 8 channels D1, WD1, 720P, or up to 1080P
+ 4 channels IP up to 1080P

VIDEO OUTPUTS

- 2 channels

AUDIO OUTPUTS

- 2 channels

CAMERA COMPATIBILITY

- 8 channels D1, WD1, 720P, or up to 1080P (see NTSC)
- 4 channels IP up to 1080P

STORAGE MEDIA

RECORDING MEDIUM

- One (1) 2.5" SATA hard drive and one (1) optional solid-state SD card

CAPACITY

- 1TB (standard) up to 2TB (capable) (optional) 64GB SD card up to 512GB

RECORDING OPTIONS

- SD card slot for redundant recording

INTERFACE

NETWORK DATA CONNECTION

- One RJ45 x 1 (10/100 M/1000M)

EXPANSION

- RS232 x 2, RS485 x 2

GPS INTERFACE

- Built-in, compatible with optional GPS antenna

DRIVER ACTION DETECTION

PANIC BUTTON

- The remote status indicator (panic button) can be connected to show DVR power/record status without using a video monitor
- The driver-operated panic button has the following functions:
 - Solid green LED indicates that the unit has power and is recording
 - Event marker (panic button)

DRIVER ACTION DETECTION WIRES

- 8 signal wires individually programmable to indicate alarm or event



BUILT-IN G-FORCE SENSOR

COMPRESSION FORMAT

- Video: H.264
- Audio: ADPCM, G.711A G.711U

RECORD RESOLUTION

NTSC

- 1080P, 720P, WD1(928X480), WHD1(928X240), WCIF(464X240), D1(704x480), HD1(704x240), CIF(352x240)

PAL

- 1080P, 720P, WD1(928X576), WHD1(928X288), WCIF(464X288), D1(704X576), HD1(704x288), CIF(352x288)

RECORDING OPTIONS

- **Continuous record:** System will record all channels continuously while vehicle is running (factory setting).
- **Alarm record:** System will record when an alarm is triggered.
- **Motion record:** System will record when the cameras detect motion while vehicle is running.
- **Schedule record:** System will boot and record according to user-selectable schedule.

ELECTRICAL & OPERATING REQUIREMENTS

AUTO ON/OFF DETECTION

- ACC detection

DELAY OFF SETTING

- User selectable up to 24 hours

OPERATING VOLTAGE

- 8~36VDC

OPERATING TEMPERATURE

- -14°F (-25°C) ~ +158°F (+70°C);
-40°F (-40°C) ~ +158°F (+70°C) with heater

POWER CONSUMPTION

- 0W-105.3W

POWER SUPPLY

INPUT RANGE

- DC 8-36V

OUTPUT RANGE

- DC5V/DC12V

OUTPUT CURRENT

- 5V@500mA, 12V@500mA

BUILT-IN POWER PROTECTION

LOW VOLTAGE PROTECTION

- User selectable and programmed at installation

HOUSING/CASING

- Removable, shock-mounted
- Vandal-resistant locking front cover
- Shock-resistant: MIL-STD-810F
- Aluminum
- Optional fan with filter, removable for cleaning

BUILT-IN WI-FI MODULE

OPTIONAL COMPONENTS

VIRTUAL SYNCHRONIZED MAPPING

- External Virtual Synchronized Mapping™ module with North American maps
- Includes GPSV1 antenna
- Embeds GPS tracking information synchronized with recorded video footage

GPS ANTENNA

FIREPROOF BOX BACKUP

CELLULAR MODEM

Safe Fleet Transit & Coach Roof Hatches

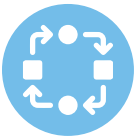
Ventilator and Emergency Escape Hatches



Enhance your passenger comfort and safety with a hatch from the leader in bus safety equipment.



Safe Fleet roof hatches demonstrate over 40 years of proven performance and come in a wide variety of styles and configurations. Hatches are also customizable to meet your specific application needs. Each hatch features a low-profile design and meets all FMVSS and CMVSS regulations.



Adaptable

Low profile design adapts to wide range of roof surfaces



High Strength

Constructed of high strength UV stable materials



Made in the USA

Proudly manufactured in North Carolina with over 40 years of proven performance



Warranty

5 Year Manufacturer Warranty



The Safe Fleet – Transpec family of ventilators and escape hatches – designed to meet the wide-ranging needs of today's transit fleet.



Dual Purpose Safety Vent

The Dual Purpose Safety Vent is a combination roof ventilator/emergency exit that provides 5-position, fresh air ventilation and a simple release handle for emergency exit.

- Multi position fresh air vent
- Emergency exit
- Most popular model



Glass Safety Vent

The Safe Fleet Glass Roof Hatch is made of 4mm tempered glass with gray tint featuring an 18% light transmission and is also available in a motorized version.

- Multi position fresh air vent
- Emergency exit
- Glass panel to allow natural light into the vehicle cabin





Power Safety Vent

The Power Safety Vent II provides all the features of the Dual-Purpose Safety Vent II with the addition of an electric fan for extracting condensation, stale or hot air from inside the vehicle to improve passenger comfort.

- Multi position fresh air vent
- Emergency exit
- High-capacity powered exhaust fan provides ventilation in the closed position



Motorized Safety Vent

The Motorized Safety Vent (MSV) is an electrically operated combination roof ventilator/emergency exit that provides fresh air ventilation as well as a simple release handle that allows the hatch to hinge open for emergency exit. The ventilation portion of the hatch is controlled by a simple switch contained within the driver's compartment of the vehicle on which it is installed.

- Multi position fresh air vent
- Emergency exit
- Allows the ventilation feature to be controlled from driver's seat



	COLORS	STATIC VENT	OUTSIDE RELEASE	RETENTION CABLE (1 or 2)	HATCH AJAR ALARM	ADHESIVE SEALANT	MULTILINGUAL DECALS
MODEL	STANDARD FEATURE & OPTIONS						
T1070 Series Dual Purpose Safety Vent II	White. Light Gray, Dark Gray, Black, Beige		●	●	●	●	●
T1670 Series Power Safety Vent II	White. Light Gray, Dark Gray, Beige	●	●	●	●	●	●
T2070 Series Motorized Safety Vent II	White. Light Gray, Dark Gray		●	●	●	●	●
T2870 Series Glass Roof Hatch	White. Light Gray, Dark Gray, Black			●	●	●	●

● Standard ● Optional



1245-SF-Hatch-BR-TR-091721

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3.38 Storage

Due to the destination signs being overhead the storage compartment will have to be located on the floor. Final determination of its location can be discussed and finalized during a pre-build meeting.



06/21/2017

MB#

Z GUARD™ 9902 STAR

A wax based undercoating intended to protect commercial vehicles from corrosion. The wax electrochemically inhibits the rate of corrosion and also, due to the film characteristics, provides a coating resistant to stone impingement and elevated temperatures.

PHYSICAL PROPERTIES

Appearance	Black Liquid
% NVM by WT.	50
Density	10.43 lb/gal
Viscosity (after reduction with water) per Brookfield RVT #5 Spindle 20RPM	2500
Viscosity per #4 Zahn cup	26 sec.
Mechanical Stability	Excellent
Heat Stability	Excellent
V.O.C.	0.00 lbs/gal
D.O.T. Flammability Rating	>200q F
pH	8.5
Cryptometer/#2 Wedge, ASTM D1212	15
60° Gloss	< 5 matt finish)
Sag (mils)	>15

Z TECHNOLOGIES CORPORATION

World Leaders in Corrosion Protection

26500 Capitol Avenue, Redford, Michigan 48239-2597
Telephone (313) 937-0710 · Fax (313) 937-1470

Z GUARD 9902 STAR Film Properties

Performance testing reflects coating on unpolished Q panels with four day air-dried films at 3.0 – 4.0 mils dry.

Dry to touch at R.T., ASTM D 1640	10 ± 2 minutes
Dry-to-Handle at R.T., ASTM D 1640	20 ± 5 minutes
Pencil Hardness	6B
Flexibility 180° bend over conical mandral	Pass
Salt Spray, ASTM B 117, 1000 hours	Field, scribe, edge clean; slight blistering
Salt Fog Resistance (463PB-10-01), 240 hours.	Pass (No rust)
◆ 500 F x 16 hours plus 240 hrs salt fog	Pass (No rust)
◆ 325 F x 16 hours plus 16 hours humidity.	Pass (No rust, nor blisters)
Salt Fog Resistance (WSS-M2P178-A), 240 hours.	
◆ 662°F x 1 hour; 1°C water quench; plus 240 hrs salt fog.	Pass (#8-9 corrosion rating or <0.1% surface rust per ASTM D 610-95)
Salt Water Immersion, 5% NaCl, 100° F, 96 Hours	Pass
Detergent Immersion, 100° F, 48 Hours	Pass
Gravelometer, ASTM D 3170, -20° F	Good(8A)
Poultice, GM 998-5470, 20 cycles	Pass
Q.U.V., ASTM G 53, 3000 Hours	Pass
Q.U.V., 100 Hours + Salt Spray, 336 Hours	Pass
Q.C.T., 3000 Hours	Pass
Humidity Resistance, ASTM D 2247, 2000 Hours	Pass
Sag resistance	≥5 mils
Impact (direct & reverse) ASTM D 3281	160/40 inch-lbs.
Adhesion (FLTM B 1 6-1 B) cross Hatch	5A Pass
Scab corrosion resistance, 20 cycles	Pass

APPLICATION

For ultimate protection, apply films to clean metals at a thickness of at least four (4) mils dry, by any of the following methods:

Airless spray, with a 33:1 1.5 - 3.5 GPM, .013 - .026 tip at 50-75 psi line pressure, 20 - 40 fan

www.ztechprotection.com

Z TECHNOLOGIES CORPORATION

World Leaders in Corrosion Protection

26500 Capitol Avenue, Redford, Michigan 48239-2597
Telephone (313) 937-0710 • Fax (313) 937-1470

UNDERCOAT PROCESS INFORMATION

Forest River Bus includes an undercoat application with every vehicle produced. The undercoating protects the unit's most exposed areas from moisture, dirt, grime, salt and other weather-related elements. Trained technicians within two undercoating bays apply the undercoating.

Each vehicle is raised using a drive-on ramp lift system in one of the two undercoating bays. Various areas of the body conversion are masked off including, but not limited to: fuel fills, mud flaps, wheel wells, etc. A rust preventative is also added to the bottom edge of the metal skirts if applicable. A spray foam is applied for additional noise reduction as well as body seam sealing. The underbody is then sprayed with a tough, pliable, corrosion protectant material, which incorporates a sound-deadening property at a pressure of 40 psi. The application runs between 45 minutes to 1.5 hours pending vehicle length.

Forest River Bus follows the strict guidelines established by QVM. No undercoating is sprayed within 12" of the exhaust system or on fuel tank(s), brake lines, AC/heater hoses, heat shield, wire harnesses, driveshaft(s), rear suspension or OEM frame rail.

Undercoating data is available upon request.



FOREST RIVER BUS

2367 Century Drive • Goshen, Indiana 46528 • 800.348.7440 • www.forestriverinc.com



Creative Bus Sales

December 9, 2021

To Whom It May Concern:

Creative Bus Sales, Inc. located at 14740 Ramona Ave Chino, CA 91710, hereby authorizes Nicholas R. Corley, Sales Operations Manager, to act as an authorized signer on behalf of Creative Bus Sales, Inc. for binding contracts with your organization.

If further information is needed, please feel free to contact me.

T.J. Matijevich, Vice President
Creative Bus Sales, Inc.
800-326-2877
TJ@creativebussales.com



Statement of Financial Stability

Creative Bus Sales, Inc has been operating in the bus industry for over 25 years. The Company is the nation's largest bus dealer offering products from over 20 top commercial and school bus manufacturers

Creative Bus Sales, Inc. has a long history of fulfilling similar contracts with other transportation agencies and government procurement offices in other states including California and Florida.

Creative Bus Sales Inc. has been profitable every year since its inception. The Company continues to be financially solvent and practices a conservative expansion plan.

Creative Bus Sales maintains the largest inventory in the nation, and possesses the expertise and necessary equipment to provide adequate support to any bus fleet. The Company has multiple long-term inventory finance resources enabling it to carry sufficient inventory to fulfill the requirements of this contract.

Our financial statements are audited by an external CPA firm, and are available upon request.

If you need any further information, please do not hesitate to contact me.

J.R. Sauder
Sr. Vice President



Creative Bus Sales

Warranties

Ford E450 Cutaway Chassis Engine, Transmission, Drive Axle, Brake System

See document titled Ford Warranty

Bus Body Bumper to Bumper

See document titled Glaval Limited warranty

Basic Body Structure Integrity

See document titled Glaval Limited warranty

Wheelchair Lift System

Five Year Limited Warranty

All Add On Components

Two Years, Unlimited Miles



Creative Bus Sales

Warranty Provider Locations

Fleetpride
3204 Maccorkle Ave SW, South
Charleston, WV 25303

Matheny Motors
50 Matheny Lane
Mineral Wells, WV 26150

Matheny Motors
4125 1st Ave
Nitro, WV 25143

Matheny Motors
1375 US Rt 52
Kenova, WV 25530

2023 FORD E-SERIES CUTAWAY

TECHNICAL SPECIFICATIONS



BODY

Construction/materials	High-strength C-section, steel frame
Body style	Body-on-frame
Final assembly location	Ohio Assembly Plant, Avon Lake, Ohio

DRIVETRAIN

Layout	Front-engine, rear-drive
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ENGINES

	7.3-liter premium V8 (standard)	7.3-liter economy V8 (optional)
Configuration	90-degree V8, single in-block cam	90-degree V8, single in-block cam
Block/head material	Cast iron block, aluminum heads	Cast iron block, aluminum heads
Displacement	7.3 liters (445 cubic inches)	7.3 liters (445 cubic inches)
Bore x stroke	4.22 x 3.97	4.22 x 3.97
Compression ratio	10.5:1	10.5:1
Valvetrain	Pushrod and rocker arms, two valves per cylinder	Pushrod and rocker arms, two valves per cylinder
Recommended fuel	87 octane	87 octane
Fuel delivery	Sequential multiport electronic	Sequential multiport electronic
Engine control system	Electronic	Electronic
Intake manifold	Naturally aspirated, tuned intake	Naturally aspirated, tuned intake
Dyno certified horsepower	350 @ 3,900 rpm	300 @ 3,750 rpm
Dyno certified torque	468 lb.-ft. @ 3,900 rpm	425 lb.-ft. @ 3,250 rpm
Oil-life monitor	Oil-minder system	Oil-minder system

ELECTRICAL

Alternator	Standard 210-amp, optional 240-amp, or optional dual 240-amp/157-amp
Battery group	12-volt; 750-CCA 78-amp/hr

TRANSMISSION

Configuration	Aluminum 6-speed with two overdrive speeds and tow/haul; auxiliary cooler
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Gear ratios:

First	3.974:1
Second	2.318:1
Third	1.516:1
Fourth	1.149:1
Fifth	0.858:1
Sixth	0.674:1
Reverse	-3.128:1

FORD E-SERIES



CHASSIS SPECIFICATIONS

Front suspension	Twin I-beam independent with computer-selected coil springs and stabilizer bar
Rear suspension	Multileaf single-stage leaf springs/solid axle and stabilizer bar (DRW only)
Front and rear shocks	Heavy-duty gas-pressurized
Steering	Recirculating ball, power-assisted

BRAKES

Type	Power four-wheel vented discs, ABS, traction control
Front (rotor diameter)	13.58 inches (345 millimeters)
Rear (rotor diameter)	13.58 inches (345 millimeters)

WHEELS

Type	Steel
Size	16 inches
Number of studs	Eight
Bolt-circle diameter	6.5 inches

EXTERIOR DIMENSIONS (INCHES UNLESS OTHERWISE NOTED)

	138-inch wheelbase E-350 SRW	158-inch wheelbase E-350 SRW	138-inch wheelbase E-350 DRW	158-inch wheelbase E-350 DRW	176-inch wheelbase E-350 DRW	158-inch wheelbase E-450 DRW	176-inch wheelbase E-450 DRW
Overall length	241.1	261.1	241.1	261.1	261.1	261.1	261.1
Overall width	79.4	79.4	94.9	94.9	94.9	94.9	94.9
Rear track	72.1	72.1	75.4	75.4	75.4	77.7	77.7
Cab, rear to rear axle	80	100	80	100	118	100	118
Rear axle to end of frame	68.5	68.5	68.5	68.5	50.5	68.5	50.5
Front overhang	34.6	34.6	34.6	34.6	34.6	34.6	34.6

INTERIOR DIMENSIONS

	E-350/E-450 Cutaway
First row headroom	42 inches
First row shoulder room	68.1 inches
First row hip room	65.6 inches
First row maximum legroom	42.1 inches

FORD E-SERIES



PASSENGER AND FUEL CAPACITIES

	E-350 SRW, DRW	E-450 DRW
Seating capacity	Two (one optional)	Two (one optional)
Fuel capacity	40 gallons (55 optional)	55 gallons (40 optional)

PAYLOAD PACKAGE SELECTOR (LBS.)

	Engine	GCWR	GVWR	Payload
E-350 SRW 138-inch wheelbase	7.3-liter economy	13,000	10,050	5,100
E-350 SRW 138-inch wheelbase	7.3-liter premium	18,500	10,050	5,100
E-350 DRW 138-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,270
E-350 DRW 138-inch wheelbase	7.3-liter premium	18,500	11,500	6,270
E-350 SRW 158-inch wheelbase	7.3-liter economy	13,000	10,050	5,030
E-350 SRW 158-inch wheelbase	7.3-liter premium	18,500	10,050	5,030
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000/17,000	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	11,500	6,210
E-350 DRW 158-inch wheelbase	7.3-liter economy	13,000	12,500	7,210
E-350 DRW 158-inch wheelbase	7.3-liter premium	18,500	12,500	7,210
E-350 DRW 176-inch wheelbase	7.3-liter economy	13,000/17,000	12,500	7,200
E-350 DRW 176-inch wheelbase	7.3-liter premium	18,500	12,500	7,200
E-450 DRW 158-inch wheelbase	7.3-liter economy	18,000	14,000	8,480
E-450 DRW 176-inch wheelbase	7.3-liter premium	22,000	14,200/14,500	8,680/8,980

WARRANTY

Bumper to bumper:	Three years/36,000 miles
Powertrain:	Five years/60,000 miles
Safety restraint system:	Five years/60,000 miles
Corrosion (perforation only):	Five years/unlimited miles
Roadside assistance program:	Five years/60,000 miles

FORD E-SERIES





GLAVAL BUS WARRANTY

NOTICE

Please return the warranty registration card to register the warranty with GLAVAL BUS so that GLAVAL BUS may record your rights under this limited warranty and to assure prompt assistance. Your dealer will provide the warranty card for you to sign. If you do not remember signing a GLAVAL BUS warranty card at the time of delivery, please contact your dealer.

1. Who Warrants the product

The product, as described and limited here, is warranted by the manufacturer and installer of the body: GLAVAL BUS, Division of Forest River, Inc., hereinafter referred to as GLAVAL BUS, 2367 Century Drive, Goshen, IN; an Indiana Corporation; and is administered by the GLAVAL BUS Customer Service Dept., Goshen, Indiana 46528.

2. Who Is Covered

GLAVAL BUS, the warrantor, extends this limited warranty to the original owner of the vehicle during the WARRANTY PERIOD.

3. What Is Covered

GLAVAL BUS, your warrantor, extends the following limited warranty to you, which limited warranty covers your conversion only as to material defects in all materials and workmanship supplied by or performed by GLAVAL BUS.

4. Warranty Period

The GLAVAL BUS limited warranty is for a period of one (1) year from the date of first delivery or 12,000 miles, whichever occurs first, except for other coverages listed under "Other Warranties that may Apply" and items listed under "Exclusions and Limitations" and "Limits of the Warranty."

5. Extended Warranty on Structural Items

Warrantor warrants to the original purchaser for a period of five (5) years from the date of first delivery or 100,000 miles, whichever comes first, that this produce shall be free of SUBSTANTIAL DEFECTS arising out of or relating to the structural portion of the product. THIS STRUCTURAL WARRANTY IS INTENDED TO COVER ONLY THE PERFORMANCE OF THE STEEL CAGE STRUCTURE OF THE BUS BODY.

Custom paint and/or tape application, if performed by GLAVAL BUS, is warranted to be free of substantial defects in workmanship and materials provided by GLAVAL BUS for one (1) year (12 months) from date of original purchase.

6. Other Warranties That May Apply

GLAVAL BUS does not warrant the base vehicle itself. The vehicle engine, chassis, drive train, suspension system, battery, and other chassis components are covered by a separate warranty offered by the manufacturer of the vehicle and administered by the manufacturer's authorized dealers. The tire manufacturer separately warrants tires. Examples of other manufacturer warranties, which may include the following, but not limited to:

- Electrical Components
- Air Conditioning and Heater(s)
- Wheelchair Restraints and Wheelchair Lifts

For a complete list of items and their respective warrantor, please contact GLAVAL BUS Customer Service Department.

7. Owner's Responsibility

Proper maintenance and cleaning of the exterior and interior of the vehicle is the responsibility of the owner. See the owner's manual for proper care instructions. Defects or damage as a result of improper care or maintenance are not covered by the warranty.

8. Exclusions and Limitations

Damage caused by abuse, misuse, neglect, failure to observe reasonable and required maintenance practices, acid rain, accidents, natural disasters, acts of war and normal wear and tear and facing of fabrics, carpeting and/or fiberglass are not covered. Light bulbs and fuses are not covered.

Damage or deterioration to the physical appearance of the unit if such damage is the result of normal use, wear and tear, or exposure to the elements.

Damages that may occur to the chassis, frame, other parts or components that occur due to overloading will not be covered and may invalidate portions of the GLAVAL BUS warranty.

Cosmetic or surface corrosion resulting from stone chips or scratches in paint are not covered.

GLAVAL BUS does not cover accessories covered by their own manufacturer's warranties. Those items listed in paragraph 6 above are not covered or warranted by GLAVAL BUS.

Replacement parts provided under terms of the warranty will whenever possible, match original equipment. When necessary, GLAVAL BUS will substitute parts of comparable function and value. Defective items may be replaced with new, remanufactured, reconditioned or repaired components.

Modifications, alterations or repairs performed by unauthorized personnel may invalidate portions of the GLAVAL BUS warranty. In addition, USING THIS VEHICLE TO TOW ANOTHER VEHICLE IS PROHIBITED AND MAY VOID WARRANTY. Contact GLAVAL BUS Customer Service before you make any changes.

9. Recovery Limitations

NO PERSON SHALL BE ENTITLED TO RECOVER FROM WARRANTOR FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING OUT OF OR RELATING TO ANY DEFECT IN THE PRODUCT. These limitations include, but are not limited to, loss of time; loss of use; loss of revenues, salaries or commissions; towing charges; bus fares; car rentals; gasoline expenses; telephone charges; inconvenience or other incidental damages.

10. How to get warranty service

To obtain warranty service, contact or visit the dealership where you originally purchased your vehicle or another warranty service facility designated by GLAVAL BUS. Have the dealership contact GLAVAL BUS Customer Service Department for authorization to have a warranty claim submitted. If you or your dealer has moved, or if your dealer is no longer in business, contact GLAVAL BUS Customer Service Department (see address and telephone numbers below) for the name of a GLAVAL BUS dealer nearest you. Your claim must be made within 30 days of the discovery of the defect. Based on the determination of GLAVAL BUS, and subject to the terms of the warranty, the warranty repair work will be authorized by GLAVAL BUS.

All warranty claims must be reported within the warranty period. Warranty personnel must authorize all warranty service prior to performance. Warranty service may be reported directly to the warrantor or to one of their authorized dealers. If warranty personnel approve warranty service, you must leave the unit at the appropriate warranty service location for a sufficient time to perform service.

11. Who Performs Warranty Service

The best place to obtain warranty service is at the dealership where you originally purchased your bus. If the dealership cannot perform the service work, they should call GLAVAL BUS Customer Service Department for assistance (see number below). If you are unable to visit your original dealer, contact GLAVAL BUS Customer Service Department (address below) for the name and location of a GLAVAL BUS dealer near you.

12. Dispute Resolution

Should you be unable to resolve a disagreement with your dealer regarding your right to pursue warranty coverage for a needed repair, contact the GLAVAL BUS Customer Service Department (see address below). If a dispute about warranty service arises between GLAVAL BUS and you, the owner, the disagreement will be resolved in accordance with the customary procedures of the American Arbitration Association relating to commercial transactions, or the dispute will be submitted to a panel of three (3) arbitrators for decision. The panel will be made up of one member appointed by GLAVAL BUS, one member appointed by the complainant/owner, and one member from the arbitrators group mentioned above. Any and all legal remedies shall be available to the owner after pursuing this informal dispute resolution if a ruling is entered against GLAVAL BUS and GLAVAL BUS fails to abide by the ruling. The expenses of arbitration will be paid by the party against whom the arbitrator(s) rule.

13. Limits Of Warranty

This written statement of limited warranty represents the entire warranty authorized and offered by GLAVAL BUS. There are no warranties or representations beyond those expressed in this written document. Any dealership, salesperson or agent cannot amend it. It expressly limits all warranties, including, but not limited to, by way of specification, both express and implied warranties, including warranties or merchantability and fitness for a particular purpose along with all other liabilities or obligations of GLAVAL BUS.

FEDERAL COMPLIANCE

THE TERMS OF THE WARRANTOR'S UNDERTAKING EXPRESSED IN THIS LIMITED WARRANTY ARE DRAFTED TO COMPLY WITH THE MAGNUSEN MOSS WARRANTY LEGISLATION, P.L. 93-637 OF 1974, AND OTHER APPLICABLE LAW. ANY WARRANTY PROVISIONS PROMULGATED BY THE FEDERAL TRADE COMMISSION PURSUANT TO RULES OR ANY OTHER LAW RELATIVE THERETO ARE EXPRESSLY INCORPORATED HEREIN. TO THE EXTENT ANY PROVISIONS OF THIS LIMITED WARRANTY ARE INCONSISTENT WITH STATE LAWS, ONLY THOSE PARTS INCONSISTENT ARE VOID.

GLAVAL BUS
Division of Forest River, Inc.
CUSTOMER SERVICE DEPT.
2367 Century Drive
Goshen, IN 46528
Phone: 877.258.1391
Fax: 574.970.6815



Trans/Air Manufacturing Corporation Limited Warranty FTA Funded Vehicles 36 Month (Unlimited Mileage)

Subject to the conditions and limitations set forth below, for a period of thirty six (36) months (with unlimited mileage) starting at the date of delivery to the End User and with proper registration documentation, Trans/Air Manufacturing Corporation (Trans/Air) warrants to the original owner, if still the user, that each manufactured system/component will be free from defects in factory workmanship and materials when used and maintained in accordance with the recommended procedures. Trans/Air will furnish new or remanufactured replacement parts and cover the cost of repair labor for thirty six (36) months following delivery in accordance with the current Trans/Air flat rate labor schedule when performed at an authorized Trans/Air Service Center. This is the End User's sole and exclusive remedy.

THIS IS TRANS/AIR'S SOLE WARRANTY AND IT IS FURNISHED IN LIEU OF ANY AND ALL OTHER WARRANTIES. TRANS/AIR MAKES NO OTHER EXPRESS OR IMPLIED WARRANTIES WHATSOEVER. NO WARRANTY OF MERCHANTABILITY AND NO WARRANTY OF FITNESS FOR PARTICULAR PURPOSE IS MADE BY TRANS/AIR.

Conditions and Limitations

- 1) In order for a thirty six (36) month system warranty to apply, the customer must purchase the evaporator(s), condenser(s), compressor(s), piping kits, electrical kits, mount kits and refrigeration hose from Trans/Air. If the full system is not purchased from Trans/Air, the thirty six (36) month warranty applies to Trans/Air supplied evaporators and condensers only. All compressors, piping kits, and electrical kits purchased outside of a full system, will be considered a service part and will carry a 180 day warranty. All mount kits purchased outside of a full system, and used on a Trans/Air system, will be considered a service part and will carry a 180 day warranty. All mount kits purchased outside of a full system, and used on a system other than Trans/Air, will carry no warranty. All other components supplied by Trans/Air are covered by standard parts warranty (see #4 below). Extended warranty coverage may be purchased from Trans/Air at the time of purchase of the unit or system. Correction of a failure under this warranty does not extend the warranty beyond the standard thirty six (36) month warranty period.
- 2) Service parts are warranted for a 180 day period from the date of sale or until the expiration of the original equipment warranty, whichever is later. (Compressors are warranted for 1 year) If required, parts covered by warranty must be returned to Trans/Air's factory in Dallastown, PA, by specified carrier freight prepaid, within standard Return Goods Authorization procedures, for evaluation, in order for Trans/Air to authorize any warranty claim.
- 3) Trans/Air will be responsible for the costs of repairs or replacement covered by warranty only if performed at an authorized Trans/Air Service Center. The Service Center is responsible for effecting repairs or replacement during the warranty period in accordance with current Trans/Air warranty procedures. A customer requesting service at a location other than an approved Service Center, or one requesting overtime, shall be responsible for all additional warranty repair expenses in excess of the flat rate allowed. Trans/Air is not responsible for towing charges.
- 4) If the customer has not properly registered the Trans/Air system, the Service Center is not authorized to render warranty services without charge. All information on the warranty registration form must be completed in its entirety and returned to Trans/Air to activate the warranty.



- 5) Trans/Air does not warrant the installation of Trans/Air products unless installed by Trans/Air or an authorized Trans/Air Turnkey installation facility. In the cases of installation related failures, which are not covered by warranty Trans/Air specifically is not responsible for failures attributable to inadequate provision by the installer of structural support or inadequate provision of electrical requirements.
- 6) This warranty does not apply in cases of a failure of Trans/Air product which is attributable to improper evacuation procedures, or the introduction of non-approved refrigerant oil, additives, or other contaminants into the system.
- 7) This warranty does not apply in cases of failure of Trans/Air product, which is attributable to failure of the end user to perform or provide preventative maintenance in accordance with Trans/Air's guidelines. Examples include, but are not limited to, failure to properly maintain belt tension, clean condenser coils, replace evaporator filters, maintain electrical systems to provide proper voltage to components, or check and tighten hardware or fittings, which may have loosened due to vibration. (See Trans/Air Preventive Maintenance Schedule)
- 8) This warranty does not apply to loss of refrigerant or any damage caused by loss of refrigerant unless directly attributable to the failure of a Trans/Air product which, at the time of the failure, was under warranty.
- 9) Trans/Air reserves the right to make changes in design or improvements to its products or parts thereof, without obligation to make or install of such changes or improvements on existing units or upon products covered by this warranty.
- 10) If Trans/Air makes a product improvement program available to the End User, Trans/Air reserves the right to limit the duration of the programs unless it is safety related. Expenses incurred in completing said product improvements after the closing date of the program are the responsibility of the End User.
- 11) Trans/Air's warranty shall not apply in the case of damage incurred during shipment, accidental damage, abuse, misuse, act of nature, or if the serial number is missing, or to any product which, in the sole opinion of Trans/Air, has been installed, altered or repaired in a manner affecting the efficiency or performance of the unit or inconsistent with Trans/Air's written procedures.
- 12) This warranty applies only within the boundaries of the whole United States, its territories, and Canada. For other available coverage that may be purchased, contact Trans/Air.

TRANS/AIR'S LIABILITY TO THE PURCHASER FOR DAMAGES FROM ANY CAUSE WHATSOEVER AND REGARDLESS OF THE FORM (S) OF ACTION, WHETHER IN CONTACT OR TORT, INCLUDING NEGLIGENCE OR OTHERWISE, SHALL BE LIMITED TO THE VALUE OF REPAIRS TO OR REPLACEMENT OF THE DEFECTIVE COMPONENTS DURING THE WARRANTY PERIOD, AS THE EXCLUSIVE REMEDY, AND STRAIGHT TIME LABOR CHARGES AS OUTLINED IN ITS CURRENT WARRANTY PROCEDURE MANUAL AND FLATE RATE LABOR SCHEDULE. IN NO EVENT SHALL TRANS/AIR BE LIABLE WHATSOEVER FOR ANY PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR FOR LOST PROFITS OR OTHER COMMERCIAL LOSSES FROM ANY CAUSE WHATSOEVER, WHETHER OR NOT TRANS/AIR HAS RECEIVED NOTICE OF THE POSSIBILITY OR CERTAINTY OF SUCH DAMAGES OR LOSSES. TRANS/AIR WILL NOT BE LIABLE FOR ANY LOSS OCCURRING BECAUSE THE EQUIPMENT IS OUT OF SERVICE. NO ACTION OR PROCEEDING ARISING OUT OF, FOR BREACH OF, OR IN ANY MANNER RELATING TO THIS WARRANTY MAY BE BROUGHT BY ANYONE AFTER SIX (6) MONTHS FROM NOTIFICATION TO TRANS/AIR OF AN IN-WARRANTY FAILURE.