



**RICE TRANSPLANTER  
DAEDONG, ESCORTS KIOTI (DUO 60)  
(SELF PROPELLED –RIDE ON)**



सत्यमेव जयते

भारत सरकार  
कृषि मंत्रालय  
(कृषि एवं सहकारिता विभाग)



**GOVERNMENT OF INDIA  
MINISTRY OF AGRICULTURE  
(DEPARTMENT OF AGRICULTURE & COOPERATION)**

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान  
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## 15. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

### 15.1 Engine Performance Test

Brake power kW (Ps)	Crank shaft torque Nm (kgf-m)	Crank shaft speed (rpm)	Specific fuel consumption kg/kWh (kg/hph)	Specific energy kWh/l (hph/l)
<b>Maximum power two hours test</b>				
12.2(16.6)	32.7(3.34)	3550	0.372(0.274)	2.104(2.860)
<b>Power at rated engine speed (3600 rpm)</b>				
11.5(15.6)	30.4(3.10)	3600	0.350(0.258)	2.237(3.041)
<b>Maximum torque</b>				
12.3(16.7)	33.2(3.39)	3535	0.370(0.272)	2.117(2.878)

- The maximum power of engine was recorded as 12.2 kW (16.6 Ps) at 3550 rpm against manufacturer's declaration of 14.0 kW (19.0 Ps) which is 12.9 % less.
- Rated power of engine was observed as 11.5(15.6)kW(Ps) against the declared power of 11.4 kW
- The specific fuel consumption corresponding to maximum power was recorded as 0.372 kg/kWh (0.274 kg/hph) .
- The maximum torque of the engine was recorded as 33.2(3.39)Nm(kgf-m)
- The back up torque of engine was recorded as 1.53% as it is constant speed engine.
- The maximum lubricating oil temperature was recorded as 108 °C which is within the manufacturer declared limit of 111°C.

### 15.2 Noise Level

Noise level at operator's ear level & at bystander was recorded as 88.5 & 75.9 dB(A) against the danger limit of 88dB(A)/ 98 dB(A) respectively, specified for continuous exposure of 8 hours.

### 15.3 Mechanical Vibration

The amplitude of mechanical vibration reported in chapter 10 on some component was observed on higher side. This should be looked into.

### 15.4 Field Test

- #### 15.4.1
- The transplanter was operated in varying field conditions for a total period of 35.67 hours for transplanting 'MTO 1010' variety of paddy seedlings. The results are summarized as under.

- i. The average depth of transplanting was recorded as 3.1 to 4.2 cm.
- ii. The variation from mean of average depth of transplanting was recorded as -15.76 to +14.13percent.
- iii. The spacing between row to row was fixed as 30.0 cm..
- iv. The average number of plants per hill was recorded as 2 to 8
- v. The average spacing between hills was recorded as 12.3 to 18.8 cm.
- vi. The % variation from mean of spacing between hills was recorded as -21.95 to +19.29%.
- vii. The average total number of hill in 1 m<sup>2</sup> was recorded as 23 to 28.
- viii. The % variation from mean of total number of hill in 1 m<sup>2</sup> was recorded as -11.54 to +7.69%.
- ix. The average number of missing hills was recorded in 1 m<sup>2</sup> as Nil to 0.67 .
- x. The average number of floating seedlings was recorded in 1 m<sup>2</sup> as 0.33 to 0.67.
- xi. The average no. of buried seedlings was recorded in 1 m<sup>2</sup> as Nil to 0.67.
- xii. The total number of transplanting faults was recorded in 1 m<sup>2</sup> as 0.33 to 1.33
- xiii. The hourly fuel consumption was recorded as 3.0 to 3.60 l/h and fuel required for planting of one hectare area was recorded as 8.10 to 11.25 ha/h
- xiv. Time required to cover one hectare 2.44 to 3.23 h/ha.

15.4.2 During the entire field operation, no overloading of the engine was noticed.

15.4.3 The quality of puddling, uniformity in leveling of the field. Standing water over puddle, uniformity of the nursery mats and presence of weeds remains in the puddle soil affect the performance of the planter to a great extent.

Therefore, to obtain best results from the machine, it is necessary to have the field well puddled and settled (for 2-3 days) field with 2-4 cm standing water.

15.4.4 The number of missing hills per square meter area is attributed mainly to the non uniform germination of nursery mat.

15.4.5 The quality of work was observed to be smooth during entire transplanting operation and overall performance of the machine was found satisfactory.

### 15.5 Components / assembly inspection

15.5.1 The engine was dismantled after 47.67 hours of operation and wear of critical components were observed to be within the limits.

**15.6 Safety Provisions**

The machine has the following safety provisions.

- i. A front bumper.
- ii. Bonnet above the engine and gear box.
- iii. Drive belt protective covers.
- iv. A slip clutch (torque limiter) at planting arm is provided to protect the planter drive mechanism.

**15.7 Ease of operation and adjustments**

- i. All the controls, which are required to be used frequently are within the easy reach of the operator.
- ii. The handling of machine was easy and stable and the operator can work continuously for about two hours.
- iii. The planting depth, hill spacing and number of seedling per hill can be adjusted quickly.
- iv. The seedling carriers are provided on both side (i.e. LHS & RHS) of operator for holding nursery trays. If the carrier is fully loaded with mat trays operator's vision is obstructed.
- v. No other operational difficulty was noticed during the operation of the transplanter even in the smaller fields.
- vi. A hydraulic system is provided to lift the seedling platform so as to enable the operator to cross over the bunds and while turning the machine (even with full load) in the field.
- vii. Four wheel drive is provided for field work.
- viii. Integral power steering is provided for easy working of operator.

**15.8 Labour requirement**

A trained operator is required for efficient operation of the machine. One helper is required for safe handling and loading of mats.

**15.9 Literature**

The manufacturer had provided work shop manual and the operator's manual of the machine printed in English language. The literature provided is found adequate for guidance of the users and services personnel. However, it is recommended to develop this literature in other Indian regional language as per IS:8132-1983 to meet the regional requirement.