



STATE OF CALIFORNIA
EXHIBIT 11.31, CLASS A, B, C & E
BUS, PARATRANSIT QUESTIONNAIRE

23-19TQ2

NOTES: The bidder shall complete this questionnaire in full for each proposed product and shall submit all questionnaires with the bid. (Bidders will need to make copies of this form if more than one vehicle Class or fuel system is offered.)

Name of bidder: Creative Bus Sales, Inc. Date: Revised 8/17/2016

Name of Bus Manufacturer: Starcraft Bus Bus Manufacturer ISO 9001(latest) certified:
 Yes: X No: _____
 Vehicle Class: A: _____ B: _____ C: X E: _____ Fuel Type: CNG: _____ Diesel: _____ Gas: X
 Bus Year, Make and Model: 2016 Starcraft Allstar Chassis Year, Make & Model:
2016 Ford E-450
 Bus Model ALTOONA Tested: 2016 Ford E-450 Bus Model Rollover Tested (FMVSS 220):
 Yes: X No: _____ Pending: _____ Yes: X No: _____

Is Altoona Test report available on Altoona website, Yes: X, No: _____ altoonabustest.psu.edu/buses/109

Note: A report from the Federal Transit Administration (FTA) that matches the Make/Model on this questionnaire or a web link to the Altoona testing web site that matches the Make/Model on this questionnaire shall be included in the bid as Exhibit 11.28, Altoona Bus Testing.

The sections referred to in this questionnaire correspond to specification 2310-3075 (Class A, B, C) and 2310-3082 (Class E) see below:

3.1.		
What is the number of wheelchair positions?	<u>2</u>	each
What is the number of ambulatory passenger (track mounted) seat positions for "rear lift" bus?	<u>16</u>	each
What is the Gross Vehicle Weight Rating (GVWR)?	<u>14,500</u>	pounds
What is the chassis wheelbase?	<u>176"</u>	inches
What is the "clear" front entrance door height?	<u>79"</u>	inches
What is the "clear" front entrance door width for bus?	<u>30"</u>	inches
What is the engine HP and Torque?	Horse Power <u>305</u> Torque <u>420</u>	HP lb-ft
3.5 Is the Engine certified by CARB to operate on Highway in State of California? Engine family name: <u>FFMXE06.8BW</u> , CARB certificate Should be provided.	Yes <u>X</u>	No _____

3.8 Does the ground load rating of the front and rear springs equal or exceed the GVWR of the vehicle? Front: Rear:	Yes <input checked="" type="checkbox"/> <u>5,000</u> <u>9,600</u>	No _____ pounds pounds
3.13 Is the chassis equipped with seven OEM, steel-belted, radial-ply tires of equal size and rating with the combined load rating of the tires equal or exceeding the GVWR of the vehicle? Tire Size: <u>LT225/75R 16</u> Tire Load Rating: <u>E</u>	Yes <input checked="" type="checkbox"/> 2,680 Single <u>2,470</u> Dual	No _____ pounds
3.14 Is the chassis equipped with an OEM front bumper? Is the chassis equipped with an energy absorbing rear bumper with a reverse assistance system integrated into the bumper? Bumper Brand/Model: <u>Romeo RIM</u> Reverse Assistance Sys Brand/Model: <u>Intermotive Hawkeye</u> <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i>	Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/>	No _____ No _____ No _____
3.15 What is the Gross Axle Weight Rating (GAWR)? Front Axle Rear Axle	<u>5,000</u> <u>9,600</u>	pounds pounds
3.16 Is protective metal guard for drive shaft provided?	Yes <input checked="" type="checkbox"/>	No _____
3.18 Is the vehicle equipped with two rearview mirrors? What is the brand and model of mirror? <u>Velvac 2020SS</u>	Yes <input checked="" type="checkbox"/>	No _____
3.19 Is the bus equipped with a 12-volt electrical system compliant to section 3.19?	Yes <input checked="" type="checkbox"/>	No _____
3.19.2 What is the alternator voltage? Is the bus equipped with a fast idle system? Brand/Model: <u>Intermotive Gateway #505-F</u>	225 Amps / 12v Yes <input checked="" type="checkbox"/>	volts No _____
3.19.3 Is the bus equipped with Light-Emitting Diode (LED) lights compliant to section 3.19.3. Brand/Model: <u>Optronics LED</u>	Yes <input checked="" type="checkbox"/>	No _____
3.19.4 Is bus equipped with additional lights requirements compliant to section 3.19.4?	Yes <input checked="" type="checkbox"/>	No _____
3.19.5 Is the bus equipped with two maximum-capacity chassis OEM batteries? Rating #1 <u>750</u> CCA, #2 <u>750</u> CCA	Yes <input checked="" type="checkbox"/>	No _____
3.19.6 Is the bus equipped with a locking, weather-protected, sliding-type battery tray compliant to section 3.19.6?	Yes <input checked="" type="checkbox"/>	No _____
3.20 What is the size of the fuel tank? Is fuel tank compliant with CARB standards?	<u>55</u> Yes <input checked="" type="checkbox"/>	Gallons No _____

<p>3.23 Is the bus equipped with a back-up alarm compliant to section 3.21 Brand/Model: <u>Ecco 575</u> <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i></p>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<p>3.26 Is the seating compliant to section 3.26? What is the Make and Name/Number of the vinyl seat material? <u>Docket 90 Vinyl (Freedman Level 4)</u> e) What is the hip to knee spacing? f) What is the aisle spacing? h) Is the bus equipped with passenger seats in compliance with Section 3.26h. <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i></p>	Yes <input checked="" type="checkbox"/> <u>27" Min</u> <u>16"</u> Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> inches inches No <input type="checkbox"/>
<p>i) Is the bus equipped with a driver seat in compliance with Section 3.26i Brand/Model: <u>Recaro SHS</u> <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i></p>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<p>3.27 What is the thickness of the plywood? Is the floor surface covered with minimum 2.2 millimeter thick, highly resilient PVC flooring in compliance with section 3.27? Brand/Model: <u>Altro Transflor</u> 3.27 Is the flooring installation and adhesion compliant with Section? 3.27 What type of flooring adhesive will be provided on the bus? Brand/Model: <u>Natcon Spider Glue / Nitro</u> <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i></p>	<u>5/8"</u> Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/>	Inches No <input type="checkbox"/> No <input type="checkbox"/>
<p>3.28 Is the bus equipped with rear emergency window compliant with Section 3.28?</p>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<p>3.29 Is the bus equipped with an electric front entrance door compliant to section 3.29? Brand/Model: <u>A&M Systems / Electric</u> <i>Bidder should submit descriptive literature (unless the reference Brand/Model is bid)</i></p>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<p>3.30 Is the bus equipped with entry steps compliant to section 3.30? What are the step dimensions (Step riser height X Depth)? What is the dimension of the bottom step tread from the ground unloaded? Are steps vertical? If not, what is the usable step area?</p>	Yes <input checked="" type="checkbox"/> <u>9" x 11.25"</u> <u>12" Max</u> Yes <input checked="" type="checkbox"/> _____	No <input type="checkbox"/> inches inches No <input type="checkbox"/> inches

3.31 Is the bus equipped with a driver's side running board compliant to section 3.31? What is the depth of the running board?	Yes <input checked="" type="checkbox"/> _____ <u>12"</u>	No _____ inches
3.32 What type of material is used to fabricate the handrails? Material What is the length of the handrail?	<u>Stainless Steel</u> <u>30" Min</u>	inches
3.35 Is the bus equipped with insulation compliant to section 3.35?	Yes <input checked="" type="checkbox"/> _____	No _____
3.37 Is the bus equipped with an exterior front one piece cap compliant to section 3.37?	Yes <input checked="" type="checkbox"/> _____	No _____
3.38 Is the bus equipped with an undercoating compliant to section 3.38? Brand/Model: <u>BASF Degacoat</u>	Yes <input checked="" type="checkbox"/> _____	No _____
3.39 Is wheel housings made of minimum 14 Gauge galvanized steel or stainless steel compliant to section 3.39?	Yes <input checked="" type="checkbox"/> _____	No _____
3.40 Is the bus equipped with an OEM integral front air conditioner and An auxiliary rear air conditioner compliant to section 3.40? What is the auxiliary rear air conditioner output? Make/Model <u>Trans Air TA733 Super 13 / #16 Suction</u> <i>Bidder should submit descriptive literature.</i>	Yes <input checked="" type="checkbox"/> _____ <u>43,367</u>	No _____ <u>SAE BTU</u>
3.41 Is the bus equipped with front-mounted, integral high-output heater and a rear floor high-output auxiliary heater mounted behind the rear wheel housing or under a rear fixed seat compliant to section 3.41? Class A auxiliary heater: _____ BTU, Make/Model: _____ Class B and C auxiliary heater : <u>65,000</u> BTU, Make/Model <u>Pro-Air 465</u> Class E Auxiliary Heater: _____ BTU, Make/Model _____ <i>Bidder should submit descriptive literature.</i>	Yes <input checked="" type="checkbox"/> _____	No _____
3.42 Is the bus equipped with a mobility aid lift compliant to section 3.42? Brand/Model: <u>Braun Century NCL919FIBHB-2</u> <i>Bidder should submit descriptive literature.</i>	Yes <input checked="" type="checkbox"/> _____	No _____
3.43 Is the bus equipped with controls for the lift that interlock with Emergency brakes and transmission compliant to section 3.43? Brand/Model: <u>Intermotive Gateway #505-F</u>	Yes <input checked="" type="checkbox"/> _____	No _____
3.44 Is the bus equipped with side lift entry doors compliant to section 3.44?	Yes <input checked="" type="checkbox"/> _____	No _____
3.45 Is the bus equipped with a device to prevent starting the vehicle in neutral? Brand/Model: <u>Intermotive PCOM 501B</u> Bidder should submit descriptive literature (unless the reference Brand/Model is bid)	Yes <input checked="" type="checkbox"/> _____	No _____

3.46 Is the bus equipped with mobility aid security and occupant restraint systems compliant to section 3.46? Brand/Model: <u>Q'Straint QRT-360</u>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
3.47 Is web cutter provided compliant to section 3.47a? Is torso pad provided compliant to section 3.47b? Is closeable box provided compliant to section 3.47c1? Is Secured container provided for storage of straps, pads etc. Compliant to section 3.47c2?	Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/>
3.48 Is 5 lb fire extinguisher provided compliant to section 3.48a? Is 16-unit First aid kit provided compliant to section 3.48b? Is reflective triangles provided compliant to section 3.48c? Is bus equipped with a passenger viewing mirror compliant to section 3.48d? Brand/Model: <u>Rosco 609</u> <i>Bidder should submit descriptive literature for mirror (unless the Reference Brand/Model is bid).</i> Is bus equipped with a two-way antenna prep compliant to section 3.48e? Is blood borne pathogen kit provided compliant to section 3.48f? Is retractable coat hook provided compliant to section 3.48g?	Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/> No <input type="checkbox"/>
3.50 What is the CNG tank capacity (total)? Does fuel tank comply with FMVSS 304 and ANSI NGV2-2007 Manufacturer of CNG conversion: _____ Installer of CNG conversion: _____ Is CNG conversion system approved by CARB?	<u>N/A</u> Yes <input type="checkbox"/> Yes <input type="checkbox"/>	GGE No <input type="checkbox"/> No <input type="checkbox"/>

Class B and C - Gasoline

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³	DIAGNOSTIC ¹
2015	FFMXE06.8BWX	6.8	Gasoline	Otto	HOO	TWC, SFI, H02S, 2WR-H02S	OBD (F)
PRIMARY ENGINE'S IDLE EMISSIONS CONTROL ⁴		ADDITIONAL IDLE EMISSIONS CONTROL ⁴					
N/A		N/A					
ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)						
6.8	E450 Incomplete / DE418N05, DE418M05, (305 for all codes)						
*	*						
* =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc; L=liter; hp=horsepower; kw=kilowatt; hr=hour; ¹ CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel; ² UM/H HDD=high/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto; ³ ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; NAC=NOx adsorption catalyst; SCR-U / SCR-N=selective catalytic reduction -urea / ammonia; WU (prefix)=warm-up catalyst; DPF=diesel particulate filter; PTOX=periodic trap oxidizer; H02S/02S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); WR-H02S=wide range oxygen sensor; TBI=throttle body fuel injection; SFI/MFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; IDI/DDI=indirect/direct diesel injection; TC/SC=turbo/ super charger; CAC=charge air cooler; EGR / EGR-C=exhaust gas recirculation / cooled EGR; PAIR/AIR=pulsed/secondary air injection; ke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series; ESS=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1) ; 30g=30 g/hr NOx (per 13 CCR 1956.B(a)(S)(C); APS =internal combustion auxiliary power system; ALT=alternative method per 13 CCR 1956.8(a)(6)(D); Exempt=exempted per 13 CCR 1956.B(a)(S)(B) or for CNG/LNG fuel systems; N/A=not applicable (e.g., Otto engines and vehicles); EMD=engine manufacturer diagnostic system ; OBD(F) / (P) / (\$) =full / partial / partial with fine / on-board diagnostic ; (2012-08-20)							

Following are: 1) the FTP exhaust emission standards , or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the SET and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, SET and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.).

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	SET	0.20	SET	FTP	SET	14.4	*	0.01	*	0.01	*
CERT	0.10	*	0.15	*	*	*	7.0	*	0.001	*	0.000	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

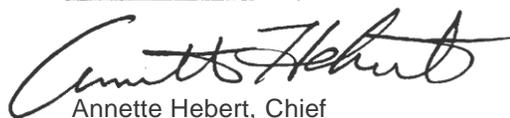
⁴ g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; SET=Supplemental Emissions Testing; NTE=Not-to-Exceed; STD=standard or emission test cap.; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde; (Rev.: 2007-02-26)

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic, full or partial compliance), and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 2 day of December 2014.



Annette Hebert, Chief
 Emissions Compliance, Automotive Regulations and Science Division

CalTrans CLASS C System Components

TA733 Super 13 #16 Suction

TA73 Evaporator

P/N 2022072-28



SMC3L Condenser

P/N 301795-04



Compressor | Engine Mount & Drive Kit

P/N 512236 13 CID Compressor,
P/N 4013524-02 Compressor Mount Kit,
P/N 4012708 Alternator Mount Kit



Basic II PCB Controls

P/N 5031451



SAE-J2064 Hose & Fitting System

P/N 5031475 Fitting Kit, P/N 311026 #8 Hose,
P/N 311027 #10 Hose, P/N 311034 #16 Hose



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.



CalTrans CLASS C System Specifications

TA733 Super 13 #16 Suction

System BTU/hr (without dash): 43K SAE / 68K IMACA

Dash unit: 15K SAE / 24K IMACA

System BTU/hr (with dash): 58K SAE / 92K IMACA

A complete Trans/Air system consisting of (1) TA73 Evaporator, (1) SMC3L Skirt Mount Condenser, and (1) 13 cid Compressor with #16 suction line, installed separately from the OEM chassis compressor & dash evaporator with Basic Controls and a Trans/Air supplied mount kit.

Quality System: Trans/Air Manufacturing is registered to ISO 9001:2008 by an accredited auditor.

Evaporator: **TA73**
Capacity: 43,367 (SAE) to 68,449 (IMACA) Btu/hr
Cooling Coil: Advanced aluminum fins on 3/8" internally enhanced copper tubing
Expansion Valve: Externally equalized thermostatic type
Blower Assembly: (2) blowers each with double wheels and dual inlets
Total Blower Air Flow: 1480 ft³/min @ 0 Static (2515 m³/hr @ 0 Static)
Motors: High performance double shaft, permanent magnet
Amperage: 16.9 A @ 13.5 Vdc / 8.5 A @ 27 Vdc
Housing: Galvaneated steel with aluminum or ABS cover
Specification: All interior components shall meet FMVSS 302 for fire retardant specifications

Condenser: **SMC3L Microchannel** (Skirt Mount)
Capacity: 71,325 (SAE) to 87,175 (IMACA) Btu/hr
Condenser Coil: Aluminum microchannel (488 in² face area)
Fan Assembly: (3) low profile, surface mounted 10 in diameter fans
Motor Type: Closed, permanent magnet w/ball bearings
Amperage: 31.0 A @ 13.5 Vdc / 15.5 A @ 27 Vdc
Total Fan Air Flow: 2745 ft³/min @ 0 static (4664 m³/hr @ 0 Static)
Filter Drier: 16 in³, R-134A compatible
Sight Glass: At back of coil
Cond Housing: Powder-coated galvaneated steel

Electrical Controls: **Basic II**
Fan Controls: 3 speed rotary switch @ driver
Temp Controls: Rotary manual switch @ driver
Protection: Fused main power distribution with individually fused motor.
Wiring: Color, number and or function coded every six inches in fire retardant loom.
Specification: All wiring automotive standard per SAE J1292 electrical specifications.

Hose/Fittings: **Trans/Air SAE J2064:**
Fittings: Steel with corrosion resistive coating, (2) grooves, and stainless steel clips.
Hose: Type C with Butyl cover, Poly-amide barrier, rubber lining.
Specification: Exceeds SAE J2064 hose fitting integrity specification.

Compressor: **13 CID**
Protection: High/low pressure switches.
Specification: Mounts shall meet SAE J637 belt alignment specifications.

Warranty: **3 years**
Mileage: Unlimited
Inception: Date of in-service
Coverage: All components and installation if installation is provided by Trans/Air.

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.



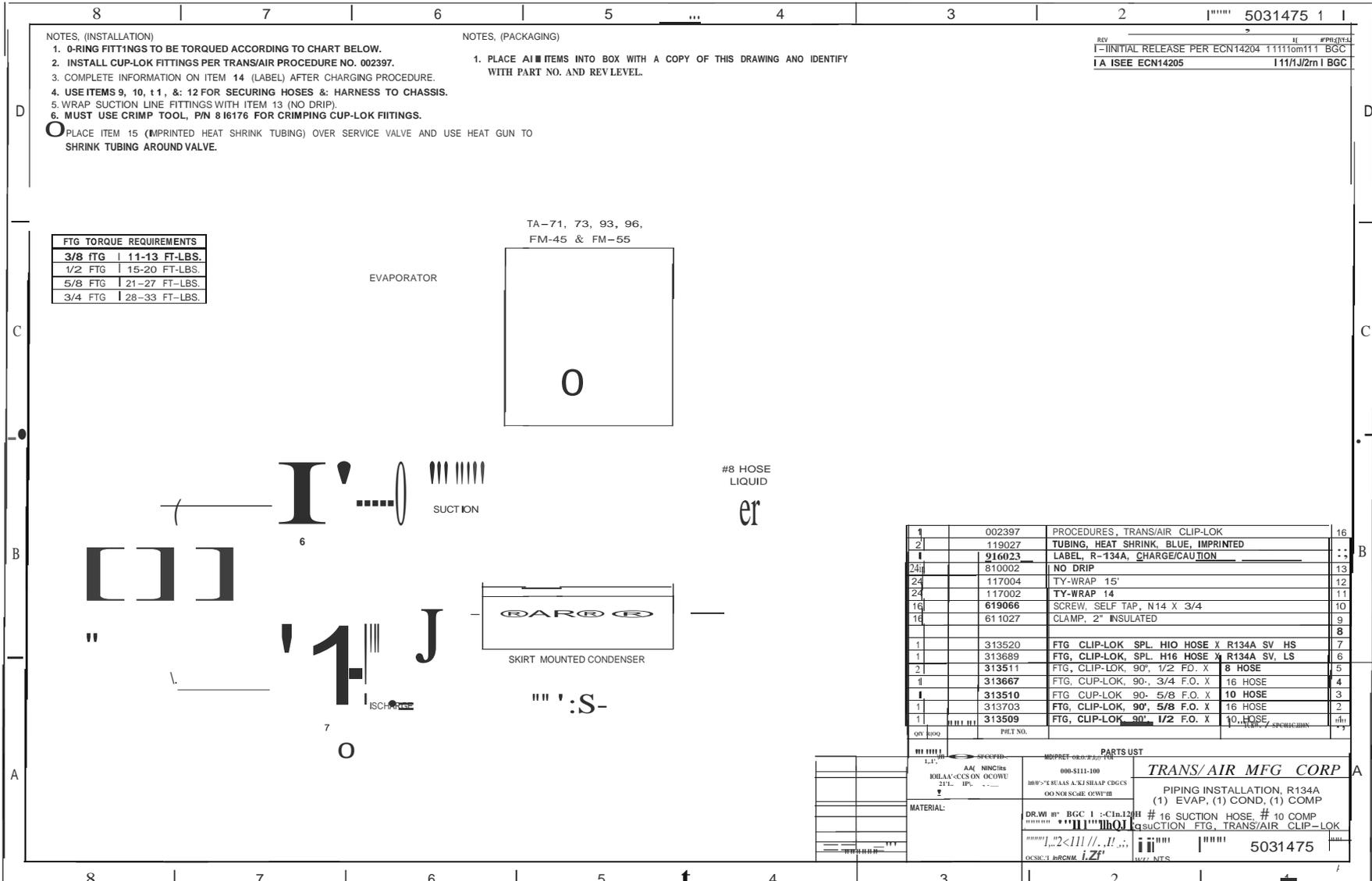
ISO 9001:2008
FM 39947

CalTrans CLASS C System Service Parts List

TA733 Super 13 #16 Suction

Evaporator	2022072-28	Evaporator, TA73 - Lines Left, w/o Heat, Gray
	412032	Blower Assy, 12V
	210042	Expansion Valve, 4 Ton
	2021365	Coil Assembly, Evaporator (includes 210042 Expansion Valve)
	111164	Resistor, .6 Ohm, 3 Tap
	111154	Switch, High Pressure
	111155	Switch, Low Pressure
	915045	Filter, Air Inlet
	413012	Louver
	110043	Fuse, ATC-20, Blade Type
	413015	Deflector, Air
Condenser	301795-04	SMC3L Condenser
	301712	Coil, Condenser, 3-Fan, Micro Channel
	2160088	Fan Assembly, 10" Puller, 12V
	212021	Filter Drier w/Sight Glass
	301799-01	Screen Assy, 3-Fan, Black
	110050-15	Fuse, Mini, 15 Amp
Hose & Fittings	5031475	Piping for #16 hose
	311026	Hose, #8, Refrigerant
	311027	Hose, #10, Refrigerant
	311034	Hose, #16, Refrigerant
	313703	Fitting, Clip-Lok, 90°, 5/8 F.O. x #16 Hose
	313687	Fitting, Clip-Lok, 90°, 3/4 FO x #16Hose
	313689	Fitting, Clip-Lok, Splice, Inline Access, #16Hose
	313511	Fitting, Clip-Lok, 90°, 1/2 FO x #8 Hose
	313520	Fitting, Clip-Lok, Splice Incline Access #10
	313510	Fitting, Clip-Lok, 90°, 5/8 FO x #10Hose
	313509	Fitting, Clip-Lok, 90°, 1/2 FO x #10Hose
Electrical & Cable	5031451	Basic II PCB Electrical
	701567	Relay Board Assembly, Basic II PCB, Mate-N-Lok Connector
	701401	Fuse Holder Assy, MDI, Bolt-On, 40A
	610008	Knob, Black, ABS, Wht Pointer, .250 Spring Index Position 1
	111051	Thermostat, Rotary
	113006	Switch, Rotary, 4 Position
Compressor	512236	Compressor, QP21, 13CID, 127MM, 8 Grv, 12V
Engine Mount & Drive Kit	4013524-02	Mount Kit, 6.8L Ford Cutaway, 13 CID
	7155061360	Belt, Poly-V, 6K Groove, 136.0" OEL
	31987606	Hose, 90°, 5/8 x 3/4 x 25" Lg
	711048	Idler Pulley, 6K Groove, 76MM Pitch
	711041	Idler, Backside, Dia 76MM
	4012675	Mount Bracket, Ford 6.8L Cutaway

CalTrans CLASS C Fitting Kit Schematic (1 of 1)



NOTES, (INSTALLATION)

1. O-RING FITTINGS TO BE TORQUED ACCORDING TO CHART BELOW.
2. INSTALL CUP-LOK FITTINGS PER TRANS/AIR PROCEDURE NO. 002397.
3. COMPLETE INFORMATION ON ITEM 14 (LABEL) AFTER CHARGING PROCEDURE.
4. USE ITEMS 9, 10, 11, & 12 FOR SECURING HOSES & HARNESS TO CHASSIS.
5. WRAP SUCTION LINE FITTINGS WITH ITEM 13 (NO DRIP).
6. MUST USE CRIMP TOOL, P/N 816176 FOR CRIMPING CUP-LOK FITTINGS.

○ PLACE ITEM 15 (IMPRINTED HEAT SHRINK TUBING) OVER SERVICE VALVE AND USE HEAT GUN TO SHRINK TUBING AROUND VALVE.

NOTES, (PACKAGING)

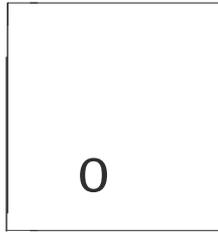
1. PLACE ALL ITEMS INTO BOX WITH A COPY OF THIS DRAWING AND IDENTIFY WITH PART NO. AND REV LEVEL.

REV	DATE	BY	APP'D
1			
INITIAL RELEASE PER ECN14204 111110m111 BGC			
IA ISEE ECN14205			1111/J2m1 BGC

FTG TORQUE REQUIREMENTS	
3/8 FTG	11-13 FT-LBS.
1/2 FTG	15-20 FT-LBS.
5/8 FTG	21-27 FT-LBS.
3/4 FTG	28-33 FT-LBS.

TA-71, 73, 93, 96,
FM-45 & FM-55

EVAPORATOR



#8 HOSE LIQUID

er

SUCTION

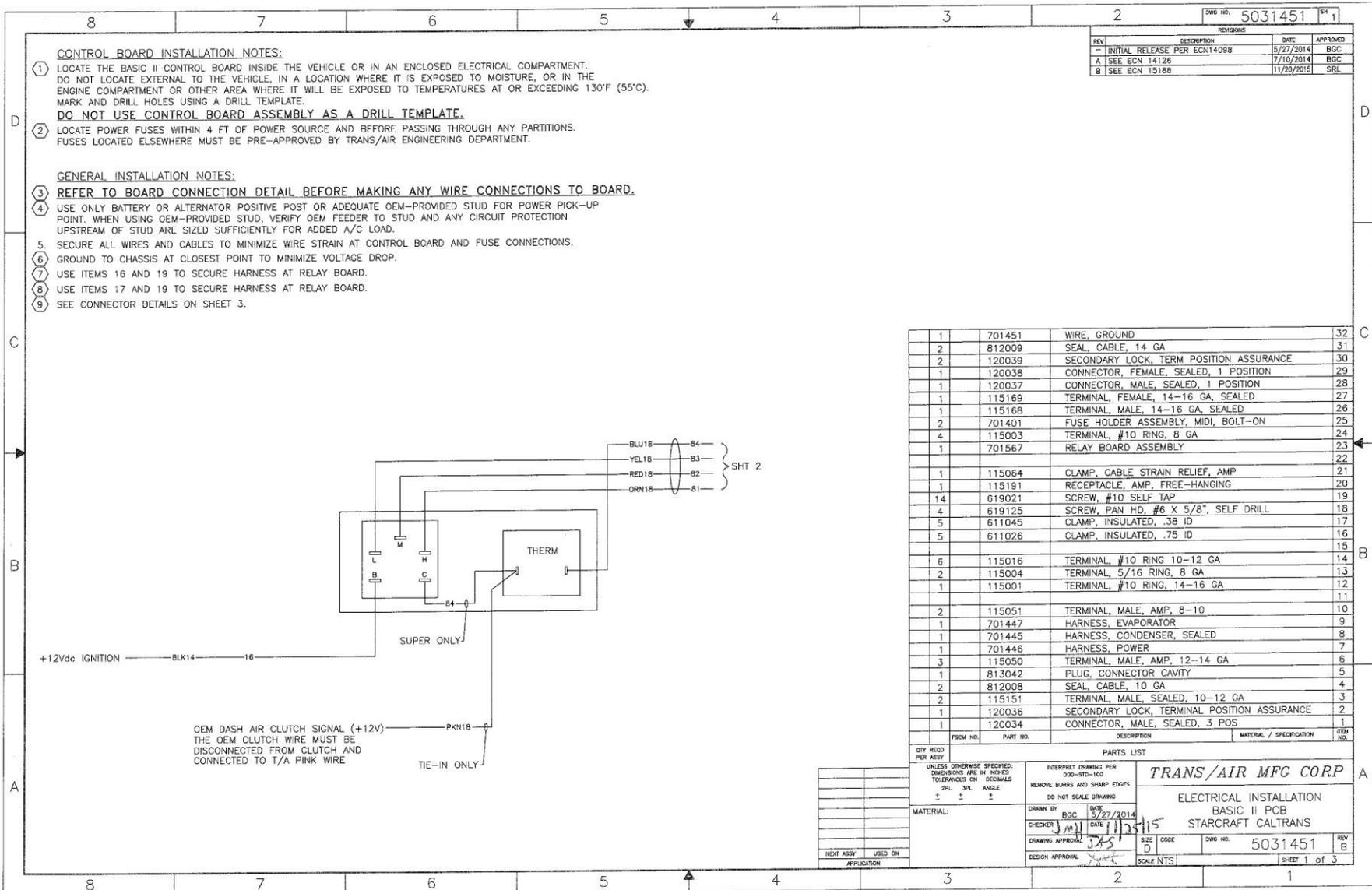


SKIRT MOUNTED CONDENSER

QTY	REV	PART NO.	DESCRIPTION	REV
1		002397	PROCEDURES, TRANS/AIR CLIP-LOK	16
2		119027	TUBING, HEAT SHRINK, BLUE, IMPRINTED	13
1		916023	LABEL, R-134A, CHARGE/CAUTION	13
24		810002	NO DRIP	13
24		117004	TY-WRAP 15'	12
24		117002	TY-WRAP 14'	11
16		619066	SCREW, SELF TAP, N14 X 3/4	10
16		611027	CLAMP, 2" INSULATED	9
1		313520	FTG CLIP-LOK SPL. H10 HOSE X R134A SV HS	7
1		313689	FTG, CLIP-LOK, SPL. H16 HOSE X R134A SV, LS	6
2		313511	FTG, CLIP-LOK, 90°, 1/2 F.O. X 8 HOSE	5
1		313667	FTG, CUP-LOK, 90°, 3/4 F.O. X 16 HOSE	4
1		313510	FTG CUP-LOK 90- 5/8 F.O. X 10 HOSE	3
1		313703	FTG, CLIP-LOK, 90°, 5/8 F.O. X 16 HOSE	2
1		313509	FTG, CLIP-LOK 90° 1/2 F.O. X 10 HOSE	1

PARTS LIST	
LIT. SEC. REF. PREP. OR. CHG. NO. 000-5111-100 AAI NNC125 ROLLA<CCS ON OCOUW STL. DP. ---	TRANS/AIR MFG CORP PIPING INSTALLATION, R134A (1) EVAP, (1) COND, (1) COMP # 16 SUCTION HOSE # 10 COMP SUCTION FTG, TRANS/AIR CLIP-LOK 5031475

CalTrans CLASS C Basic II PCB Controls Schematic (1 of 3)



CONTROL BOARD INSTALLATION NOTES:

- ① LOCATE THE BASIC II CONTROL BOARD INSIDE THE VEHICLE OR IN AN ENCLOSED ELECTRICAL COMPARTMENT. DO NOT LOCATE EXTERNAL TO THE VEHICLE, IN A LOCATION WHERE IT IS EXPOSED TO MOISTURE, OR IN THE ENGINE COMPARTMENT OR OTHER AREA WHERE IT WILL BE EXPOSED TO TEMPERATURES AT OR EXCEEDING 130°F (55°C). MARK AND DRILL HOLES USING A DRILL TEMPLATE.
- ② **DO NOT USE CONTROL BOARD ASSEMBLY AS A DRILL TEMPLATE.**
- ② LOCATE POWER FUSES WITHIN 4 FT OF POWER SOURCE AND BEFORE PASSING THROUGH ANY PARTITIONS. FUSES LOCATED ELSEWHERE MUST BE PRE-APPROVED BY TRANS/AIR ENGINEERING DEPARTMENT.

GENERAL INSTALLATION NOTES:

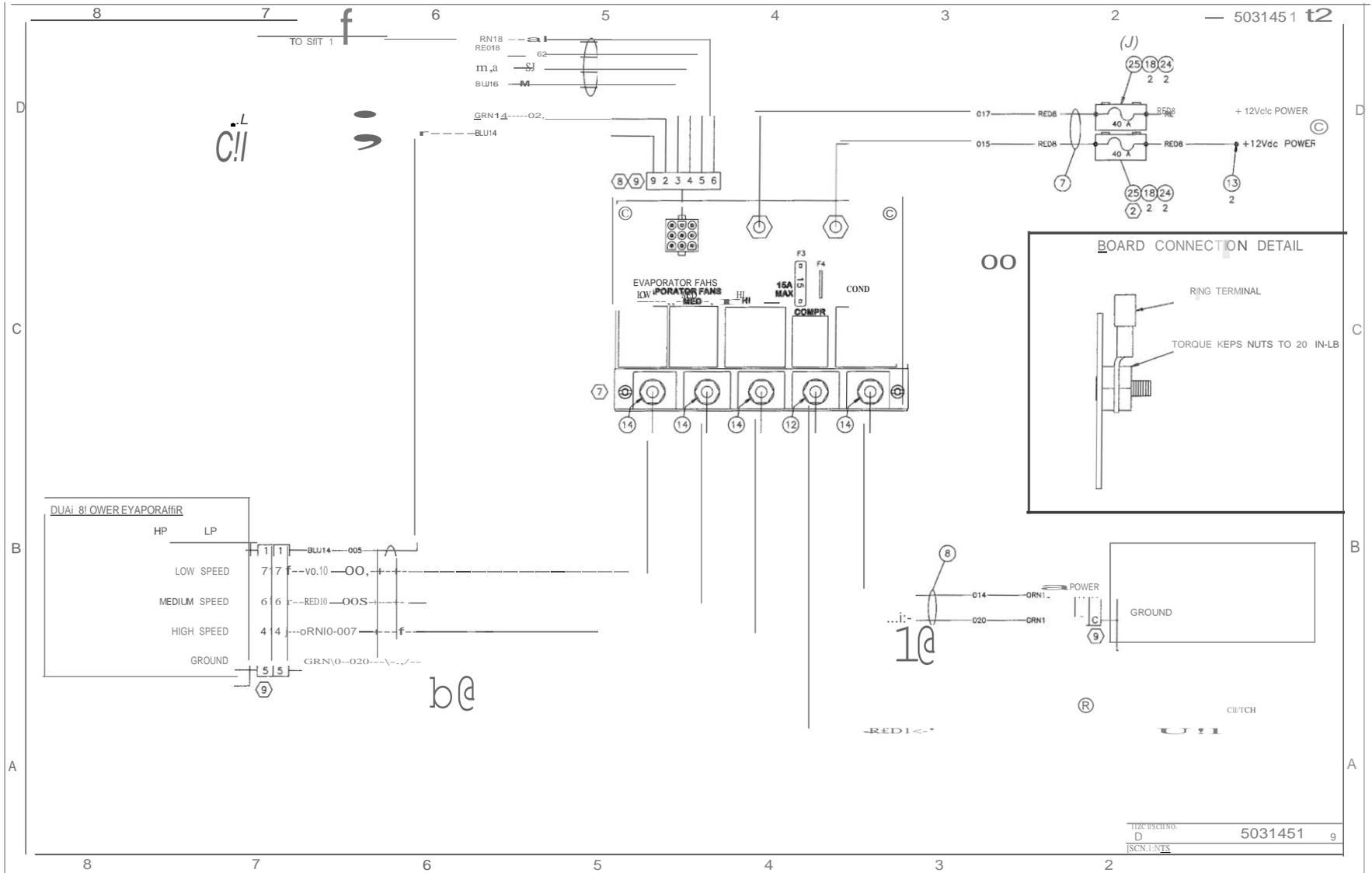
- ③ **REFER TO BOARD CONNECTION DETAIL BEFORE MAKING ANY WIRE CONNECTIONS TO BOARD.**
- ④ USE ONLY BATTERY OR ALTERNATOR POSITIVE POST OR ADEQUATE OEM-PROVIDED STUD FOR POWER PICK-UP POINT. WHEN USING OEM-PROVIDED STUD, VERIFY OEM FEEDER TO STUD AND ANY CIRCUIT PROTECTION UPSTREAM OF STUD ARE SIZED SUFFICIENTLY FOR ADDED A/C LOAD.
- ⑤ SECURE ALL WIRES AND CABLES TO MINIMIZE WIRE STRAIN AT CONTROL BOARD AND FUSE CONNECTIONS.
- ⑥ GROUND TO CHASSIS AT CLOSEST POINT TO MINIMIZE VOLTAGE DROP.
- ⑦ USE ITEMS 16 AND 19 TO SECURE HARNESS AT RELAY BOARD.
- ⑧ USE ITEMS 17 AND 19 TO SECURE HARNESS AT RELAY BOARD.
- ⑨ SEE CONNECTOR DETAILS ON SHEET 3.

REV		DESCRIPTION	DATE	APPROVED
-	INITIAL RELEASE PER ECN1409B		5/27/2014	BGC
A	SEE ECN 14126		7/10/2014	BGC
B	SEE ECN 15188		11/20/2015	SRL

1	701451	WIRE, GROUND	32
2	812009	SEAL, CABLE, 14 GA	31
2	120039	SECONDARY LOCK, TERM POSITION ASSURANCE	30
1	120038	CONNECTOR, FEMALE, SEALED, 1 POSITION	29
1	120037	CONNECTOR, MALE, SEALED, 1 POSITION	28
1	115169	TERMINAL, FEMALE, 14-16 GA, SEALED	27
1	115168	TERMINAL, MALE, 14-16 GA, SEALED	26
2	701401	FUSE HOLDER ASSEMBLY, MIDI, BOLT-ON	25
4	115003	TERMINAL, #10 RING, 8 GA	24
1	701567	RELAY BOARD ASSEMBLY	23
			22
1	115064	CLAMP, CABLE STRAIN RELIEF, AMP	21
1	115191	RECEPTACLE, AMP, FREE-HANGING	20
14	619021	SCREW, #10 SELF TAP	19
4	619125	SCREW, PAN HD, #6 X 5/8", SELF DRILL	18
5	611045	CLAMP, INSULATED, .38 ID	17
			16
			15
6	115016	TERMINAL, #10 RING 10-12 GA	14
2	115004	TERMINAL, 5/16 RING, 8 GA	13
1	115001	TERMINAL, #10 RING, 14-16 GA	12
			11
2	115051	TERMINAL, MALE, AMP, 8-10	10
1	701447	HARNESS, EVAPORATOR	9
1	701445	HARNESS, CONDENSER, SEALED	8
1	701446	HARNESS, POWER	7
3	115050	TERMINAL, MALE, AMP, 12-14 GA	6
1	813042	PLUG, CONNECTOR CAVITY	5
2	812008	SEAL, CABLE, 10 GA	4
2	115151	TERMINAL, MALE, SEALED, 10-12 GA	3
1	120036	SECONDARY LOCK, TERMINAL POSITION ASSURANCE	2
1	120034	CONNECTOR, MALE, SEALED, 3 POS	1

QTY READ PER ASSY	PARTS LIST	TRANS/AIR MFG CORP
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS 2PL 3PL ANGLE ± ± ±	INTERPRET DRAWING PER DOD-STD-100 REMOVE BURRS AND SHARP EDGES DO NOT SCALE DRAWING	ELECTRICAL INSTALLATION BASIC II PCB STARCRAFT CALTRANS
MATERIAL:	DRAWN BY: BGC DATE: 5/27/2014 CHECKER: [Signature] DATE: 11/25/15 DRAWING APPROVAL: [Signature] DESIGN APPROVAL: [Signature]	SIZE: D DWG NO.: 5031451 REV: B
NEXT ASSY USED ON APPLICATION	SCALE: NTS	SHEET 1 of 3

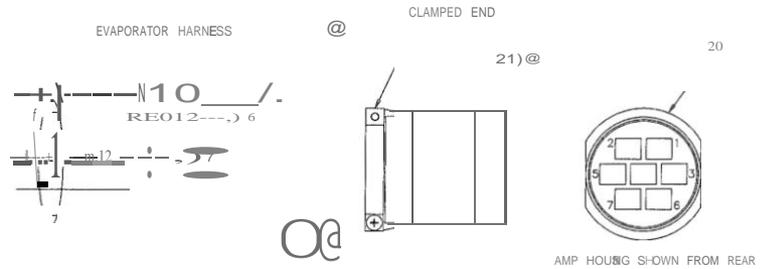
CalTrans CLASS C Basic II PCB Controls Schematic (2 of 3)



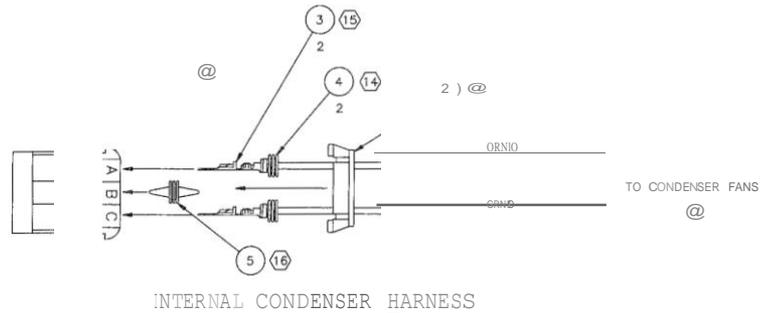
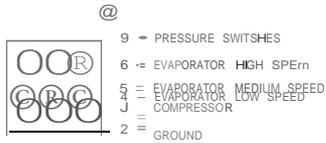
CalTrans CLASS C Basic II PCB Controls Schematic (3 of 3)

8 7 6 5 4 3 2 5031451 13

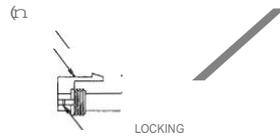
- @ CRIMP MALE TERMINALS TO EVAPORATOR LEADS. USE CRIMP TOOL, AMP P/N HHHT 90384-1 FOR 10 GA, AND AMP P/N 90382-2 FOR 14 GA.
- @ SLIDE CLAMPED END OF TEM 21, CABLE STRAIN RELIEF CLAMP, OVER EVAPORATOR LEADS SO THAT THE THREADS IN PLACE. SCREW TEM 21 TIGHTLY ON TO RECEPTACLE HOUSING THEN TIGHTEN CLAMP AROUND EVAPORATOR LEADS. FACE THE TERMINALS AS SHOWN. INSERT TERMINALS INTO SPECIFIED POSITIONS ON RECEPTACLE HOUSING AND SNAP.
- @ REMOVE CUN CONNECTOR BETWEEN POWER LEADS OF CONDENSER HARNESS TO RELAY BOARD AND
- @ CONNECT FAN HARNESS LEADS TO THE MALE HALF OF THE CONNECTOR AS SHOWN. DISCONNECT GROUND LEADS AND REMOVE RING TERMINALS.



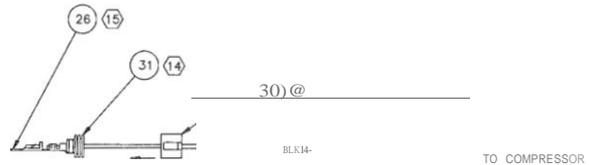
- @ INSERT CABLE LEADS THROUGH CABLE SEAL AS SHOWN. KEEP INSULATION FLUSH WITH EDGE OF SEAL.
- @ CRIMP TERMINAL TO STRIPPED LEADS FIRST THEN CRIMP SEAL RETAINING TABS FOR BEST RESULTS. USE HAND TOOL, P/N 816155 (PURCHASED SEPARATELY) FOR CRIMPING TERMINALS ON CONDENSER HARNESS. USE HAND TOOL, P/N 816158 (PURCHASED SEPARATELY) FOR CRIMPING TERMINALS ON COMPRESSOR HARNESS.
- @ INSERT PLUG INTO CENTER POSITION OF CONNECTOR AS SHOWN.
- @ SLIDE SECONDARY LOCK AROUND CABLE LEADS AS SHOWN AND CLIP ONTO TABS OF CONNECTORS (LABELED LOCKING TABS) SECURELY TO KEEP PLUGS AND TERMINALS IN PLACE.
- @ POSITION NUMBERS OF THE CONNECTIVITY CONNECTOR ON PCS AND CORRESPONDING SIGNALS.



ih301 @ 317
FROM RELAY BOARD RED14



COMPRESSOR HARNESS



8 7 6 5 4 3 2

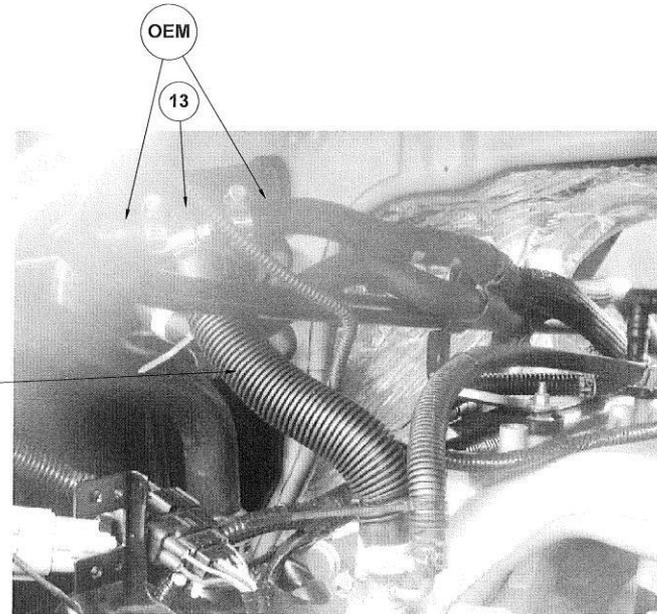
CalTrans CLASS C Engine Mount & Drive Kit (1 of 2)

DWG NO. **4013524** SHEET 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
-	SEE ECR 16167	10/9/2015	DJF
A	ECR 16016	1/19/2016	DJF
B	ECN 16123	3/30/2016	DJF

NOTES:

- DISCONNECT BATTERY.
- DRAIN RADIATOR.
- REMOVE AIR CLEANER AND INTAKE HOSE.
- REMOVE OEM BELT AND OEM ALTERNATOR. SAVE HARDWARE AS IT MAY BE USED FOR NEW ALTERNATOR INSTALLATION.
- MODIFY HEATER HOSES AS SHOWN WITH SUPPLIED HOSES AND FITTINGS. CUT OUT THE OEM TEE AND REPLACE WITH THE SUPPLIED FITTING. CUT BOTH SUPPLIED HOSES LEAVING APPROXIMATELY 1" OF STRAIGHT HOSE AFTER THE ELBOW. ATTACH WITH SUPPLIED CLAMP.
- PUT LOOM ON HEATER HOSE AND SECURE WITH TYRAPS AS SHOWN.
- INSTALL GROOVED IDLER USING INDICATED HARDWARE. IF INSTALLING KIT -02, REPLACE OEM IDLER WITH SUPPLIED BACKSIDE IDLER AS SHOWN. USE THREADLOCK.
- INSTALL MOUNT USING INDICATED BOLTS AND WASHERS. USE THREADLOCK. USE CLAMP PROVIDED TO SECURE ALTERNATOR CABLE TO THE MOUNT TO PREVENT THE CABLE FROM BEING PINCHED BETWEEN THE MOUNT AND ANY ENGINE COMPONENTS AS SHOWN ON SHEET 2.
- BOLT PLATE AND FITTINGS TO COMPRESSOR USING INDICATED BOLT AND WASHER. USE THREADLOCK. INSTALL SUCTION AND DISCHARGE HOSES.
- LIGHTLY TAP DOWEL BUSHINGS INTO MOUNT. INSTALL COMPRESSOR USING INDICATED BOLTS AND WASHERS. USE THREADLOCK.
- INSTALL ALTERNATOR ON MOUNT USING HARDWARE SUPPLIED IN ALTERNATOR MOUNT KIT. USE THREADLOCK.
- INSTALL BELT IN REAR 6 GROOVES OF COMPRESSOR.
- REINSTALL AIR CLEANER AND INTAKE HOSE.
- APPLY BELT ROUTING LABEL TO ENGINE COMPARTMENT. THE SURFACE MUST BE VISIBLE AND FREE OF DIRT AND OIL.



14

OEM

13

TORQUE SPECS	
6mm GR8.8 - 7 ft-lb	
6mm GR10.9 - 9 ft-lb	
8mm GR8.8 - 18 ft-lb	
8mm GR10.9 - 23 ft-lb	
10mm GR8.8 - 30 ft-lb	
10mm GR10.9 - 45 ft-lb	
12mm GR8.8 - 65 ft-lb	
12mm GR10.9 - 75 ft-lb	
12mm GR12.9 - 95 ft-lb	
.375"-16 GR5 - 30 ft-lb	
.375"-16 GR8 - 40 ft-lb	
.438"-14 GR5 - 45 ft-lb	
.438"-14 GR8 - 65 ft-lb	
.500"-20 GR5 - 75 ft-lb	
.500"-20 GR8 - 110 ft-lb	

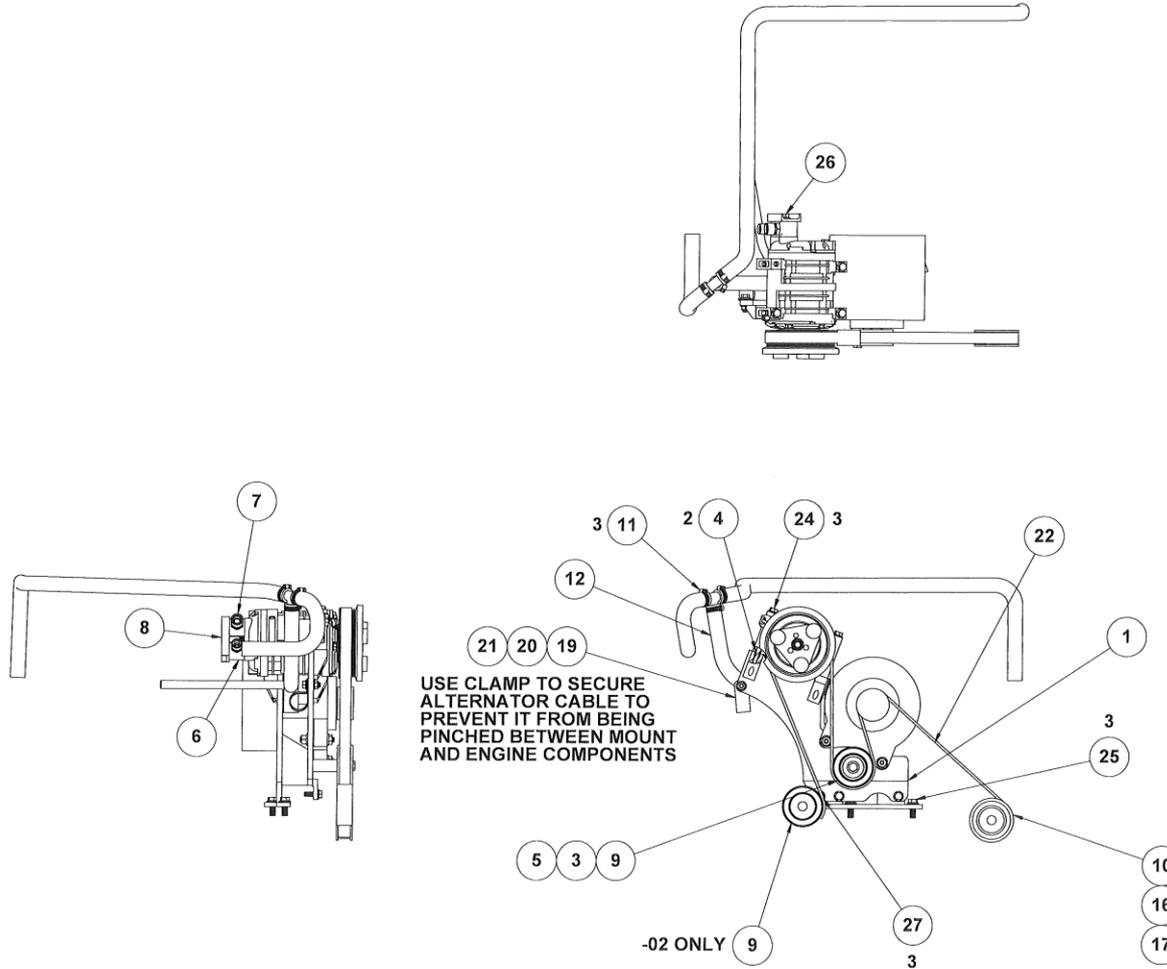
-01: 10 CID
-02: 13 CID

3	3	616483	BOLT, HEX HD FLANGE, M8-1.25 X 25MM GR10.9	27
1	1	616442	BOLT, HEX HD FLANGE, M10-1.50 X 50MM, GR10.9	26
3	3	616481	BOLT, HEX HD FLANGE, M10-1.50 X 25MM, GR10.9	25
3	3	616439	BOLT, HEX HD FLANGE, M8 X 1.25P X 100MM, GR 10.9	24
1	1	916178	LABEL, BELT ROUTING, FORD 5.4L	23
1	1	7156061360	BELT, POLY-V, 6K GROOVE, 136.0"	22
1	1	616384	BOLT, HEX HD FLANGE, M8 X 1.25P X 25MM, GR 8.8	21
1	1	618092	NUT, HEX FLANGE, LOCK, M8-1.25	20
1	1	611033	CLAMP, INSULATED, 1 - 1/4" ID	19
1	1	611063	CLAMP, SPRING HOSE, 1 1/16"	18
1	1	711035	BOLT W WASHER, HEX HD, 8MM X 1.25 X 1.41"	17
2	2	911009	THREADLOCK, REMOVABLE	16
4	4	117003	TYRAP, 3.75	15
1ft	1ft	119015	LOOM, PLASTIC, 1.00", SLIT, HIGH TEMP	14
1	1	316111	FITTING, TEE, 5/8 X 5/8 X 5/8 BARB	13
1	1	31987606	HOSE, 90, 5/8" X 3/4" X 25"	12
3	3	611062	CLAMP, SPRING HOSE, 15/16"	11
1	1	711048	IDLER PULLEY, 6K-GROOVE, 76MM PITCH	10
2	1	711041	PULLEY, BACKSIDE, 76MM X 30.9MM WIDE	9
1	1	501262	PLATE, FITTING PAD	8
1	1	313455	FITTING, PAD BLOCK, STR, #10 MIO	7
1	1	313454	FITTING, PAD BLOCK, STR, #8 MIO	6
1	1	616449	BOLT, HEX HD FLANGE, M10-1.50 X 30MM, GR10.9	5
2	2	517068	BUSHING, DOWEL, 8MM X 13MM LONG	4
1	1	4013379	BUSHING, IDLER PULLEY, SINGLE 6303 BEARING	3
				2
1	1	4012675	MOUNT, FORD 5.4L CUTAWAY	1

QTY REQD PER ASSEMBLY DIMENSIONS OF HEREIN SPECIFIED DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED TOLERANCES ON DIMENSIONS .31 .31 ANGLE .03 .010 .010		INTERPRET DRAWING PER ISO-8101:00 REMOVE BURRS AND SHARP EDGES DO NOT SCALE DRAWING		TRANS/AIR MFG CORP MOUNT KIT, FORD CUTAWAY	
MATERIAL:		DRAWN BY DJF DATE 10/9/2015 CHECKER JAH DATE 3/11/16 DRAWING APPROVAL SEE DESIGN APPROVAL XJA		SIZE D CODE DWG NO. 4013524 REV B SCALE 1:4 SHEET 1 OF 2	

CalTrans CLASS C Engine Mount & Drive Kit (2 of 2)

DWG NO. 4013524 REV 2



SIZE D	FSCM NO.	DWG NO. 4013524	REV B
SCALE 1:2	SHEET 2 OF 2		1