ITEM NUMBER	DESCRIPTION	Quantity
1	**DQFAH, Commercial Diesel Generator Set, 1000kW Standby 60Hz** U.S. EPA, Stationary 1000DQFAH, Diesel Genset, 60Hz, 1000kW Emissions Certification, Tier 4 Final, Nonroad Compression Ignition Listing - UL 2200 Voltage - 277 / 480, 3 Phase, Wye, 4 Wire Alternator - 60Hz, 3 Phase, Wye, Extended Range, 105 / 80C Fuel Water Separator Control Mounting - Front Facing PowerCommand 3.3 Generator Controller, Paralleling Capable Gauge - Exhaust Gas Temperature Analog Meters - AC Output LCD Control Display Relays - Genset Status, User Configured Signals - Auxiliary, 8 Inputs / 8 Outputs Relay - Alarm Shutdown Relays - Paralleling Circuit Breaker Control	1

ITEM NUMBER	DESCRIPTION	Quantity
	Control Display Language - English Housing Arrangement - Left Entry Circuit Breaker - 2000A, Left, 3P, 600 / 415V, UL / IEC, Serv Ent, 100%UL Terminal Box - Low Voltage, Right - None Bottom Entry, Left Engine Air Cleaner - Heavy Duty Engine Cooling - Radiator, Enhanced High Ambient Air Temperature, Ship Fitted Warning AND Shutdown - Low Coolant Level Sight Glass - Coolant Level Coolant Heater - 208 / 240 / 480 Volts AC, Below 40F Ambient Temperature Test Record - Strip Chart Test - Extended, Prime Load, 4 Hour Cummins Certified Test Record Literature - English Bumpers - Shipping Protection Tier4 Final Certified DEF supply lines included	

Details:
Provided in the quote is a factory certified prime power 4 hour load bank test. On site or facility load bank testing is not part of quote.

Quoted MLCB are 100% rated.

Exclusions:
Aftertreatment comes mounted to a skid, the support and structure design is by others.
Fuel tank and enclosure are by others.
Fuel fill and DEF fill are by others.
Any and all offloading or rigging.

Thank you for choosing Cummins.

Submitted by:
Cummins Sales and Service

Specification sheet

Tier4 certified diesel generator set QST30 series engine

900 - 1000 kW 60 Hz

Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby and Prime Power applications.

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Cummins aftertreatment system - Fully integrated power generation systems that are certified to EPA Tier 4 standards. They provide optimum performance, reliability and versatility for stationary Standby, Prime Power and Continuous duty applications.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating	~~Prime rating~~	Emissions compliance	Data sheets
Model	**60 Hz kW (kVA)**	**~~60 Hz kW (kVA)~~**	**EPA**	**60 Hz**
DQFAH	1000 (1250)	~~900 (1125)~~	T4F certified	D-3535

Generator set specifications

Governor regulation class	ISO8528 Part 1 Class G3
Voltage regulation, no load to full load	+/- 0.5%
Random voltage variation	+/- 0.5%
Frequency regulation	Isochronous
Random frequency variation	+/- 0.25%
Radio frequency emissions compliance	IEC 61000-4-2 : Level 4 Electrostatic discharge IEC 61000-4-3 : Level 3 Radiated susceptibility

Engine specifications

Bore	140 mm (5.51 in)
Stroke	165.0 mm (6.5 in)
Displacement	30.5 litres (1860 in^3)
Configuration	Cast iron, V, 12 cylinder
Battery capacity	1800 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	High ambient radiator

Aftertreatment specifications

Model	CA451
Emissions certification	Tier4F certified
Duct diameter	1143 mm (45 in)
Duct quantity	1
Components included	Insulated aftertreatment ducts, saddle supports for aftertreatment, control panel, DEF tank, heater with ILB, harness from control panel to engine and AFT, lifting tool. Assembly required at site.

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	150 ºC Standby at 40 °C ambient
Exciter type	Permanent Magnet Generator (PMG)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50% per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3%

Available voltages

• 120/208	• 220/380	• 240/416	• 277/480
• 139/240	• 230/400	• 255/440	• 347/600

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)

Control panel

- 120/240 V 100 W control anti-condensation heater
- Paralleling configuration
- Remote fault signal package
- Run relay package

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 120/240 V 300 W, anti-condensation heater
- Temperature sensor - RTDs, 2-phase
- Temperature sensor – alternator bearing RTD
- Differential current transformers

Aftertreatment system

- DEF lines
- DEF freeze protection kit
- SCR only
- SCR w/heater (ILB)
- SCR w/heater and DPF Configuration

Cooling system

- Remote radiator

Generator set

- AC entrance box
- Battery
- Battery rack with hold-down - floor standing
- Circuit breaker - set mounted
- Disconnect switch - set mounted
- PowerCommand network
- Remote annunciator panel
- Spring isolators
- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

PowerCommand 3.3 Control System

An integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

AmpSentry – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

Power management – Control function provides battery monitoring and testing features and smart starting control system.

Advanced control methodology – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

Communications interface – Control comes standard with PCCNet and Modbus interface.

Regulation compliant – Prototype tested: UL, CSA and CE compliant.

Service - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

Easily upgradeable – PowerCommand controls are designed with common control interfaces.

Reliable design – The control system is designed for reliable operation in harsh environment.

Multi-language support

Operator panel features

Operator/display functions

- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating generator set running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

Paralleling control functions

- First Start Sensor System selects first generator set to close to bus
- Phase Lock Loop Synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVar load sharing
- Load govern control for utility paralleling
- Extended Paralleling (baseload/peak shave) Mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions,

Alternator data

- Line-to-neutral and line-to-line AC volts
- 3-phase AC current
- Frequency
- kW, kvar, power factor kVA (three phase and total)

Engine data

- DC voltage
- Engine speed
- Lube oil pressure and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)

Other data

- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)

Standard control functions

Digital governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire line-to-line sensing
- Configurable torque matching

AmpSentry AC protection

- AmpSentry protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse var shutdown
- Field overload shutdown

Engine protection

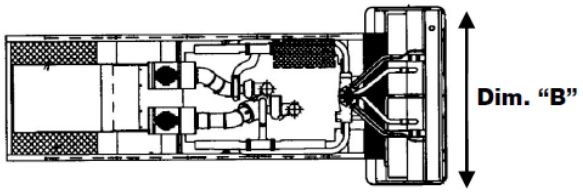
- Battery voltage monitoring, protection and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown
- Full authority electronic engine protection

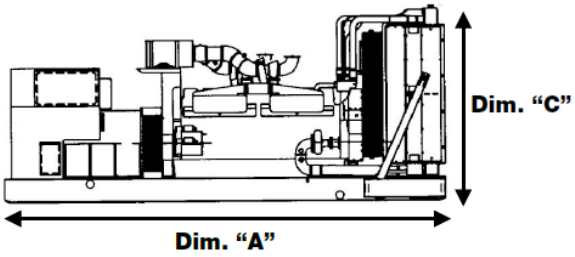
Control functions

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (4)
- Remote emergency stop

Options

- Auxiliary output relays (2)

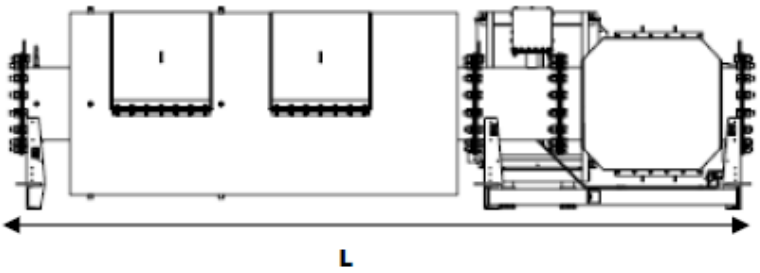


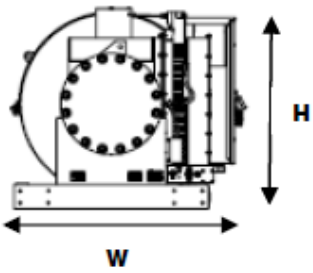


Generator set weights and dimensions

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

Model	Dim “A” mm (in.)	Dim “B” mm (in.)	Dim “C” mm (in.)	Set weight* dry kg (lbs)	Set weight* wet kg (lbs)
DQFAH	4239 (167)	2000 (79)	2353 (93)	7631 (16824)	7929 (17480)





Aftertreatment weights and dimensions

* Due to multiple configurations of the CA451 model, maximum weight of the model is shown.
Note: Dimension and weights are subject to change. See submittal data for exact details.

Aftertreatment model number*	Genset model	L (Length) mm (in.)	W (Width) mm (in.)	H (Height) mm (in.)	Weight of aftertreatment system (lbs)
CA451	DQFAH	4651 (183)	1480 (58)	1260 (50)	4367

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	All low and medium voltage models are CSA certified to product class 4215-01.	**ISO8528**	The generator set has been rated in accordance with ISO8528.
U.S. EPA	Engine certified to US EPA Nonroad 40CFR1039 and Stationary (Emergency and Non-Emergency) US EPA NSPS, 60CFR Subpart IIII Tier4 Emissions Standards.		This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.
International Building Code	The genset package is certified for seismic application in accordance with the following International Building Code: IBC2012.		The Aftertreatment System bears the ETL ListedMark as proof of conformity to NFPA 79, UL 61010C-1, and CSA 22.2 No. 61010-1-12.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.		The generator set is available listed to UL 2200 for all 60 Hz low voltage models, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building’s electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

S-1671.PDF (01/18)

A-weighted Sound Pressure Level @ 7 meters, dB(A)

See notes 2, 5 and 7-11 listed below

Configuration	Exhaust	Applied Load	Position (Note 2)								8 Position Average
			1	2	3	4	5	6	7	8	
Standard – Unhoused	Infinite Exhaust	0% Prime	84.4	87.4	87.3	89.4	86.4	88.7	89.8	87.5	87.9
		75% Prime	87.8	91.1	90.7	91.7	88.7	91.2	92.0	90.9	90.7
		100% Prime	88.9	92.7	92.4	93.3	89.6	92.7	93.4	92.3	92.2
		100% Standby	90.1	93.1	93.3	93.8	90.1	93.3	94.0	93.0	92.8

Average A-weighted Sound Pressure Level @ 1 meter, dB(A)

See notes 1, 5 and 7-14 listed below

Configuration	Exhaust	Applied Load	Octave Band Center Frequency (Hz)										Overall Sound Pressure Level
			16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	0% Prime	N/A	42.1	62.4	80.7	85.4	89.7	93.1	91.0	85.8	79.3	70.9	97.1
		75% Prime	N/A	44.8	63.6	81.1	86.3	91.3	94.8	94.5	91.6	86.9	77.6	99.9
		100% Prime	N/A	46.5	65.9	81.8	87.1	92.2	95.7	95.9	92.9	92.7	79.6	101.4
		100% Standby	N/A	47.1	66.6	82.4	87.3	92.4	96.0	96.5	93.4	94.6	81.7	102.1

A-weighted Sound Pressure Level @ Operator Location, dB(A)

See notes 1, 3, 5 and 7-14 listed below

Configuration	Exhaust	Applied Load	Octave Band Center Frequency (Hz)										Overall Sound Pressure Level
			16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	100% Prime	N/A	53.2	67.7	79.0	83.7	86.7	89.6	91.0	85.6	88.1	70.4	96.0
		100% Standby	N/A	54.0	69.3	79.5	83.5	86.7	90.2	91.7	86.0	93.8	75.3	97.9

A-weighted Sound Power Level, dB(A)

See notes 1, 3 and 6-14 listed below

Configuration	Exhaust	Applied Load	Octave Band Center Frequency (Hz)										Overall Sound Power Level
			16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	0% Prime	N/A	61.7	82.1	100.3	105.0	109.3	112.7	110.6	105.4	98.9	90.6	116.8
		75% Prime	N/A	64.4	83.2	100.7	106.0	111.0	114.4	114.2	111.2	106.6	97.2	119.5
		100% Prime	N/A	66.2	85.5	101.4	106.7	111.9	115.3	115.5	112.5	112.3	99.2	121.0
		100% Standby	N/A	66.7	86.2	102.1	106.9	112.0	115.6	116.1	113.1	114.3	101.3	121.7

Exhaust Sound Power Level, dB(A)

See notes 4 and 6-15 listed below

Configuration	Applied Load	Octave Band Center Frequency (Hz)											Overall Sound Power Level
		16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Open Exhaust (No Muffler)	100% Standby	N/A	N/A	94.5	111.6	116.5	122.0	122.5	126.5	125.7	121.3	N/A	131.4
Open Exhaust with T4fc, 1x45	100% Standby	N/A	N/A	71.5	86.6	97.5	91.0	93.5	92.5	88.7	87.3	N/A	106.4

Global Notes:

1. Sound pressure levels at 1 meter are measured per the requirements of ISO 3744, ISO 8528-10, ANSI S1.13, ANSI S12.1 and European Communities Directive 2000/14/EC as applicable. The microphone measurement locations are 1 meter from a reference parallelepiped just enclosing the generator set (enclosed or unenclosed).
2. Seven-meter measurement location 1 is 7 meters (23 feet) from the generator (alternator) end of the generator set, and the locations proceed counter-clockwise around the generator set at 45° angles at a height of 1.2 meters (48 inches) above the ground surface.
3. Sound Power Levels are calculated according to ISO 3744, ISO 8528-10, and or CE (European Union) requirements.
4. Exhaust Sound Levels are measured and calculated per ISO 6798, Annex A.
5. Reference Sound Pressure Level is 20 µPa.
6. Reference Sound Power Level is 1 pW (10^{-12} Watt).
7. Sound data for remote-cooled generator sets are based on rated loads without cooling fan noise.
8. Sound data for the generator set with infinite exhaust do not include the exhaust noise contribution.
9. Published sound levels are measured at CE certified test site and are subject to instrumentation, measurement, installation and manufacturing variability.
10. Unhoused/Open configuration generator sets refers to generator sets with no sound enclosures of any kind.
11. Housed/Enclosed/Closed/Canopy configuration generator sets refer to generator sets that have noise reduction sound enclosures installed over the generator set and usually integrally attached to the skid base/base frame/fuel container base of the generator set.
12. Published sound levels meet the requirements India's Central Pollution Control Board (Ministry of Environment & Forests),vide GSR 371 (E), which states the A-weighted sound level at1meter from any diesel generator set up to a power output rating of 1000kVA shall not exceed 75dB(A)
13. For updated noise pollution information for India see website: http://www.envfor.nic.in/legis/legis.html
14. Sound levels must meet India's Ambient Air Noise Quality Standards detailed for Daytime/Night-time operation in Noise Pollution (Regulation and Control) Rules, 2000
15. Open exhaust with T4fc, 1x45 Exhaust Sound Power Levels are calculated by using the Insertion Loss (IL) of T4fc, 1x45 system.

Exhaust emission data sheet
DQFAH
60 Hz Diesel generator set
EPA emission

Engine information:

Model:	Cummins Inc. QST30-G17	Bore:	5.51 in. (140 mm)
Type:	4 Cycle, 50° V 12 cylinder diesel	Stroke:	6.50 in. (165 mm)
Aspiration:	Turbocharged and low temperature after-cooled	Displacement:	1860 cu. in. (30.5 liters)
Compression ratio:	14.7:1		
Emission control device:	SCR & DPF		
Emission level:	Stationary non-emergency, Tier4 final (with DPF)		

Performance data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
BHP @ 1800 RPM (60 Hz)	371	741	1112	1482	1322
Fuel consumption (Gal/Hr)	19	36	54	72	64
Exhaust gas flow (CFM)	2780	4500	6370	7540	6950
Exhaust gas temperature (°F)	620	760	814	890	873
Exhaust emission data					
HC (Total unburned hydrocarbons)	0.02	0.01	0.03	0.04	0.03
NOx (Oxides of nitrogen as NO2)	0.72	0.40	0.35	0.42	0.39
CO (Carbon monoxide)	1.06	0.64	0.60	0.61	0.60
PM (Particular matter)	0.00	0.00	0.00	0.00	0.00
SO2 (Sulfur dioxide)	0.00	0.00	0.00	0.00	0.00
Smoke (Bosch)	0	0	0	0	0

All values are Grams/HP-Hour, Smoke is Bosch #

Test conditions

Data is representative of steady-state engine speed (± 36 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel specification:	ASTM D975 No. 2-D diesel fuel with ULSD, and 40-48 cetane number.
Fuel temperature	99 ± 9 °F (at fuel pump inlet)
Intake air temperature:	77 ± 9 °F
Barometric pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

2021 EPA Tier4 Certified Exhaust Emission Compliance Statement 1000DQFAH Stationary Non-Emergency,

60 Hz Diesel generator set

Compliance Information:

The engine used in this generator set complies with Tier 4 emissions limit of U.S. EPA New Source Performance Standards for stationary non-emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	MCEXL78.0AAA-036
Effective Date:	07/09/2020
Date Issued:	07/09/2020
EPA Engine Family (Cummins Emissions Family):	MCEXL78.0AAA

Engine Information:

Model:	QST30-G17	Bore:	5.51 in. (140 mm)
Engine Nameplate HP:	1490	Stroke:	6.50 in. (165 mm)
Type:	4 Cycle, 50°V, 12 Cylinder Diesel	Displacement:	1860 cu. in. (30.5 liters)
Aspiration:	Turbocharged & Low Temperature Aftercooled	Compression Ratio:	14.7:1
Emission Control Device:	SCR & DPF		

Diesel Fuel Emissions Limits

D2 cycle exhaust emissions	Grams per BHP-hr				Grams per kW_m-hr			
	NO_X	NMHC	CO	PM	NO_X	NMHC	CO	PM
Test Results	0.40	0.01	1.0	0.00	0.54	0.02	1.4	0.00
EPA T4F Emissions Limit	0.50	0.14	2.6	0.02	0.67	0.19	3.5	0.03

Test methods: EPA emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50. Reference: ASTM D975 No. 2-D, 7-15 ppm Sulfur.

Reference conditions: Air inlet temperature: 25°C (77°F), Fuel inlet temperature: 40°C (104°F). Barometric pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H_2O/lb) of dry air; required for NOx correction, Restrictions: Intake restriction set to a maximum allowable limit for clean filter; Exhaust back pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

PTC® Creo® Parametric

DEF LINE INSTALLATION
MODEL- CA451/CA452/CA542
FEATURE CODE- L181-2

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-171947	B	1	PRODUCTION RELEASE	LDE	CJF	T.SCHIEBE	28AUG17

NOTE:

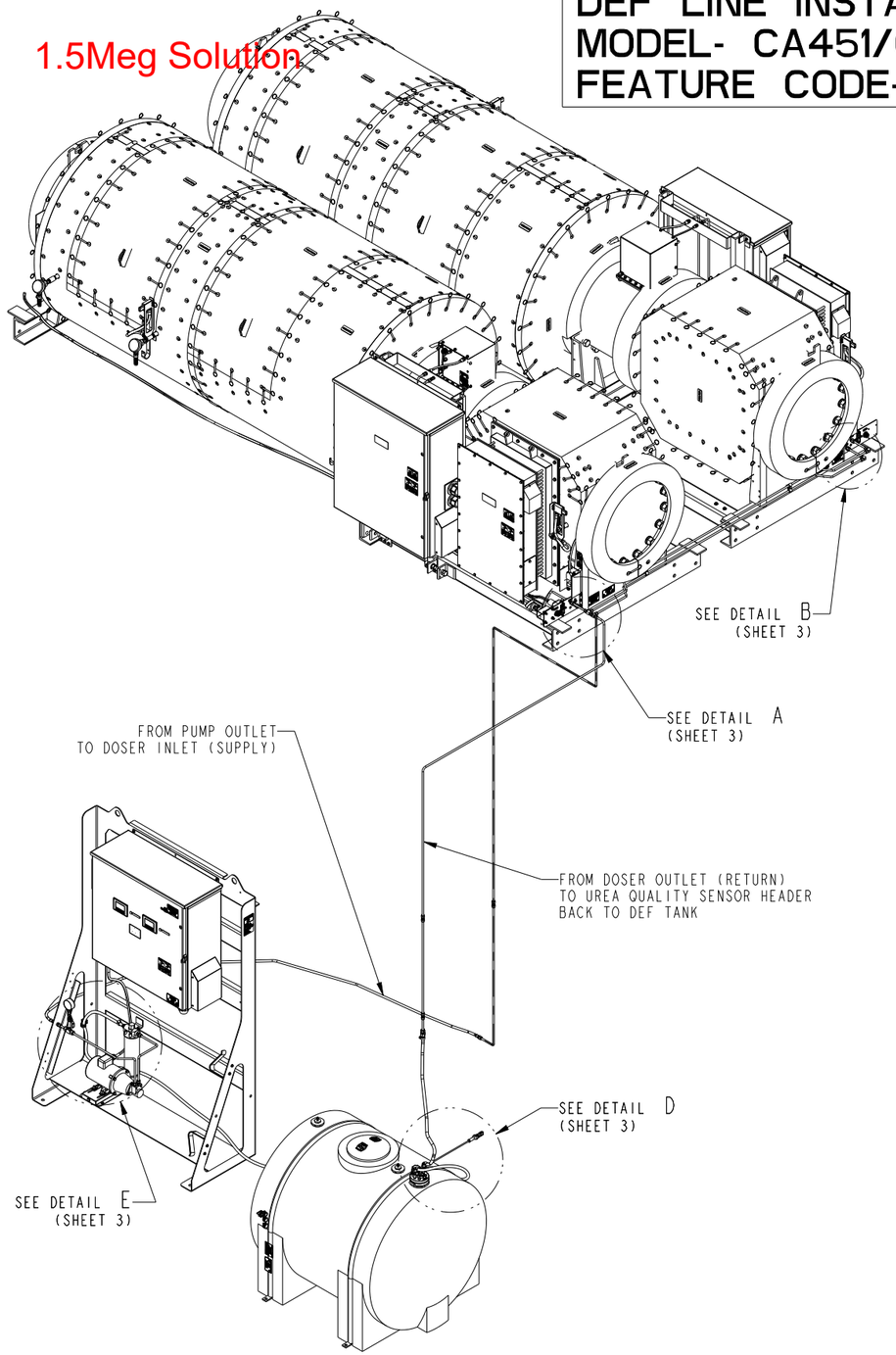
1. ALL DIMENSIONS ARE REFERENCE UNLESS SPECIFICALLY TOLERANCED.

2. ALL DIMENSIONS IN [ ] ARE INCHES.

3. INSTALL COMPRESSION FITTING AS PER INSTRUCTION BELOW:

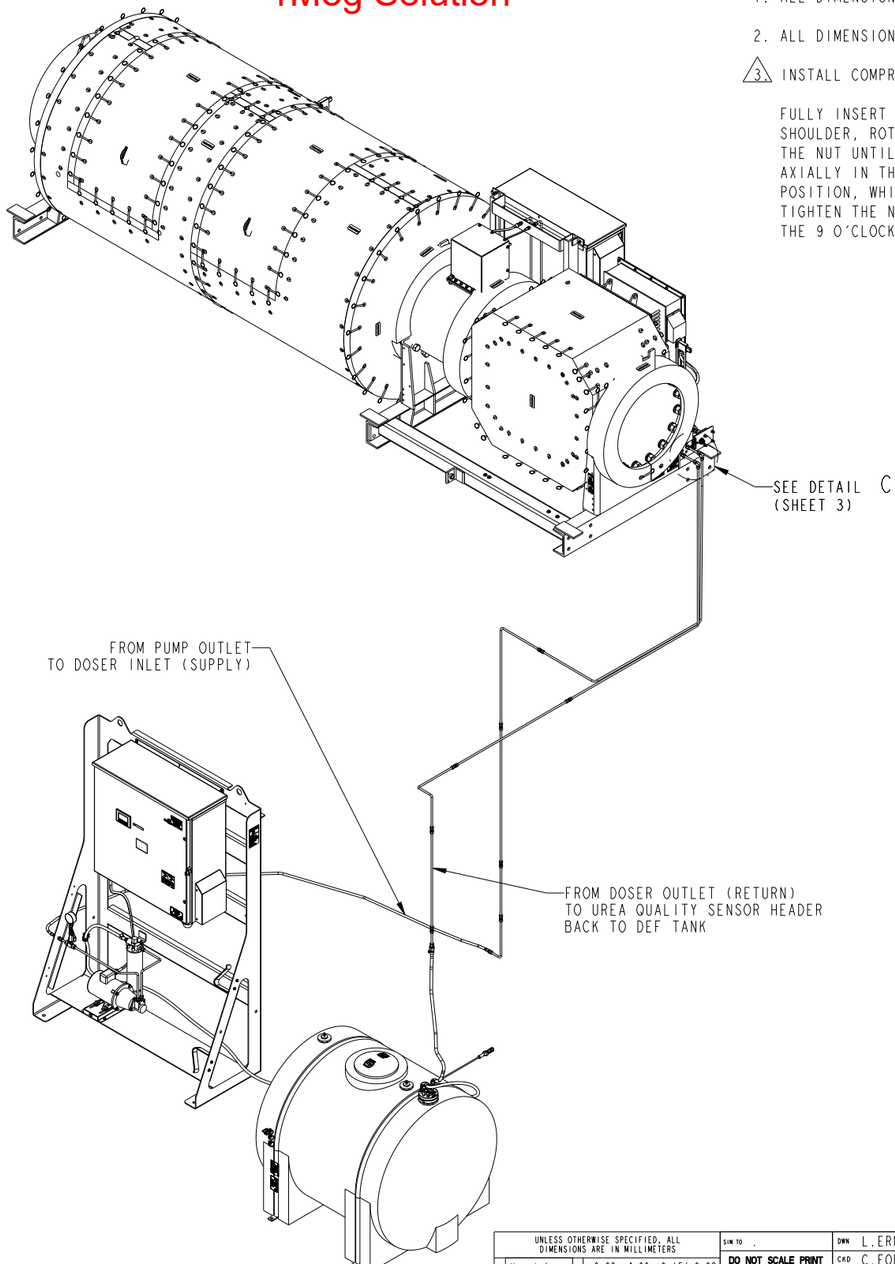
   FULLY INSERT THE TUBE INTO THE FITTING AND AGAINST THE SHOULDER, ROTATE THE NUT FINGER-TIGHT. FURTHER TIGHTEN THE NUT UNTIL THE TUBE WILL NOT TURN BY HAND OR MOVE AXIALLY IN THE FITTING. MARK THE NUT AT THE 6 O'CLOCK POSITION, WHILE HOLDING THE FITTING BODY STEADY, TIGHTEN THE NUT ONE AND ONE-QUARTER TURNS TO THE 9 O'CLOCK POSITION. (SEE SHEET 3)

1.5Meg Solution



CA452 OR CA542

1Meg Solution



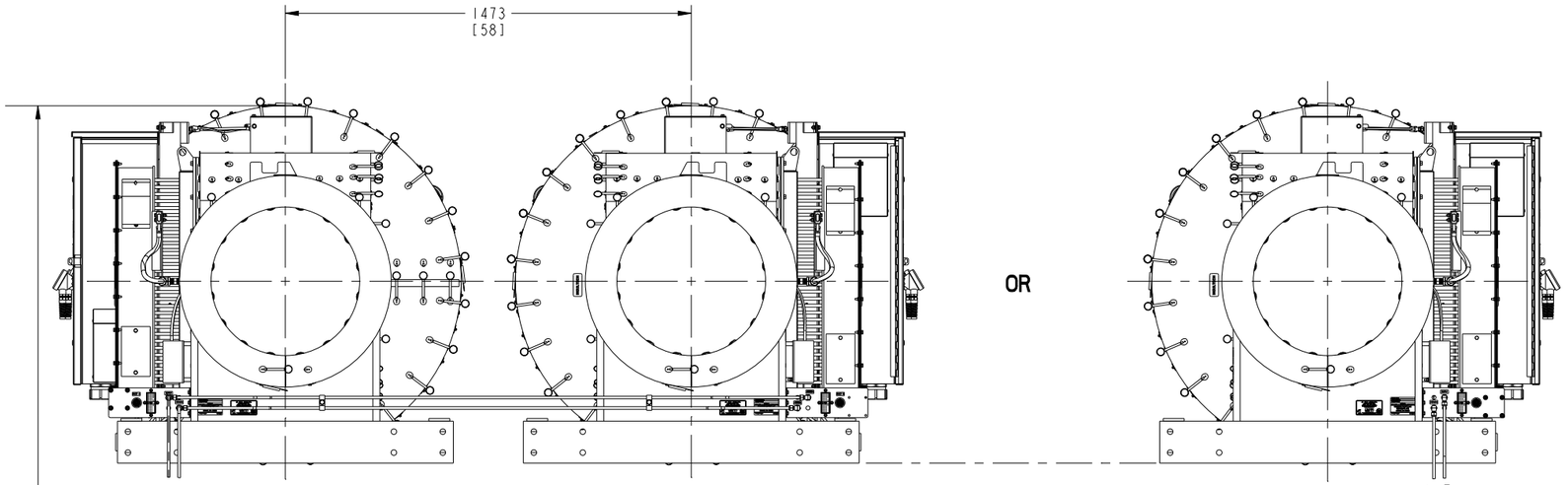
CA451

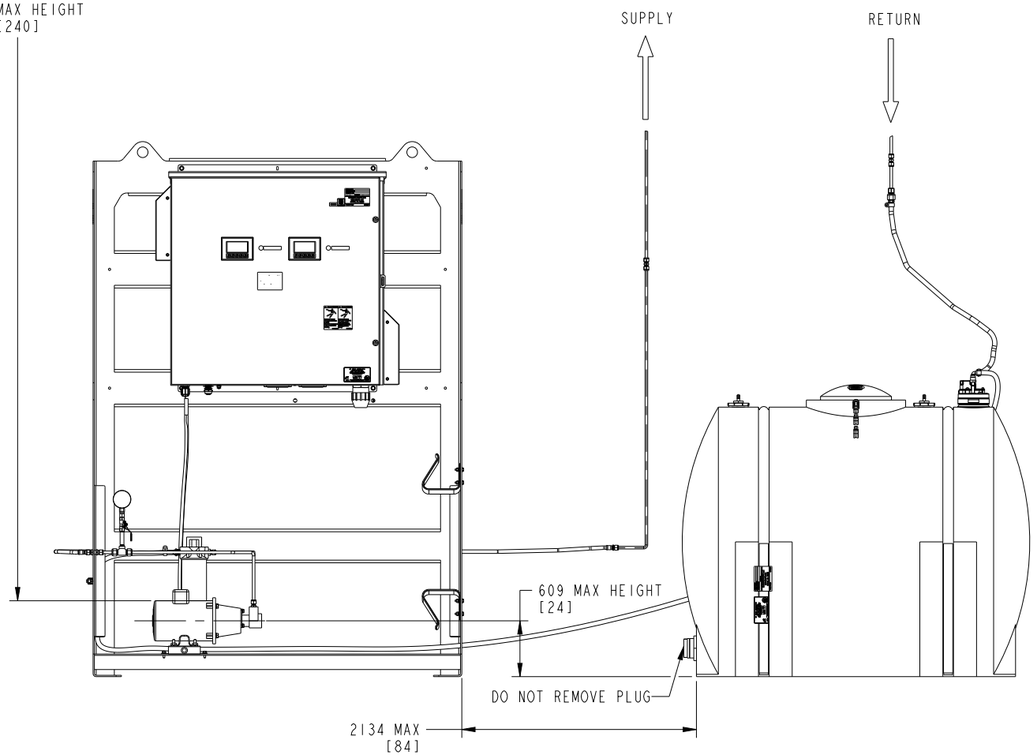
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS		SIM TO .	DWN L.ERNST	CUMMINS POWER GENERATION	
DIM: X ±1, .X ±0.8, .XX± 0.38	HOLE: 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD C.FORNELL		
			APVD T.SCHIEBE	OUTLINE, AFTERTREATMENT	
			DATE 29JUN17	SITE CODE .	
ANG TOL ± 1.0°	SCALE 1:16	THIS DOCUMENT (AND THE INFORMATION SHOWN THEREON) IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009 FIRST USED ON DQKAM	PGF	DWG SIZE D A057U252 CAD SHEET 1 OF 3

Drawing Name: A057U253 Revision: B
Part Name: A057U252 Revision: B
ECO-171947 Sheet 1 of 4

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-171947	B	1	PRODUCTION RELEASE	LDE	CJF	T.SCHIEBE	28AUG17





UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM: X ±1 | .X ±0.8 | .XX± 0.38

HOLE: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13

ANG TOL ± 1.0°

SCALE 1:10

SIM TO .

DO NOT SCALE PRINT

DWN	L.ERNST
CKD	C.FORNELL
APVD	T.SCHIEBE
DATE	29JUN17

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009

FIRST USED ON DQKAM

Cummins®

CUMMINS POWER GENERATION

OUTLINE, AFTERTREATMENT

SITE CODE PGF

DWG SIZE D

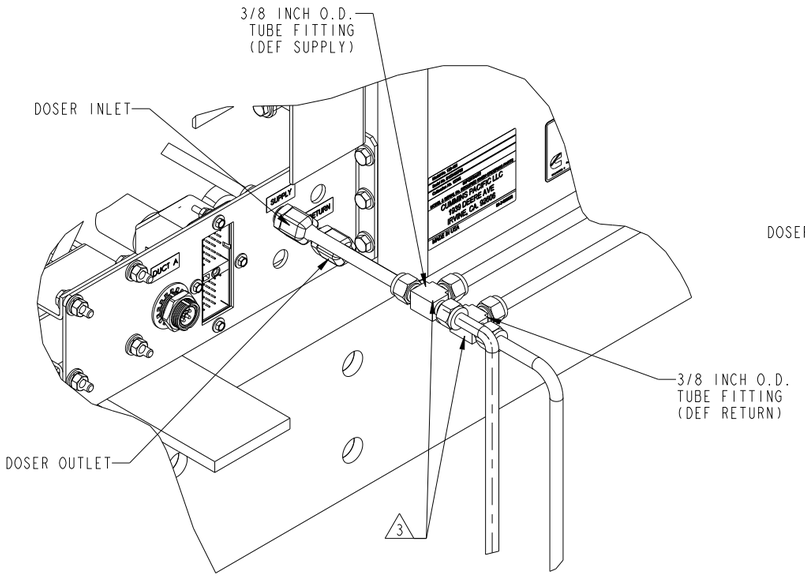
A057U252

CAD SHEET 2 of 3

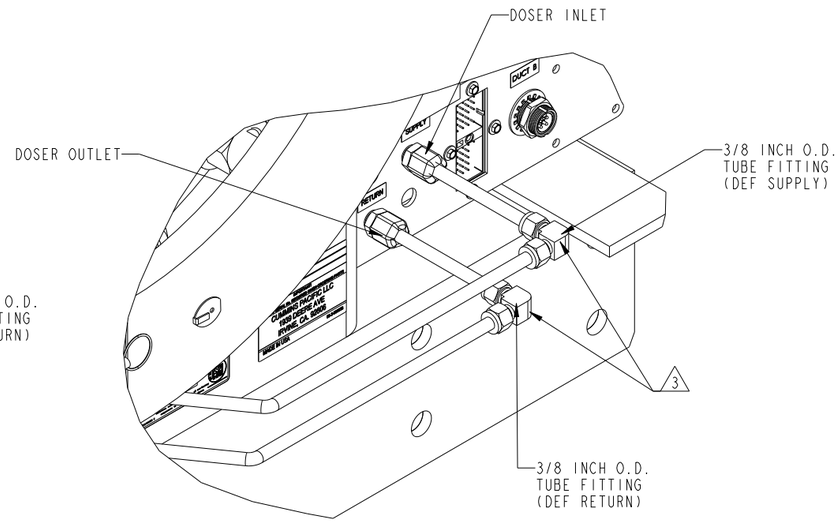
Drawing Name: A057U253 Revision: B
Part Name: A057U252 Revision: B
ECO-171947 Sheet 2 of 4

PTC® Creo® Parametric

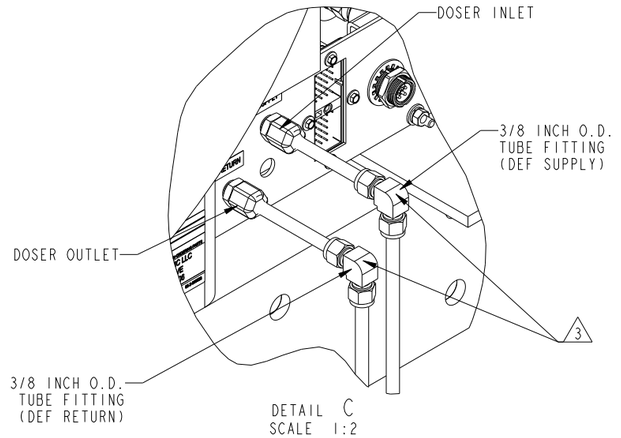
REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-171947	B	1	PRODUCTION RELEASE	LDE	CJF	T.SCHIEBE	28AUG17



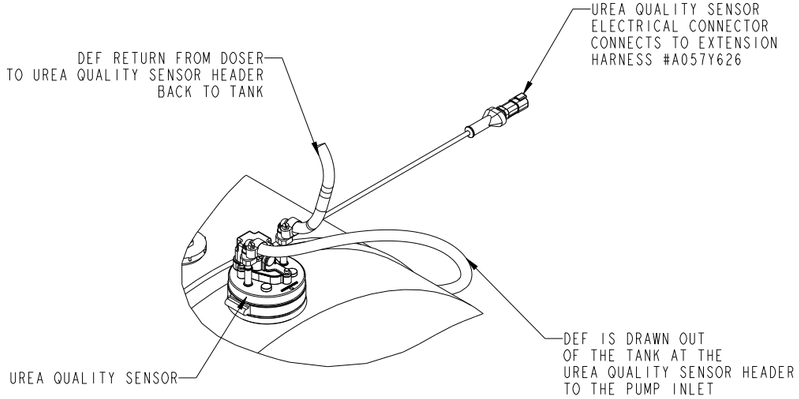
DETAIL A
SCALE 1:2



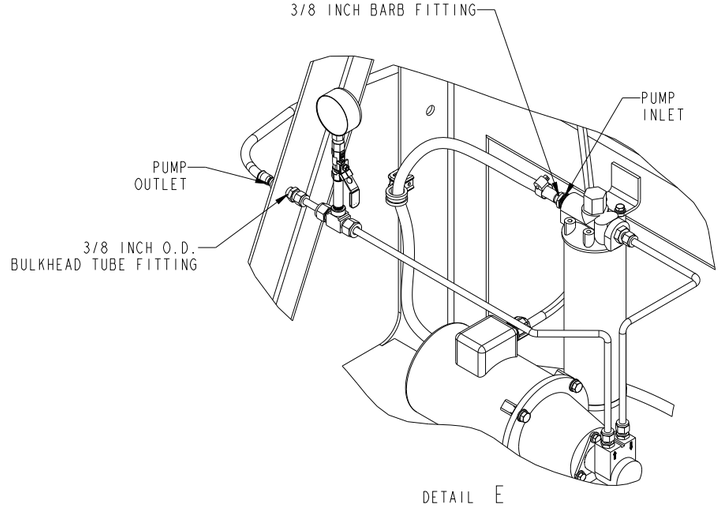
DETAIL B
SCALE 1:2



DETAIL C
SCALE 1:2



DETAIL D
SCALE 1:4



DETAIL E
SCALE 1:4

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS		SIM TO .	DWN L.ERNST	Cummins®	CUMMINS POWER GENERATION
DIM: X ±1, .X ±0.8, .XX± 0.38 — HOLE: 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13		DO NOT SCALE PRINT	CKD C.FORNELL		OUTLINE, AFTERTREATMENT
			APVD T.SCHIEBE	SITE CODE .	
			DATE 29JUN17		
ANG TOL ± 1.0°	SCALE 1:16	THIS DOCUMENT AND THE INFORMATION SHOWN THEREON IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009	FIRST USED ON DQKAM	PGF — DWG SIZE D — A057U252 — CAD SHEET 3 of 3

Part A057U252 B

Description	Legacy Name	External Regulations	Application Status	Release Phase Code	Security Classification	Alternates
OUTLINE,AFTERTREATMENT	A057U252	No External Regulations Apply	Production & Service	Production	Internal use Only	

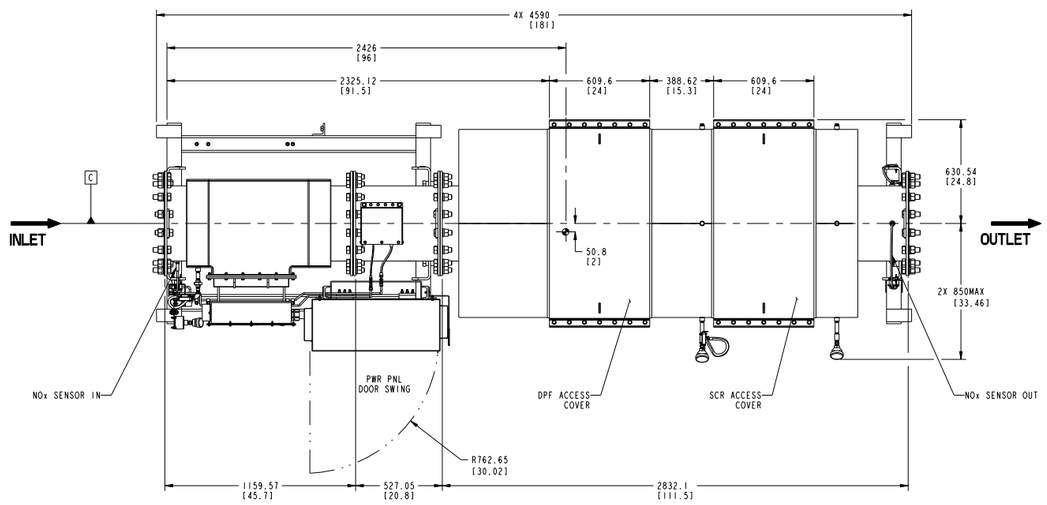
Part Specifications :A057U252 B

Name	Description	Legacy Name
A030B356	SPECIFICATION,MATERIAL	CES10903
A057U253	DRAWING,ENGINEERING	A057U253

Creo Parametric

REV. NO.	LTR	NO.	REVISION	BY	CHD	APVD	DATE
ECO-137023	D	1	ZONE (D3):DIM 4590[181] WAS 4598[181]	SL	RC	R.CHANGELA	12AUG13
		2	DRAWING HAS BEEN PICTORIALLY UPDATED	SL	RC	R.CHANGELA	12AUG13
		3	SEE SHEET 2	SL	RC	R.CHANGELA	12AUG13
		4	SEE SHEET 2	SL	RC	R.CHANGELA	12AUG13
		5	ZONE(A3): DIM 4463.37[175.72] WAS 4455.61[175.4]	SL	RC	R.CHANGELA	12AUG13
		6	ZONE(A3): RWV DIM 4638.12[182.5]	SL	RC	R.CHANGELA	12AUG13
		7	ZONE(A3): ADD DIM 4666.04[183.7]	SL	RC	R.CHANGELA	12AUG13

AFTERTREATMENT T4fc
MODEL - CA451
FEATURE CODE - L178-2



NOTES:-

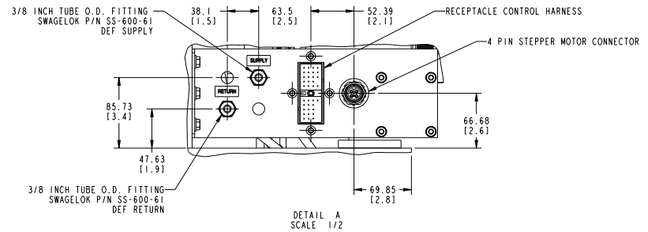
1. EXHAUST AFTERTREATMENT IS SUPPLIED WITH LISTED BELOW FLANGE MOUNTING HARDWARE.

TOTAL QTY	DESCRIPTION
2	GASKET FLANGE
32	SCREW HEX HEAD 1.125-7X3.5 IN LG
32	SP.LOCK WASHER 1.125 DIA NOM
64	FLAT WASHER 1.125 DIA NOM
32	NUT 1.125-7

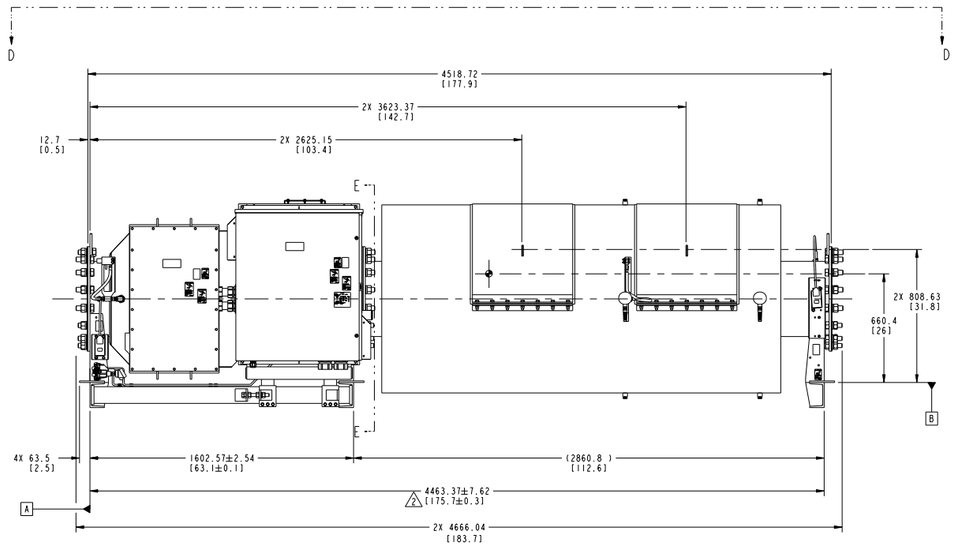
DESCRIPTION	WEIGHT Kg (lbs) TOTAL
EXHAUST AFTERTREATMENT	1981 [4367]
COMPONENT WEIGHT	
SCR/DPF COVER	44 (97)
DPF	19.5 (43)
SCR CARTRIDGE	236.8 (522)

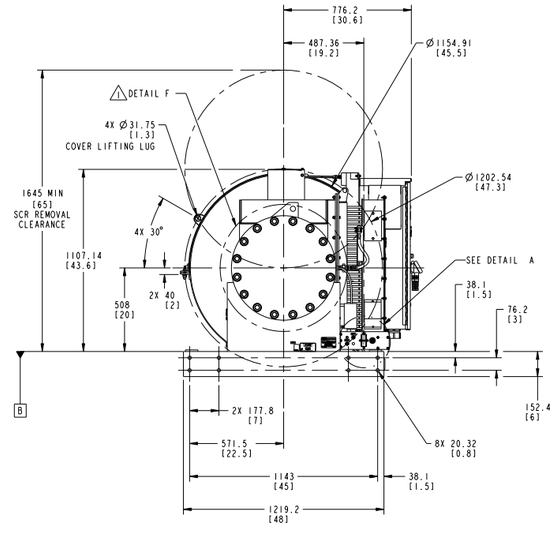
DESCRIPTION	WEIGHT Kg (lbs)
UNIVERSAL LIFTING BEAM	242 (533)

2. FOR TRANSPORTATION DIMENSION WILL BE "4470.90 [176.02]"
3. VIEWS SHOWN WITHOUT INSULATION & UNIVERSAL LIFTING BEAM FOR CLARITY.
4. DIMENSION SHOWN IN [ ] ARE IN INCHES.



DETAIL A
SCALE 1/2





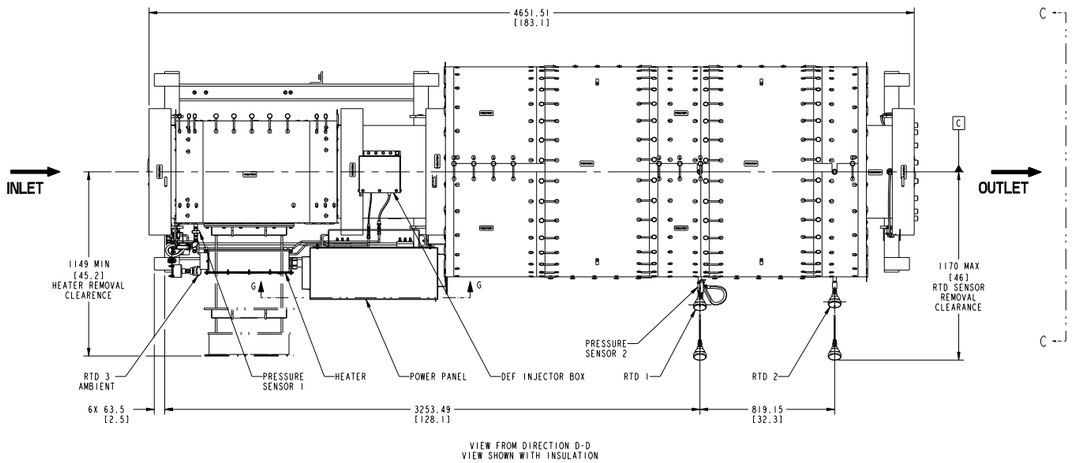
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS						
DIM	X ±1 .X ±0.8 .XX±0.38	DEC	0.00-4.99 +0.15/-0.08 5.00-9.99 +0.20/-0.10 10.00-17.49 +0.25/-0.13 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	DRN P.JOSHI CHD R.CHANGELA APVD R.CHANGELA DATE 30MAR12	CUMMINS POWER GENERATION
ANG TOL: ± 1.0°		SCALE: 1/10	CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	NEXT ASSY DOKAK-M	SITE CODE PGF	OUTLINE, AFTERTREATMENT T4fc 1845*
					SIZE E	A041V017 SHEET 1 OF 3 REV D

Drawing Name: A041V018 Revision: D
Part Name: A041V017 Revision: D
Sheet 1 of 4

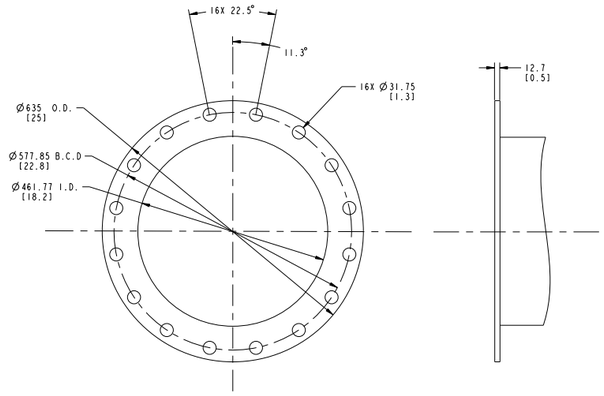
Creo Parametric

REL NO	LTR	NO	REVISION	DRN	CHD	APVD	DATE
ECO-137023	D	2	DRAWING HAS BEEN PICTORIALLY UPDATED	SL	RC	R.CHANGELA	12AUG13
		3	ZONE(B1): NOTE WAS 'TERMINAL...TWO AWG 500 Kcmil...'	SL	RC	R.CHANGELA	12AUG13
		4	ZONE(A1): ADD DIM 95.25[3.8]	SL	RC	R.CHANGELA	12AUG13

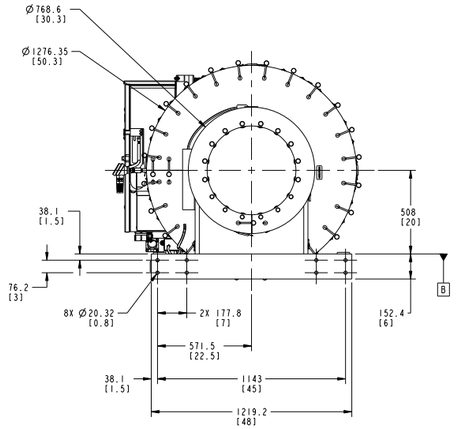
AFTERTREATMENT T4fc
MODEL - CA451
FEATURE CODE - L178-2



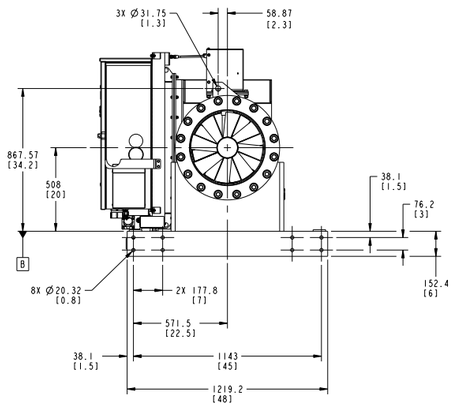
VIEW FROM DIRECTION D-D
VIEW SHOWN WITH INSULATION



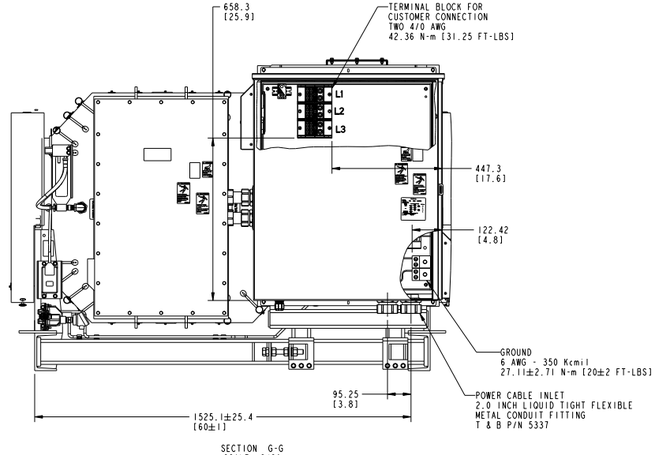
DETAIL F
125/150 ANSI 18" FLANGE, 2 PLACES
SCALE 1/4



VIEW FROM DIRECTION C-C
VIEW SHOWN WITH INSULATION



SECTION E-E



SECTION G-G
SCALE 3/20

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN MILLIMETERS

DIM	TOL	RANGE
X	±1	0.00- 4.99 +0.15/-0.00
.X	±0.6	5.00- 9.99 +0.20/-0.10
.XX	±0.38	10.00-17.49 +0.25/-0.13
ANG	TOL: ± 1.0°	17.50-24.99 +0.30/-0.13

SCALE: 1/10

DO NOT SCALE PRINT

DRN	P.JOSHI
CHD	R.CHANGELA
APVD	R.CHANGELA
DATE	30MAR12

DOKAK-M

CUMMINS POWER GENERATION

OUTLINE, AFTERTREATMENT
[4fc 1845"

SITE CODE: PGF

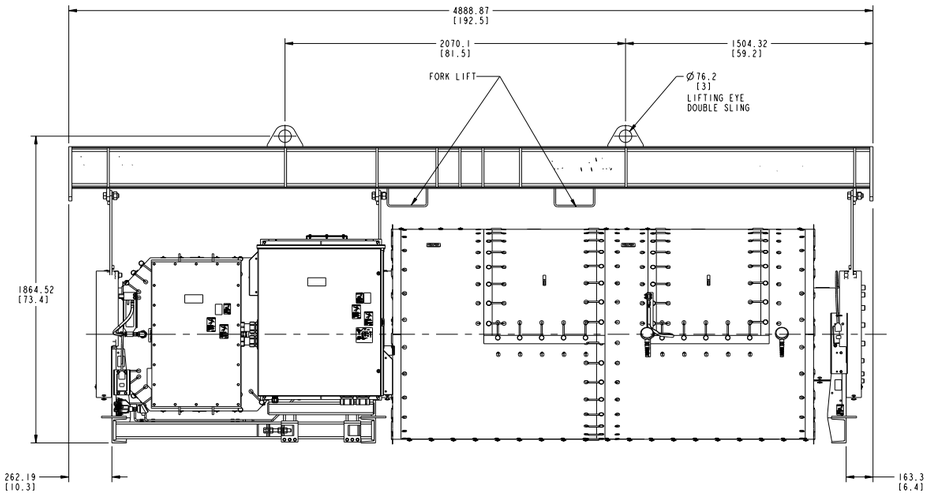
SIZE: E | DWG NO: A041V017 | SHEET: 2 of 3 | REV: D

Drawing Name: A041V018 Revision: D
Part Name: A041V017 Revision: D
Sheet 2 of 4

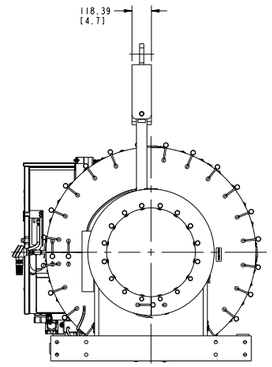
Creo Parametric

REV. NO.	LTR	NO.	REVISION	DRN	CHD	APVD	DATE
ECO-137023	D	2	DRAWING HAS BEEN PICTORIALLY UPDATED	SL	RC	R.CHANGELA	12AUG13

AFTERTREATMENT T4fc
MODEL - CA451
FEATURE CODE - L178-2



VIEW SHOWN WITH INSULATION & UNIVERSAL LIFTING BEAM



VIEW SHOWN WITH INSULATION & UNIVERSAL LIFTING BEAM

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

X	±1	0.00~4.99 +0.15/-0.00
.X	±0.6	5.00~9.99 +0.20/-0.10
.XX	±0.36	10.00~17.49 +0.25/-0.13
		17.50~24.99 +0.30/-0.13

ANG TOL: ± 1.0°

SCALE: 1/10

DO NOT SCALE PRINT

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DRN P_JOSHI
CHD R_CHANGELA
APVD R_CHANGELA
DATE 30MAR12

DOKAK-M

CUMMINS POWER GENERATION

OUTLINE, AFTERTREATMENT
T4fc 1X45°

SITE CODE: PGF

SIZE: E | DRAWING NO.: A041V017 | SHEET 3 of 3 | REV: D