User Guide

WARNING – THIS UNIT STARTS AND SPEEDS UP BY ITSELF

- With the key in RUN the engine can go to full throttle whenever the radar sees movement. In **Auto** it can also **restart from off**.
- Turn the key **OFF** and wait for the engine and fan to stop before opening doors or reaching into the unit.
- Stay clear of the fan inlet, the discharge air stream, the belts and the hot exhaust. Run with the doors closed, outdoors only.

CONTROL PANEL

1. **Key switch** – OFF / RUN / START (springs back to RUN).
2. **Function switch** – selects how the engine runs.
3. **RUN light**, green – the roof light shows the same.
4. **OIL PRESS light**, red – low oil pressure shutdown.
5. **HIGH TEMP light**, red – high coolant temperature shutdown.
6. **Fuse** – control power, 5 A maximum.

Tachometer – on the Operation Information plate below the panel. Reads engine RPM ×100: about 12 at idle, about 30 at full throttle.

BEFORE STARTING

- Check fuel, engine oil and coolant levels. Use **ultra-low-sulfur diesel only**.
- Clear snow, ice and loose material from the fan inlet and discharge.
- Make sure nobody is near the fan, belts or discharge, and close the doors.

STARTING

1. Set the **Function switch** to the mode you want.
2. Turn the key to **START** and let go. It returns to RUN and the controls power up. You do not need to hold it.
3. The RUN light flashes while the glow plugs preheat (about a minute), then the engine cranks by itself.
4. If it does not fire, the control rests the starter for 30 seconds and tries again: up to 3 tries of 10 seconds each.
5. Once running, the engine idles at about 1,200 RPM until the fan is called for.

STOPPING

Turn the key to **OFF**. The engine shuts down, and the controls switch themselves off once it has stopped turning. When you can, let the engine drop back to idle before keying off.

RUN LIGHT AND ROOF LIGHT

Flashing	Preheating, starting, or idling and waiting for the radar.
Solid	At full throttle, ready for blowing.
Off	Asleep (Auto), shut down, or stopped by a fault.

FUNCTION SWITCH

POSITION	WHAT THE ENGINE DOES
Up – Full Throttle	Runs at full throttle (about 3,000 RPM) the whole time. The radar is ignored.
Middle – Run, No Off	Idles until the radar sees a vehicle, then goes to full throttle. Drops back to idle 3 minutes after the radar last saw something. The engine never shuts off.
Down – Auto	Works like Middle, and also saves fuel: after 20 minutes at idle with no radar activity the engine shuts off (sleep) and **restarts by itself** when the radar sees a vehicle. After about 1 hour with no radar activity the system powers down; turn the key OFF, then start again with the key.

The radar has to see a vehicle for about 3 seconds before the engine speeds up. The fan is driven through a centrifugal clutch that engages at about 1,650 RPM, so the fan only blows when the engine is above idle.

IF IT STOPS OR WILL NOT START

WHAT YOU SEE	WHAT IT MEANS	WHAT TO DO
Red OIL PRESS light on, engine stopped	Oil pressure stayed below about 7 psi for 5 seconds.	Check the oil level and look for leaks. Do not restart until the cause is found.
Red HIGH TEMP light on, engine stopped	Coolant reached about 230 °F (110 °C) for 5 seconds.	Let it cool. Check coolant level and that the radiator and screens are not blocked.
Engine stopped, no red light, key in RUN	In Auto this is normal: asleep or powered down. Otherwise three failed start attempts, or the engine stalled.	In Auto, key OFF and restart if it does not wake on the radar. Otherwise check fuel, clear the fault and try again.
Nothing happens at START, no lights	No control power.	Check the 5 A panel fuse and the battery connections. Replace the fuse with 5 A only.

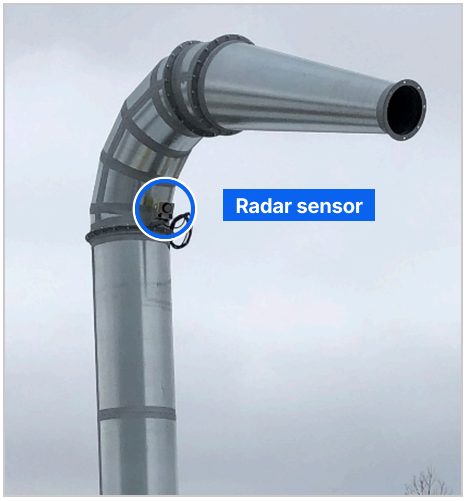
Clearing a fault. Faults do not clear on their own. Turn the key **OFF**, wait for the engine to stop and the lights to go out, fix the cause, then start normally.

Radar Sensor

The unit comes with a **BEA Falcon XL** radar motion sensor that tells the control when a vehicle is at the duct. The sensor is **configured before it ships**. All you need to do is mount it on the duct with the bands supplied and plug it in.

MOUNTING IT ON THE DUCT

1. The sensor goes near the top of the duct, where the vertical riser meets the elbow, on the same side as the duct outlet. The photo shows the position.
2. Hold the sensor's bracket against the duct with the front face of the sensor looking down at the ground below the outlet, where vehicles pass.
3. Fasten the bracket to the duct with the bands supplied. Tighten them until the sensor cannot move or rattle. A loose sensor vibrates and can trigger the engine falsely.
4. Run the cable down the duct to the unit and tie it off along the way. Keep it clear of the belts, the exhaust and anything hot or moving, and do not leave slack cable where it can swing in front of the sensor.



Example from another Fleet Blast installation, shown for the duct and the sensor position only. This is not the engine unit.

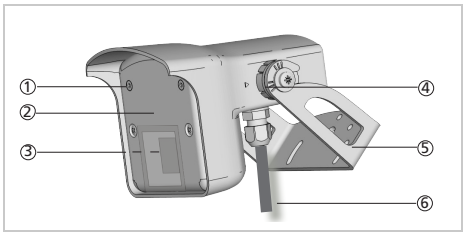
PLUGGING IT IN

1. Turn the key to **OFF**.
2. Push the zip plug on the end of the sensor cable fully into the zip port on the unit.
3. That is all. There is no wiring to do and nothing to set.

HOW IT WORKS

- The sensor detects **movement** below the duct outlet, in either direction. It does not see a vehicle that is standing still.
- The light on the sensor shows **red** while it is detecting. It blinks red and green for a moment when the unit powers up.
- About 3 seconds after the sensor detects movement, the engine goes from idle to full throttle and the RUN light goes solid.
- The engine stays at full throttle while movement keeps being detected, and drops back to idle about 3 minutes after the last detection.
- The sensor only works while the key is in RUN.

FUNCTION SWITCH	WHAT THE RADAR DOES
Up – Full Throttle	Nothing. The engine stays at full throttle.
Middle – Run, No Off	Moves the engine between idle and full throttle.
Down – Auto	Same as Middle. It also restarts the engine after an Auto engine-off. After about 1 hour with no detection the system powers down and the radar can no longer wake it: restart with the key.



The sensor: 1 push buttons · 2 front face · 3 radar antenna · 4 angle marks · 5 bracket · 6 cable

LOOKING AFTER IT

- Do not press the two push buttons on the sensor unless directed.
- Keep the front of the sensor uncovered. Clear off packed snow or ice.
- Do not open the sensor.
- Check that the bands are still tight whenever the unit is serviced.

TAKING THE DUCT DOWN AT SEASON CHANGE

To avoid damaging the sensor, mark where it sits on the duct, then unplug it and take it off **before** the duct is taken down.

IF THE RADAR DOES NOT BEHAVE

WHAT YOU SEE	WHAT TO DO
Engine never speeds up for a vehicle	Check that the zip plug is pushed fully in, the key is in RUN, and the front of the sensor is clear and looking down at where vehicles pass. The sensor light should go red when something moves under the duct.
Engine goes to full throttle with nothing there	Check that the bands are tight and the sensor is not shaking, and that nothing loose is moving in front of the sensor, such as slack cable or a tarp.
Still not right	Call Fleet Blast at 866-393-9300.

Engine and Fan Service

BEFORE ANY SERVICE

- Turn the key **OFF** and wait for the engine and fan to stop. With the key in RUN the engine can start or speed up on a radar trigger.
- Disconnect the battery negative cable before working on the belts, clutch, fan or wiring.
- Let the engine cool before touching the exhaust or opening the cooling system.

WHAT IS ON THIS UNIT

Engine	Yanmar TNV-series liquid-cooled diesel with glow-plug preheat. Model and serial number are on the engine nameplate.
Engine speed	Idle 1,200 RPM, full throttle 3,000 RPM. Set by the control through the Actus 720 cable throttle actuator.
Fuel	Ultra-low-sulfur diesel only.
Air cleaner	Baldwin PA2824.
Fan	Cincinnati Fan belt-driven centrifugal blower, shaft carried in pillow-block bearings.
Drive	BLM centrifugal clutch on the engine (engages at about 1,650 RPM), three A-71 V-belts (13 × 1800), idler tensioner.
Shutdowns	Low oil pressure below 7 psi (49 kPa). High coolant temperature at 230 °F (110 °C).
Electrical	12 V battery. 5 A control fuse on the panel.

ENGINE SERVICE SCHEDULE

WHEN	WHAT TO DO
Every day of use	Check engine oil, coolant and fuel levels. Look over the engine for fuel, oil or coolant leaks and for loose or damaged hoses and wiring.
First 50 hours	Change the engine oil and oil filter. Check and adjust the engine's own cooling-fan V-belt.
Every 50 hours	Drain water from the fuel filter / water separator. Check the battery and its connections.
Every 250 hours	Change the engine oil and oil filter. Clean the air cleaner. Clean the radiator fins. Check the cooling-fan V-belt. Drain water and sediment from the fuel tank.
Every 500 hours	Replace the air cleaner element and the fuel filter. Clean the fuel filter / water separator.
Every 1,000 hours	Drain, flush and refill the cooling system. Have the valve clearance checked and adjusted.
1,500 to 2,000 hours	Have the injectors and crankcase breather inspected, and check or replace the fuel and coolant hoses.

These intervals follow Yanmar's published TNV-series maintenance schedule. The Yanmar operation manual for the engine model on the nameplate governs oil grade, capacities, coolant type and any differences in interval. The control panel has no hour meter, so keep a log of running time.

FAN AND DRIVE SERVICE

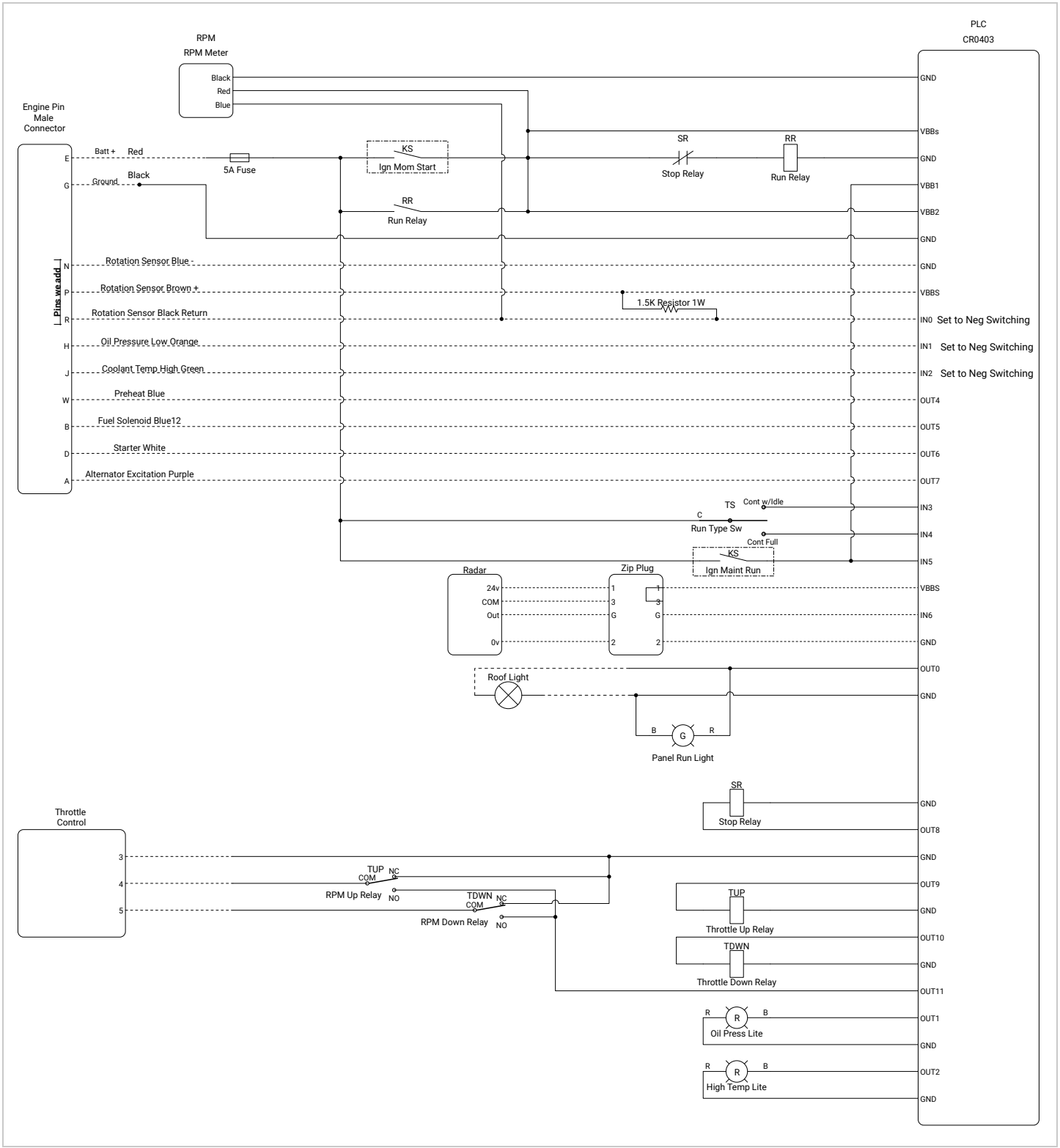
WHEN	WHAT TO DO
Every day of use	Clear snow, ice and debris from the fan inlet and discharge. Listen for new vibration, rubbing or belt squeal. If you hear any, stop the unit and find the cause before running again.
After the first few hours, then each oil change	Check all three drive belts for tension, cracking, glazing and uneven wear, and that they sit properly in the grooves. Replace all three together (A-71). Check that the idler tensioner pulley spins freely and holds the belts tight.
At each oil change	With the engine off, turn the fan by hand: it should spin freely with no rubbing. Check the fan wheel for buildup or damage. Check that the bearing, sheave and clutch fasteners are tight. Look at the clutch for oil contamination or signs of overheating.
Per Cincinnati Fan manual	Grease the fan shaft bearings with the grease type, amount and interval given in the Cincinnati Fan installation and maintenance manual supplied with the fan. Do not over-grease.

Clutch check. The clutch should release at idle and drive solidly above about 1,650 RPM. If the fan is slow to come up to speed at full throttle, or the belts squeal as the engine speeds up, have the clutch and belts inspected.

WHO TO CALL

For any problem with the unit, engine, fan, controls or radar, call **Fleet Blast at 866-393-9300**.

Wiring Diagram



INPUTS, ifm CR0403

IN0	Engine speed sensor
IN1	Oil pressure low
IN2	Coolant temperature high
IN3	Function switch down (Auto)
IN4	Function switch up (Full Throttle)
IN5	Key switch in RUN
IN6	Radar sensor

OUTPUTS

OUT0	Roof light and panel RUN light
OUT1	OIL PRESS light
OUT2	HIGH TEMP light
OUT4	Preheat (engine pin W)
OUT5	Fuel solenoid / ignition (pin B)
OUT6	Starter solenoid (pin D)
OUT7	Alternator excitation (pin A)

OUTPUTS, CONTINUED

OUT8	Stop relay (control power off)
OUT9	Throttle up relay
OUT10	Throttle down relay
OUT11	Throttle actuator supply

Radar zip plug: 1 = supply +, 2 = 0 V, 3 = COM, G = output to IN6.

Engine connector pins refer to Bell Power engine harness 700-00251.

RELAY WIRES

BK	Coil –
WH	Coil +
BL	COM
YL	NO
RD	NC