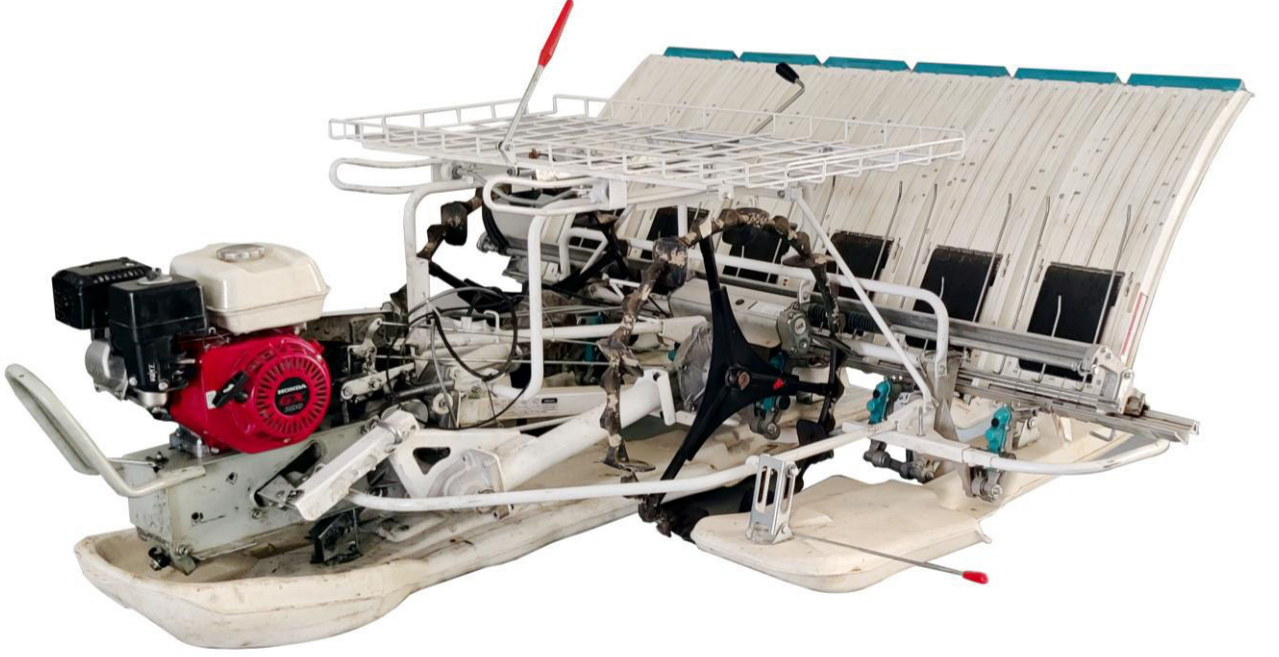


व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: MACHINE-37/2751/2021  
माह/Month: September, 2021

**THIS TEST REPORT VALID UP TO : 30<sup>th</sup> September, 2026**



**XTRA-POWER, XP-PT-001, SELF PROPELLED,  
WALK BEHIND TYPE  
PADDY TRANSPLANTER**



भारत सरकार

**Government of India**

कृषि एवं किसान कल्याण मंत्रालय

**Ministry of Agriculture and Farmers Welfare**

कृषि, सहकारिता एवं किसान कल्याण विभाग

**Department of Agriculture, Cooperation and Farmers Welfare**

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

**Northern Region Farm Machinery Training and Testing Institute**

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## 9. MECHANICAL VIBRATION MEASUREMENT

Date of test : 20.07.2021  
Type of test surface : Plain Concrete Surface

Sl. no.	Measuring points		Vibration Micron	
			Horizontal displacement (HD)	Vertical displacement (VD)
1	Steering handle	Left	110*	73
		Right	97	72
2	Fuel tank cap		83	150*
3	Steering clutch lever	Left	180*	170*
		Right	131*	120*
4	Main switch		153*	130*
5	Gear shifting lever		99	144*
6	Main clutch lever		74	54
7	Planting clutch lever at transport lock position		77	50
8	Accelerator lever		75	68
9	Bumper		455*	255*
10	Quantity of seedling adjusting lever		380*	349*
11	Spare seedling platform		288*	145*
12	Float	Left	178*	164*
		Middle	112*	85
		Right	180*	172*
13	Engine mounting base		299*	230*

\* Amplitude of mechanical vibration is on higher side.

## 10. TURNING ABILITY

Characteristics	LHS	RHS
Minimum turning diameter (m)	1.33	1.31
Minimum clearance diameter (m)	2.33	2.03

## 11. FIELD PERFORMANCE TEST

Field test was conducted for 36.77 hours. Field was puddled by using tractor operated rotavator followed by leveler. Total six test trials were conducted in sandy soil. Conditions of test plot and nursery & the field performance results are given Annexure-I & Annexure-II and summarized in Table-1 & Table-2



Machine -37/2751/2021	<b>XTRA-POWER, XP-PT-001, SELF PROPELLED, WALK BEHIND TYPE PADDY TRANSPLANTER (COMMERCIAL)</b>
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**Summary of condition of field and nursery**

**Table-1**

Sl. No.	Parameters	Range
	<b>Condition of field</b>	
1	Type of soil	Sandy loam
2	Interval between last puddling and planting, days	2 to 3
3	Depth of puddle, cm	14.80 to 21.50
4	Depth of standing water over puddle, cm	4.50 to 6.50

Sl.No.	Condition of nursery	
1	Variety of paddy	PB-1121 and PB-1718
2	Type of seed bed soil	Sandy loam
3	Area of each tray, m <sup>2</sup>	0.148 to 0.252
4	Age of nursery, days	18 to 22
5	Leaf stage (no. of leaf)	2 to 3
6	Size of seedlings (thickness at base of root), mm	15 to 20
7	Length of root, cm	4 to 7

**Summary of performance results**

**Table-2**

Sl. no.	Parameters	Range
1	Average forward speed, kmph	1.38 to 1.46
2	Engine speed, rpm	
	No. load	2000
	On load	1970 to 1980
3	Average depth of transplanting, cm	4.30 to 6.00
4	Average travel reduction, %	7.69 to 10.20
5	Average spacing between rows, cm	30
6	Average number of plants per hill (nos.)	3 to 6
7	Average spacing between hills, cm	20.33 to 20.70
8	Average total number of hills in 1 m <sup>2</sup>	18.33 to 19.00
9	Percentages of transplanting faults in 1 m <sup>2</sup> %	
	- missed hills	0.33 to 1.67
	- Floating seedlings	0 to 0.67
	- Buried seedlings	0 to 0.33
	- Damaged seedlings	0 to 0.33





	- Total transplanting fault, %	0.99 to 1.67
10	Average area Covered ha/h	0.123 to 0.140
	Time required to covered 1 ha. h	7.14 to 8.13
11	Fuel consumption	
	- l/h	0.67 to 0.69
	- l/ha	4.79 to 5.45
12	Number of seedling trays consumed per ha	151 to 203

After loading the transplanter fully (full loading of the nursery on the seedling platform and carrier), the transplanting operation was done. Arrangements for loading the nursery mats was made at the ends of the plot. All the trials were conducted at the full accelerator setting of the engine as recommended by the applicant.

#### 11.1 Rate of work

The average area covered and time required to cover one hectare area recorded as 0.123 to 0.140 ha/h and 7.14 to 8.13 h respectively at the forward speed of 1.38 to 1.46 kmph.

#### 11.2 Quality of work

The quality of work was assessed by taking into consideration of the following parameters :-

- The average depth of transplanting was recorded as 4.30 to 6.00 cm.
- The spacing between row to row was recorded as 30 cm.
- The average number of plants per hill was recorded as 3 to 6.
- The average spacing between hills was recorded as 20.33 to 20.70 cm
- The average total number of hill in 1 m<sup>2</sup> was recorded as 18.33 to 19.00
- The average percentage of missing hills was recorded as 0.33 to 1.67 %
- The average percentage of floating seedlings was recorded as 0 to 0.67 %
- The average percentage of buried seedlings was recorded as 0 to 0.33 %
- The average percentage of damaged seedlings was recorded 0 to 0.33 %
- The total percentage of transplanting faults was recorded as 0.99 to 1.67 %

#### 11.3 Fuel consumption

The hourly fuel consumption was recorded as 0.67 to 0.69 l/h and fuel required for planting of one hectare area was recorded as 4.79 to 5.45 l/ha.

#### 11.4 Labour requirement

One skilled operator's is required for continuous operation of machine. One person is required for feeding nursery mats to machine and two persons for handling the nursery trays.

#### 11.5 Ingress of water and/or mud

After completion of field tests, the transplanter was partially dismantled to check the effectiveness of sealing provided against ingress of water and / or mud in various assemblies / components.

S. No.	Locations	Whether ingress of mud and / or water was observed
1	Engine oil	No
2	Main gear box	No
3	Planting box	No
4	Planting arm drive	No
5	Hydraulic system	No
6	Drive wheel chain case	No
7	Planting arms	No

### 12. EASE OF OPERATION AND ADJUSTMENT

No noticeable difficulty was observed in operation and adjustment during the field test.

### 13. BREAKDOWNS AND REPAIRS

No noticeable defect or breakdown was observed during test.

### 14. COMPONENTS / ASSEMBLY INSPECTION

The engine and transplanter was dismantled after 38.77 hours for components/assembly/inspection and assessment of wear of operation at this institute.

#### 14.1 Engine

##### I. Cylinder Bore



Cylinder	Cylinder bore dia. (mm)						Max. Permissible wear limit (mm)
	Top position		Middle position		Bottom position		
	Thrust side	Non Thrust side	Thrust side	Non Thrust side	Thrust side	Non Thrust side	
1	68.01	68.01	68.01	68.01	68.01	68.01	68.165

##### II. Piston

Piston no.	Piston dia. (mm)				Piston liner side clearance observed, mm	Max. Permissible wear limit (mm)
	At top		At skirt			
	Thrust side	Non Thrust side	Thrust side	Non Thrust side		
1	67.68	67.68	67.96	67.67	0.05	67.845



**14.3 Planter**

The gears of the main gear box, planting box and planting mechanism, seedling tray oscillating mechanism, chain cases and planting arms were dismantled and inspected visually. The observations are as under :-

**14.3.1 Main & planting gear box**

The transmission gears, bearings and shafts were visually inspected and no abnormal wear or damage of components was noticed. All components were found in satisfactory working condition.

**14.3.2 Planting arms**

All the four planting arms were dismantled and inspected visually. The arms, cams, bearings, springs and rod were found in normal working condition.

**14.3.3 Seedling platform**

The seedling platform were visually inspected and found in normal working condition.

**14.3.4 Chain case and wheels**

The chain cases of drive wheels were visually inspected. The chains, sprockets and bearings were found in normal working condition.

**14.3.5 Floats**

All the three floats were examined visually for cracks, punctures, etc and found in satisfactory working condition. No mud or water entered inside the floats.

**14.3.6 Hydraulic system**

All components of hydraulic system were inspected visually and found to be in satisfactory working condition.

**15. CRITICAL TECHNICAL SPECIFICATION**

Vide Ministry's communication No. 13-9/2019 - M&T, (I&P) dated 26.04.2019.



Sr. No	Parameters	Specification	Observed	Remark
1.	Type of machine	Manually operated walk behind / self propelled walk behind / self-propelled ride-on type	Self propelled, walk behind type	Conforms
2.	Working width (mm)	880 (min.)	1710	Conforms
3.	Type of planting mechanism	Finger type for mat type nursery / cup type for seeding cups	Finger type for mat type nursery	Conforms
4.	Number of rows	4, 6, 8	6	Conforms
5.	Row spacing (mm)	220 to 300	300	Conforms

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6.	Average hill spacing (mm)	120 to 250 (Adjustable)	203 to 207	Conforms
7.	Type and number of floats	Wooden plank / metallic sheet / PVC sheet / hollow plastic.	High Density Poly Ethylene/plastic 3 nos.	Conforms
8.	Angle of mat sliding board, (degrees)	45 to 70	50	Conforms
9.	Material of planting fork/fingers/tweezers	Stain steel type 4 and above	Stain steel	Conforms
10.	Provision for adjusting depth of planting	Must be provided.	Provided	Conforms
11.	Provision for adjusting hill spacing	Must be provided.	Provided	Conforms
12.	Provision for adjusting no of plants per hill	Must be provided.	Provided	Conforms
13.	Marking/labeling	The labeling plate should be riveted on the body of machine having name & address of manufacturer, country of origin, make, model, year of manufacture, serial number, size, required size of prime mover kW/hp	Provided	Conforms
14.	Literature	Operator manual, Service manual and Parts catalogue should be provided.	<b>Partially meet the requirement</b>	<b>Partially conform</b>

## 16. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

### 16.1 Engine rating test

- The average rated power in rating test of engine was observed as 3.69 kW at 3600 rpm against manufacturers declared power as 3.7 kW at 3600 rpm.
- The specific fuel consumption at average rated power in rating test was observed as 389.0 g/kWh.

### Governing test

- Momentary speed change in percentage of rated speed was observed as 6.22 percent.
- Permanent speed change in percentage of rated speed was observed as 5.42 percent.





**16.2 Noise Level**

Noise level at operator's ear level was recorded as 82.3 dB(A), and noise level at bystander level was recorded 70.8 dB(A). which is well within the maximum and danger limit of 85dB(A)/ 90 dB(A) respectively specified for continuous exposure of 8 hours.

**16.3 Mechanical Vibration**

The amplitude of mechanical vibration marked as (\*) on the relevant chapter are on drastically higher side. It is not just directly concerned with operator's health safety and comfort, but also adversely affect the useful life of the components. In view of above, this deserved to be given top priority for corrective action.

**16.4 Field Test**

The summary of field test is given in chapter 11 of this report.

**16.5 Components / assembly inspection**

**16.5.1** The engine was dismantled after 38.77 hours of operation and wear of critical components were observed within the limits.

**16.5.2** The main gear box, planting box, planting arm drive mechanism and bearings were dismantled after 38.77 hours of operation and found in satisfactory working condition.

**16.6 Safety Provisions**

The machine has the following safety provisions.

- A front bumper.
- Drive belt protective covers.
- A slip clutch (torque limiter) inside the planting arm case to protect the planter drive mechanism.

**16.7 Ease of operation and adjustments**

- All the controls, which are required to be used frequently are within the easy reach of the operator.
- The handling of machine was easy and stable and the operator can work continuously for about two hours.
- The planting depth, hill spacing and number of seedling per hill can be adjusted quickly.
- The seedling carrier is provided just above the engine for holding nursery trays. If the carrier is loaded fully with mat trays, operator's vision was obstructed.
- No other operational difficulty was noticed during the operation of the transplanter even in the smaller fields.
- One touch hydraulic swing system is provided to enable the operator to cross over the bunds and while turning the machine (even with full load) in the field.
- The machine is fitted with rubberized steel wheels and is stable in the field as well as on the road transportation.
- Two folding type markers are provided and can be operated by the operator while planter is in motion. One centre marker at spare seedling carrier frame is provided to guide the operator to drive planter in straight direction.
- The machine is provided with reverse field speed so that planting at corners / missing area can easily be done



**16.8 General Comments**

- The make of planting clutch and gear box is not specified. It should be looked into.
- The make of the gear box is not specified. It should be looked into.
- The make of final drive is not specified. It should be looked into.
- The make and model of the hydraulic pump is not specified. It should be looked into.
- The maximum permissible wear limit of piston ring side clearance is not specified. It **MUST** be looked into.
- Lighting system is not provided. It **MUST** be provided.
- Horn is not provided. It should be provided.
- The engine bonnet cover is not provided. It should be provided.
- The grade of grease is not specified. It **MUST** be specified.
- The make of steering is not provided. It should be looked into.


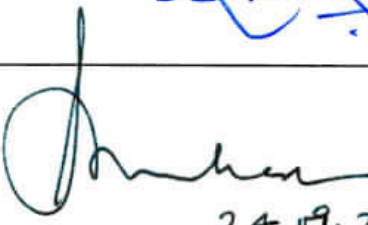
**17. TECHNICAL LITERATURE**

The following literatures are provided by the manufacturer.

- i. Operator's manual
- ii. Part's catalogue
- iii. Service manual

The manuals of machine should be updated as per IS:8132-1999.

**TESTING AUTHORITY**

G.R. AMBALKAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 24.09.2021

Test report compiled by E. Bhaskar, Senior Technician

**18. APPLICANTS COMMENTS**

We have noted the comments, we will take corrective action in future production.

