

## Gardening Excavator - Official Technical Overview & Datasheet

### EXECUTIVE SUMMARY

Designed exclusively for the rigorous demands of professional landscaping, arboriculture, and high-value agricultural land management, the Gardening Excavator bridges the gap between compact utility tractors and standard mini-excavators. Targeting golf courses, botanical gardens, orchard maintenance crews, and municipal parks departments, this machine delivers diesel-powered excavation force while maintaining turf-friendly ground pressure below 4.5 psi. The primary value proposition combines a zero-tail-swing architecture with proportional auxiliary hydraulics, enabling seamless attachment switching between augers, tree spades, and soft-grip grapples without compromising plant health or soil structure.

In high-density planting environments and fragile ecosystem restoration projects, conventional excavators cause irreversible root damage and soil compaction. The Gardening Excavator solves this through an integrated Eco-Sense load-sensing hydraulic system that reduces fuel consumption by up to 18% while delivering 6,200 lbf of breakout force. For commercial operators, this translates to 2,000+ hours between major service intervals, compatibility with ISO 11783 (ISOBUS) telematics for precision horticulture, and a certified noise emission level of only 98 dBA – making it suitable for residential area

operations and nighttime greenhouse construction.



## STRUCTURAL INTEGRITY & POWERTRAIN

The chassis utilizes DOMEX 700 MC hot-rolled martensitic steel (650 MPa minimum yield strength) with an additional 3mm abrasion-resistant overlay on belly pans and track frames. This structural platform undergoes 200-hour salt spray testing (ASTM B117) to withstand fertilizer corrosion, constant moisture exposure, and chemical pesticide residues. The upper frame integrates a cast-steel pivot joint with a 45mm hardened pin – field-proven to exceed 15,000 hours in horticultural applications without rebushing.

Power comes from a Yanmar 3TNV88F direct-injection diesel engine (24.8 hp / 18.5 kW) meeting EPA Tier 4 Final and EU Stage V emissions standards through

a maintenance-free diesel oxidation catalyst (DOC) system – no diesel exhaust fluid (DEF) required. The hydraulic system features a twin-variable-displacement piston pump (44.9 L/min total flow) with independent load-sensing circuits for boom/swing and auxiliary/ travel functions. A dedicated 12.5 L/min pilot pressure circuit ensures precise feathering for delicate tasks like transplanting mature specimens or working within 300mm of irrigation lines.

#### KEY FEATURES & OPERATOR COMFORT

- ROPS/FOPS Level II Certified Cab: Integral 44mm diameter steel roll-over protection structure with laminated polycarbonate front window (ANSI Z87.1 impact rating). Pressurized cab with activated carbon recirculation filter removes pollen, spores, and fine particulate down to 3 microns. Heated high-back suspension seat with 75mm vertical travel and 2.5-degree lateral isolation reduces spinal compression during continuous trenching.

- Smart Horticulture Control Panel: 5-inch color LCD display with glove-friendly membrane switches. Real-time monitoring of hydraulic oil temperature (compaction avoidance warning at 45°C), fuel efficiency graphs (L per meter cubed of soil moved), and attachment presets for 12 tools. Includes digital root-protection geofencing – pre-program no-go zones around specimen

trees via GPS coordinates or manual boundary setting.

- Auto-Idle & Economy Lift Mode: Electronic control unit automatically reduces engine speed from 2,500 to 1,400 rpm after 5 seconds of joystick inactivity. Economy Lift Mode limits boom-down speed to 0.25 m/s for controlled placement of 200kg root balls or nursery stock, eliminating shock loading to cargo straps and fragile containers.

- Zero Tail Swing with Asymmetric Travel: Rear counterweight rotates within 50mm of track width, allowing operation directly adjacent to greenhouses, retaining walls, and mature tree trunks. Independent two-speed travel (2.5 km/h low / 4.6 km/h high) with oscillation angle of  $\pm 8$  degrees per track for negotiating uneven terrain without scalping turf.

- Tool-Free Attachment Change System: Hydraulic quick coupler with integrated debris wipers and alignment guides. Changes between 24-inch digging bucket, 36-inch cleanup bucket, and 16-inch auger (with torque limiting) in under 45 seconds without leaving the cab. Automatic auxiliary flow recognition adjusts maximum hydraulic pressure from 2,500 to 3,800 psi based on attachment RFID tag.

COMPLIANCE & SAFETY STANDARDS

Certified to ISO 12100:2010 (risk assessment methodology for horticultural machinery), ISO 5010:2019 (steering systems for compact excavators), and ANSI/SAE J1290 (agricultural & construction operator controls). Safety features include an acoustic travel alarm (107 dB at 1m) with automatic activation when boom angle exceeds 15 degrees, secondary pilot-operated hydraulic lockout on all boom cylinders (prevents drift if engine fails), and four emergency boom lowering cables accessible from cab or ground level. Electromagnetic compatibility (EMC) tested to ISO 14982:2019 for use near electric fence chargers, irrigation control boxes, and greenhouse climate sensors. The entire thermal management system meets UL 94 V-0 flame resistance rating for engine compartment materials.

## TECHNICAL SPECIFICATIONS

The following tables present verified performance data for the Gardening Excavator under standard horticultural operating conditions (ambient temperature 20 ° C, 100m AMSL). All measurements comply with ISO 9249 (engine power) and ISO 7457 (hydraulic performance) test protocols.

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Parameter	Specification
Engine Model	Yanmar 3TNV88F Direct Injection
Engine Power (Net)	24.8 hp / 18.5 kW @ 2,500 rpm
Operating Weight (Cab w/ 24" bucket)	2,850 kg (6,282 lbs)
Operating Weight (Canopy w/ 24" bucket)	2,680 kg (5,908 lbs)
Ground Pressure (Turf track pads)	4.3 psi (0.30 kg/cm <sup>2</sup> )
Bucket Breakout Force	6,200 lbf (27.6 kN)
Arm Breakout Force	3,950 lbf (17.6 kN)
Total Hydraulic Flow	44.9 L/min (11.9 gal/min)
Max Dig Depth	

>2,460 mm (96.9 in)	
>Max Dump Height	
>2,680 mm (105.5 in)	
>Tail Swing Radius	
>680 mm (26.8 in) - Zero tail	
>Track Width (Retracted / Extended)	
>1,100 mm / 1,350 mm (43.3 / 53.1 in)	
>Fuel Tank Capacity	
>32 L (8.5 gal)	
>Hydraulic Tank Capacity	
>25 L (6.6 gal)	
>Noise Level (Operator ear LpA)	
>78 dB(A)	
>Noise Level (External LwA)	
>98 dB(A)	