



20 kW DC Generator in Vertical Enclosure

POLAR Model Number: V020GFB360TE

Operates on Natural Gas or Propane

Includes:

- Enclosure is all aluminum construction with stainless hardware
- Powder Coated for extended service
- Can be transported to the roof via elevator / stairs
- Can meet the needs of prime power and backup installations
- Remote control and monitoring without subscription to third party cloud service

Options:

- 8-alarm relay board
- Jump start kit
- Ethernet module
- Cell modems or IoT devices
- Coastal powder coating (prime coat with powder coating as top coat)
- MSC2020 providing an embedded webpage for universal remote access and control and enhanced datalogging

Standards:

- UL STD 2200
- EPA Compliant

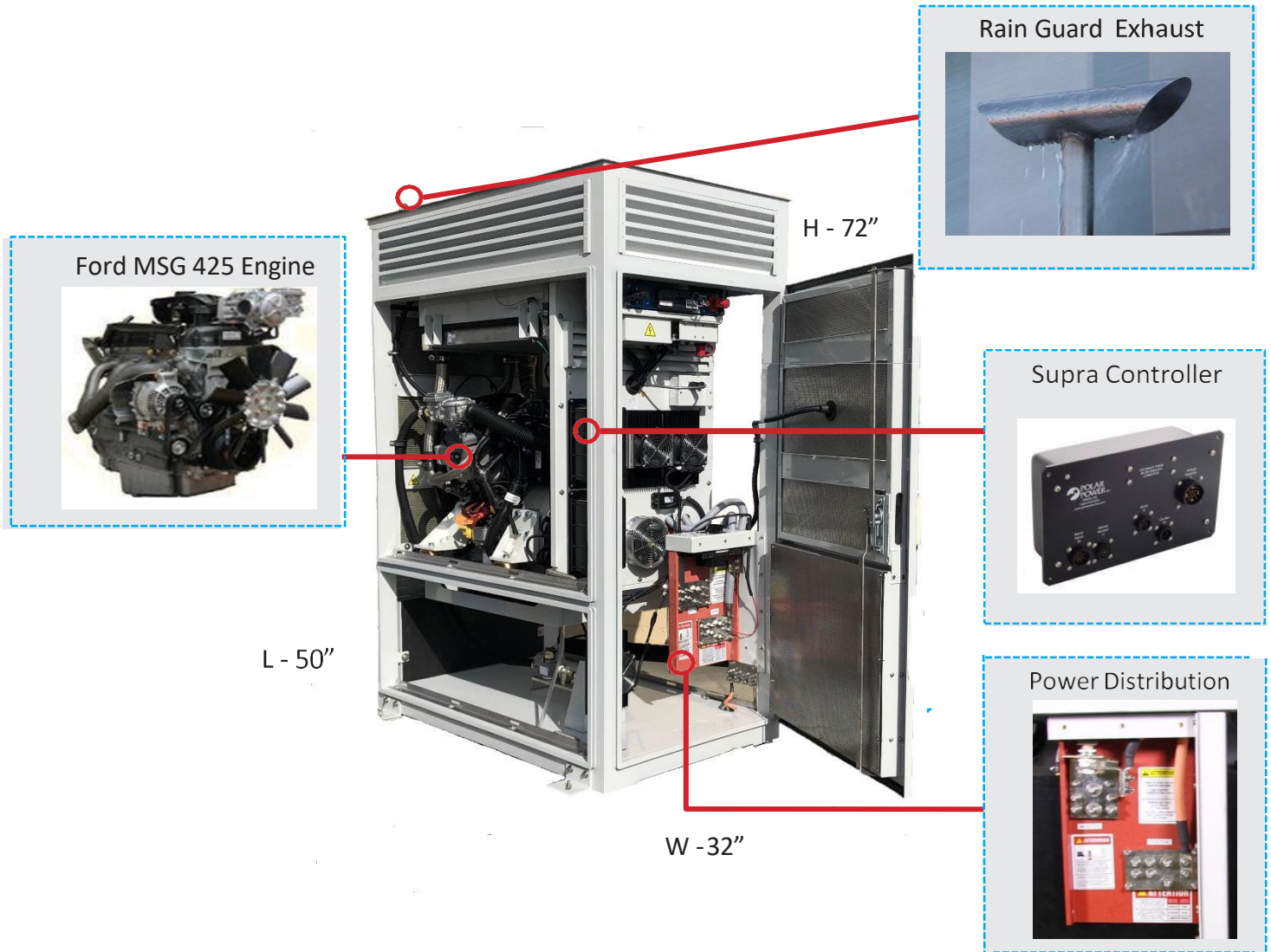


Founded in 1979 Polar Power specialized in solar photovoltaic systems, solar air conditioning and refrigeration. We developed and provided photovoltaic charging controls for telecommunications in the 1980s along with DC generators for the military. In 1994 we were first to provide DC generators with remote control and monitoring to the telecommunications industry.

Polar's success is based on engineering generators to meet the very specific needs of each application. Telecom site optimization is best met with the DC generator technology as the loads and batteries are DC. It makes no sense to install an AC generator and convert the output to DC. The AC generators are designed for a wide range of applications and they are not specifically produced for telecom applications so there are issues with reliability, space, and fuel efficiency.

Polar can save you considerable time and cost in permitting, installing, purchasing, and maintaining a backup generator. We reduce CAPEX and OPEX costs while improving backup reliability.

MAIN FEATURES: V020GFB360TE



SMALL FOOTPRINT, LIGHT WEIGHT. Polar's vertical 500amp -48V DC generator is the lightest weight, most compact power source on the market for either prime or backup power applications. This 27kw model is sized to support growing telecom power needs associated with 5G or sites with multiple tenants. It fits where traditional generators won't.

GREATLY REDUCED INSTALLATION COST. This generator is light weight and compact enough to be moved up to the roof in the elevator then up the stairs to the roof, saving the cost of a crane rental and long delays in crane permitting and street closures. The light weight also reduces or eliminates the need for structure or roof reinforcements. The Polar generator requires no ATS, saving on purchase, installation and reliability costs.

LOW ACOUSTIC NOISE. <66.0 dBA @ 7 meters (@ max load), and low vibration so as not to disturb the local residents or building landlords.

LOW MAINTENANCE COST. Serving long utility outages without maintenance breaks.

RODENT RESISTANT. Small animals can quickly destroy a

generator set by gnawing on wires, fuel lines, radiator hoses, etc. Cooling air inlets and outlets have perforated aluminum screens to keep small rodents and large insects out. Stainless steel wire braid is placed over fuel and radiator lines to prevent damage.

LONG LIFE. Controls and wire harnesses are designed to exceed a 20 year life. Higher grade, longer life electrical wire (UL 3173), weather tight connectors, gold plated connector pins on signal circuits. No transfer switches are required.

CORROSION RESISTANT. All-aluminum enclosure with stainless hardware for low maintenance, and long service life.

FUEL EFFICIENT. Up to 85% fuel savings due to smaller engine displacement, high efficiency alternator, and variable speed operation.

ADVANCED MONITORING. Included IoT device that provides secure real time data monitoring and remote diagnostics via CANBUS, RS232, and Edge compute abilities.

SPECIFICATIONS: V020GFB360TE

Engine

Engine Model	Ford MSG 425
Cylinders	Inline Type 4-Cylinder
Displacement (liters)	2.5
Bore (in./mm)	3.5/89
Stroke (in./mm)	3.94/100
Intake Air System	Naturally Aspirated
Engine HP	60 at 2500RPM
Emissions	U.S. EPA Tier 4 Interim
Emissions Compliance	EPA and CARB Certified
Variable RPM	Up to 2500

Engine lubrication system

Oil Filter Type	Full flow spin-on canister
Oil Capacity (L)	6.6
Oil Pressure Switch (standard)	Yes
Oil Pressure Transducer	Optional

Fuel Flow Requirement

Output (kW)	Flow Rate in BTU/hr
20KW	330,000

Engine cooling system

Type	Pressurized Aluminum Radiator
Water Pump	Belt Driven, Pre-Lubed, Self-Sealing
Fan Type	Electric Fans
Airflow CFM	2354
Fan Mode	Puller
Temperature Sensor	Yes

Environmental

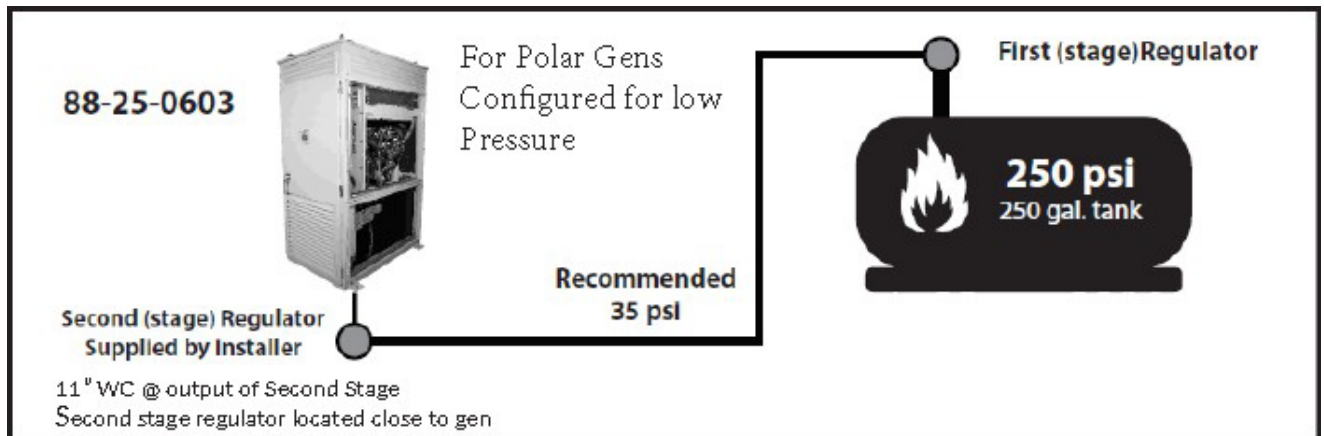
Operating Temperature (°C/°F)	-23 to 50/-10 to 122
Operating Humidity %	100

Power adjustment for conditions

Temperature Deration	2% derate for every 5.6 °C (10 °F) above 25 °C (77 °F)
Altitude Deration	4% derate for every 300 m (1000ft) above 91 m (300 ft)

Fuel system

Type	NG
Fuel Pump Type	Fuel Solenoids
Fuel Tank/Line	Fuel tank N/A/ Line 1 st & 2 nd stage regulator supplied by customer



**POLAR 20kW GENERATOR WITH FORD MODEL MSG-425 ENGINE
VAPOR FUEL ONLY**

INLET PRESSURE REQUIREMENTS FOR NATURAL GAS

Rev 0 020722

Minimum Dynamic Pressure	Recommended Dynamic Pressure	Maximum Static Pressure
2.0 in H₂O	4.0 in H₂O	11.0 in H₂O
.072 PSI	.145 PSI	.397 PSI
4.98 mbar	9.96 mbar	27.40 mbar

Size Regulator and Fuel Lines for 330,000 Btu/hr or 330 ft³/hr

- **Maximum Static Pressure** is measured just before the Shut off Valve (SOV) with the engine NOT running.
 - The measurement is taken and verified after the Dynamic Pressure measurements. Exceeding this pressure will damage the SOV and the Demand Regulator with the potential of causing fire or explosion.
- **Recommended Dynamic Pressure** is measured with the generator operating at full load.
 - Too small of a regulator on the gas line or too much restriction in the fuel line may prevent the gas pressure from reaching the recommended pressure.
- **Minimum Dynamic Pressure** is measured with the generator operating at full load. Below this value the generator output will begin to drop. Much below this value the generator may not start.
- The Regulator and/or the gas line may be too small if the Maximum Static Pressure is exceeded to reach the Recommended Dynamic Pressure.
- Please read the Installation manual before running the unit.

Engine cooling

System coolant capacity (gal/L)	2.5/9.5
---------------------------------	---------

Alternator

Alternator Model	8342
Type	Permanent Magnets, NdFeB
Weight (lb/kg)	46.5/21
Regulation Type	Variable engine speed
Stator	6 phase/32 poles
Overcurrent Protection (A)	20 kW – 360Amps
Disconnect Means	450Amp Fuse
Voltage Range (VDC)	44 to 60
Alternator Exhaust Flow (cfm/cmm)	130 to 180 / 3.68 to 5.1
MTBF (hr)	100,000+

Enclosure

Model	88-25-0603
Type	Weather Protective
Materials	Powder coated aluminum
Door Hardware	Three Point with Padlock Hasp, and Removable Side Panels
Mounting	Secure Mounting Tabs
Dims.	L 50" x W 32" x H 72"

Weight

Total Weight (lb/kg) Including oil and coolant:	1165/529
--	----------

Starter Supercapacitor

Model	20-16-0001
Storage Rating (Ah)	500
Voltage (VDC)	13-14.4
Weight (lb/kg)	12.1/5.5
Operating Temperature (°C/°F)	-40 to 65 / -40 to 149
Service Life (year)	10 to 15

Charger

Model	00-10-0015
Input Voltage (VDC)	37 to 62
Output Voltage (VDC)	14 to 14.4
Recharge time from 0 VDC (min)	10
Recharge time from 8 VDC (min)	2
Weight (lb/kg)	2.2/1

Standards

	Intertek 400376
UL Listing	UL STD 2200
Standards	CSA STD C22.2 No. 100

Controller features

Controller Type	Supra Model 250
4-Line Plain Text OLED Display.....	Simple user interface for ease of operation
Engine Run Hours Indication	Standard
Programmable Start Delay	Standard
Run/Alarm/Maintenance Logs.....	Standard
Engine Start Sequence	Cyclic cranking: 5 sec on, 30 sec rest (6 attempts maximum)
Starter Supercapacitor Charger	Standard
Automatic Voltage Regulation with Over and Under Voltage Protection.....	Standard
Automatic Low Oil Pressure/High Oil Temperature Shutdown	Standard
Overcrank/Overspeed.....	Standard
Automatic High Engine Temperature Shutdown	Standard
Field Upgradeable Firmware	Standard
Engine Start Delay.....	Adjustable, Set at 30 sec
Return to Utility Delay	Adjustable, Set at 30 sec
Engine Cool-down.....	Adjustable, Set at 30 sec
Exerciser	Programmable

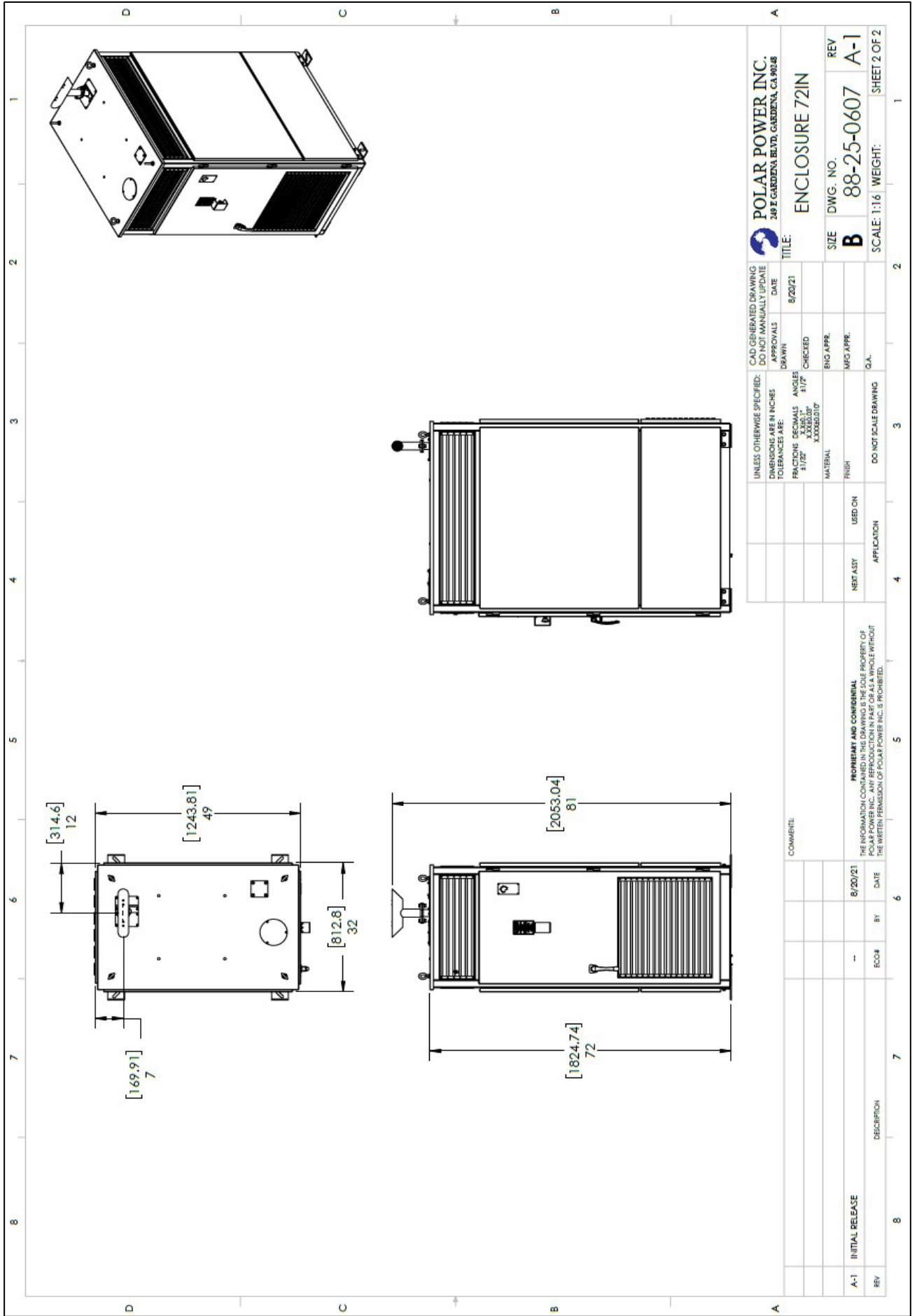
Monitoring

Alarm monitoring and remote control through Ethernet.

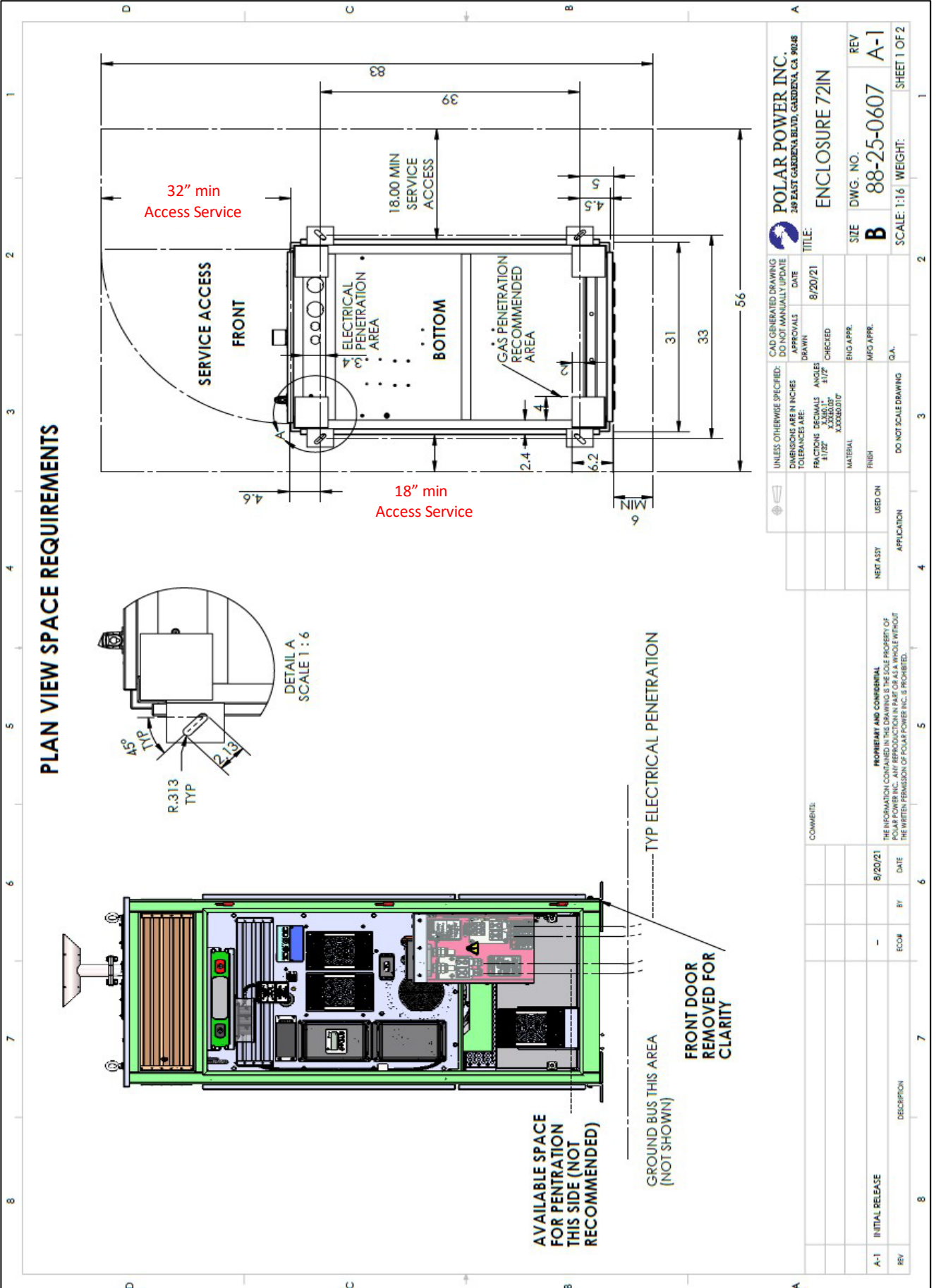
Contact closure alarm board

Shutdown Alarm	Standard
Warning Alarm.....	Standard
Engine Run.....	Standard
E-Stop Depressed	Standard

DIMENSION DRAWING FOR: V020GFB360TE



PLAN VIEW FOR: V020GFB360TE



CAD GENERATED DRAWING DO NOT MANUALLY UPDATE		APPROVALS		DATE		8/20/21		POLAR POWER INC. 249 EAST GARDENA BLVD. GARDENA, CA 90248	
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ARE:		DRAWN		CHECKED		8/20/21		ENCLOSURE 72IN	
FRACTIONS: DECIMALS ANGLES		ANSI AS		ENG APPR.		MFG APPR.		SIZE DWG. NO.	
1/16" 0.0005" 1/32"		X.3MM 0.1"		X.3MM 0.1"		G.A.		B 88-25-0607	
MATERIAL		X.0000010"		DO NOT SCALE DRAWING		SCALE: 1:16		WEIGHT: SHEET 1 OF 2	
FINISH		NEXT ASST		USED ON		APPLICATION		REV	
PROPRIETARY AND CONFIDENTIAL		8/20/21		BY		ECO#		A-1	
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF		DATE		DESCRIPTION		INITIAL RELEASE		REV	
POLAR POWER INC. ANY REPRODUCTION WITHOUT		BY		INITIAL RELEASE		DESCRIPTION		REV	
THE WRITTEN PERMISSION OF POLAR POWER INC. IS PROHIBITED.		DATE		INITIAL RELEASE		DESCRIPTION		REV	
		8/20/21		-				A-1	
								A-1	



249 E. Gardena Blvd., Gardena, CA 90248
Tel.: +1(310)830-9153 • Fax: +1(310)719-2385
info@polarpowerinc.com • www.polarpower.com