



# Operation Manual

**Goodrive12 Series Inverter**

**Special for Veneer Peeling Lathe**



SHENZHEN INVT ELECTRIC CO., LTD.

# Additional Manual of Goodrive12 Inverter Special for Veneer Peeling Lathe

Please read the manual carefully before commissioning the product. For more information, please download Goodrive300 operation manual from our website.

## 1. Product introduction

Goodrive12 inverter special for veneer peeling lathe is a special product developed on the platform of INVT Goodrive300 series products. Integrating the controller/PLC functions of the original control system inside the inverter, the product has the integrated control functions of rotary cutting and segmentation.

## 2. Type designation key

**GD12 – 5R5G – 4 – \* \***

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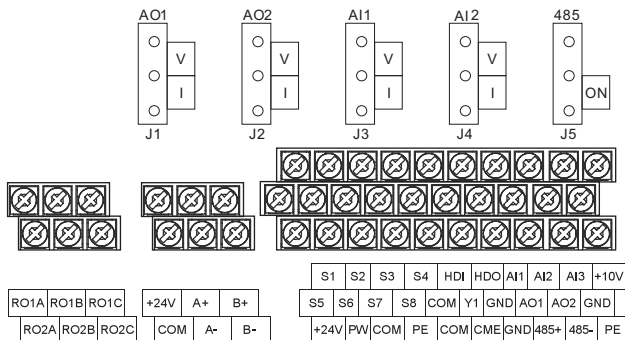
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Key	No.	Detailed description	Detailed content
Abbreviation	①	Product abbreviation	Goodrive12: inverter special for veneer peeling lathe
Rated power	②	Power range + Load type	5R5-5.5kW G—Constant torque load
Voltage degree	③	Voltage degree	2: 3PH AC 220V (-15%)~240V (+10%) 4: 3PH AC 380V (-15%)~440V (+10%) 6: 3PH AC 520V (-15%)~690V (+10%)
Lot number	④	Market lot number	Can be omitted

### 3. Wiring diagram of terminals



Terminal name	Description
+24V	Encoder power supply
A+, A-, B+, B-	Encoder signal input
COM	Encoder power ground

**Note:** For the voltage or current on the jumpers of AO1, AO2, AI1, AI2 and 485 terminals, please refer to 4.3.5 in *Operation Manual of Goodrive300 Inverter*.

## 4. Function codes

### 4.1 Run command channel and basic function group of motor parameters

Function code	Name	Detailed instruction of parameters	Default value	Modify
P00.00	Speed control mode	0: Sensorless vector control mode 0 (apply to AM and SM) 1: Sensorless vector control mode 1 (apply to AM) 2: SVPWM control (apply to AM and SM) <b>Note: AM-Asynchronous motor</b> <b>SM-Synchronous motor</b>	2	⊙
P00.01	Run command channel	0: Keypad run command channel (LED off) 1: Terminal run command channel (LED flickering) 2: Communication run command channel (LED on);	1	⊙
P00.03	Max. output frequency	Setting range: P00.04~400.00Hz	50.00Hz	
P00.04	Upper limit of running frequency	P00.05~P00.03 (Max. output frequency)	50.00Hz	
P00.05	Lower limit of running frequency	0.00Hz~P00.04 (Upper limit of running frequency)	0.00Hz	
P00.11	ACC time 1	0.0~3600.0s	Depend on model	○

Function code	Name	Detailed instruction of parameters	Default value	Modify
P00.12	DEC time 1	0.0~3600.0s	Depend on model	<input type="radio"/>
P00.15	Motor parameter autotuning	0: No operation 1: Rotation autotuning 2: Static autotuning	0	<input checked="" type="radio"/>
P02.01	Rated power of AM 1	0.1~3000.0kW	Depend on model	<input checked="" type="radio"/>
P02.02	Rated frequency of AM 1	0.01Hz~P00.03 (Max. output frequency)	50Hz	<input checked="" type="radio"/>
P02.03	Rated speed of AM 1	1~36000rpm	Depend on model	<input checked="" type="radio"/>
P02.04	Rated voltage of AM 1	0~1200V	Depend on model	<input checked="" type="radio"/>
P02.05	Rated current of AM 1	0.8~6000.0A	Depend on model	<input checked="" type="radio"/>

## 4.2 Additional function codes for veneer peeling lathe

Function code	Name	Detailed instruction of parameters	Default value	Modify
P05.01	S1 terminals function selection	Special for veneer peeling lathe 42: Start (pulse valid) 43: Stop (pulse valid) 44: Fast feed (switch valid) 45: Fast retract (switch valid) 46: Origin reset 47: Wood thickness shift 48: Wood length shift 49: Feed limit 50: Retract limit 51~63: Reserved	42	⊙
P05.02	S2 terminals function selection		43	⊙
P05.03	S3 terminals function selection		44	⊙
P05.04	S4 terminals function selection		45	⊙
P05.05	S5 terminals function selection		47	⊙
P05.06	S6 terminals function selection		48	⊙
P05.07	S7 terminals function selection		46	⊙
P05.08	S8 terminals function selection		49	⊙
P05.09	HDI terminal function selection		50	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify																				
P05.10	Polarity selection	<p>The function code is used to set the polarity of the input terminals.</p> <p>Set the bit to 0, the input terminal is anode.</p> <p>Set the bit to 1, the input terminal is cathode.</p> <table border="1"> <tr> <td>BIT0</td><td>BIT1</td><td>BIT2</td><td>BIT3</td><td>BIT4</td></tr> <tr> <td>S1</td><td>S2</td><td>S3</td><td>S4</td><td>S5</td></tr> <tr> <td>BIT5</td><td>BIT6</td><td>BIT7</td><td>BIT8</td><td></td></tr> <tr> <td>S6</td><td>S7</td><td>S8</td><td>HDI</td><td></td></tr> </table> <p>Setting range: 0x000~0x1FF</p>	BIT0	BIT1	BIT2	BIT3	BIT4	S1	S2	S3	S4	S5	BIT5	BIT6	BIT7	BIT8		S6	S7	S8	HDI		0x040	○
BIT0	BIT1	BIT2	BIT3	BIT4																				
S1	S2	S3	S4	S5																				
BIT5	BIT6	BIT7	BIT8																					
S6	S7	S8	HDI																					
P06.01	Y1 output	27: Drive roller running output	28	○																				
P06.03	Relay RO1 output	28: Wood cutting output 29~30: Reserved	27	○																				
P18 Group Special function group for veneer peeling lathe																								
P18.00	Veneer peeling lathe enable	0: Disabled 1: Enabled	1	◎																				

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.01	Starting of drive roller and rotary cutting	<p>0: Drive roller and rotary cutting start together</p> <p>After the command of start at the first time, drive roller and rotary cutting start simultaneously.</p> <p>1: Drive roller starts at first and then rotary cutting</p> <p>After stop, press the key Start at the first time, drive roller starts at first; press the key Start at the second time, rotary cutting starts.</p>	1	⊙
P18.02	Speed of drive roller	<p>Designated speed value of drive roller</p> <p>Setting range: 0.01~655.35</p>	110.76	⊙
P18.03	Diameter of drive roller	0.1~5000.0mm	99.0mm	⊙
P18.04	Center distance of drive roller	0.1~5000.0mm	100.0mm	⊙
P18.05	Cutting thickness 0	<p>Cutting thickness 0 and 1 can be selected via switch.</p> <p>Setting range: 0.01~100.00mm</p>	1.50mm	⊙
P18.06	Cutting thickness 1	0.01~100.00mm	1.80mm	⊙



Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.07	Length compensation of tool end	During adjusting the complete piece of wood, the value=wood cutting length—the last piece of wood length; the value can be adjusted properly according to the actual situation. Setting range: -1000~1000mm	0mm	⊙
P18.08	Thickness compensation	When there is a deviation between the actual thickness and the set value, the set value can be achieved via P18.08. Setting range: -50.00~50.00mm	0.00mm	⊙
P18.09	Feed pitch	0.01~50.00mm	10.00mm	⊙
P18.10	Core setting	When the log diameter at rotary cutting is smaller than the set core, retract automatically. Setting range: 0.1~1000.0mm	30.0mm	⊙
P18.11	Opening setting	When the log diameter at retract is larger than the set opening, stop retracting. Setting range: 0.1~6000.0mm	300.0mm	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.12	Cutting length 0	<p>Cutting length 0 and 1 can be selected via switch.</p> <p>The setting range of P18.12: 1~65535mm</p> <p>The setting range of P18.13: 1~65535mm</p>	600mm	⊙
P18.13	Cutting length 1	1~65535mm	800mm	⊙
P18.14	Cutting length coefficient	<p>When there is a deviation between the actual cutting length and the set length, the set length can be achieved via P18.14.</p> <p>Setting range: 0.01~600.00%</p>	100.00%	⊙
P18.15	Origin reset displacement point	0.1~6553.5mm	100.0mm	⊙
P18.16	Displacement compensation	<p>When there is a deviation between the detected displacement and the actual value, the set displacement can be achieved via P18.16.</p> <p>Setting range: -100.0~100.0mm</p>	0.0mm	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.17	Current displacement point of tool table (for detecting origin)	Before the tool table finds origin for autotuning, use caliper to measure current location of tool table, set the value to P18.17 and start autotuning on origin. Setting range: 0.1~6553.5mm	100.0mm	⊙
P18.18	Reserved	Reserved	Reserved	○
P18.19	Fast forward frequency	After the user presses the key Fast forward, the inverter will run forward fast at the speed. Setting range: 0.00 Hz~P00.03 (Max. output frequency)	50.00Hz	⊙
P18.20	Fast backward frequency	After the user presses the key Fast backward, the inverter will run backward fast at the speed. Setting range: 0.00 Hz~P00.03 (Max. output frequency)	50.00Hz	⊙
P18.21	Feed drive ratio	The value is the mechanical drive ratio of the system. Setting range: 0.01~100.00	14.68	⊙
P18.22	Encoder pulse	1~50000	600	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.23	Restart delay time after drive roller stops at retract	The drive roller stops for a while after retracting a certain distance and then it restarts to get the wood dust off the tool head. Setting range: 0.0~1000.0s	3.0s	⊙
P18.24	Retention time before roller starts at retract	The retention time can get the wood dust or other sundries off the tool head. Setting range: 0.0~1000.0s	200.0s	⊙
P18.25	Current displacement accumulated characteristic	If the displayed log diameter changes in the different way as the actual diameter changes, it indicates that displacement is accumulated oppositely, so P18.25 needs changing (change current value 0 to 1 or 1 to 0). 0: Positive characteristic 1: Negative characteristic	0	⊙
P18.26	Auto retract frequency	0.00Hz~P00.03 (Max. output frequency)	50.00Hz	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.27	Autotuning on origin and wood	<p>Before using veneer peeling lathe, ensure the accuracy of displacement and the correctness of origin reset value. 1 is autotuning on origin. When adjusting the last complete piece of wood, carry out autotuning on large and small wood;</p> <p>Range of large wood: 120~320mm;  Range of small wood: 120mm below;  Setting range: 0~3  0: Disabled  1: Autotuning on origin (combined with start command)  2: Autotuning on large wood  3: Autotuning on small wood</p>	0	⊙
P18.28	Cutting off timing	<p>Retract automatically, and stop after cutting off timing arrival.</p> <p>Setting range: 0.0~1000.0s</p>	0.0s	⊙
P18.29	Cutting thickness 0	<p>Cutting thickness 0 and 1 can be selected via switch.</p> <p>Setting range: 0.01~100.00mm</p>	1.50mm	⊙
P18.30	Cutting thickness 1	0.01~100.00mm	1.80mm	⊙

Function code	Name	Detailed instruction of parameters	Default value	Modify
P18.31	The first cutting delay counting	According to the location of the first cutting, ensure whether the last piece of wood is complete for the purpose of control accuracy on the first cutting. Setting range: 0~65535ms	500ms	⊙
P18.32	Tool head compensation	At the beginning of rotary cutting, the wood is a little thin. The parameter is used to maintain uniform cutting thickness. Setting range: 0.00~50.00mm	0.00mm	⊙
P18.33	Compensation time of tool head	Compensation time of tool head can be adjusted via P18.33. Setting range: 0~65535ms	0ms	⊙
P18.34	Compensation thickness of tool end	0.00~50.00mm	0.00mm	⊙
P18.35	Compensation length of tool end	0~1000mm	0mm	⊙
P19 Group Display function group				
P19.00	Log diameter	0.1~5000.0mm	500.0mm	●

Function code	Name	Detailed instruction of parameters	Default value	Modify
P19.01	Current cutting thickness	0.01~100.00mm	5.00mm	●
P19.02	Current displacement point of tool table	0.1~6553.5mm	100.0mm	●
P19.03	Cutting output frequency	0.00~P0.03	0.00Hz	●
P19.04	Current cutting length	1~65535mm	500mm	●
P19.05	Reserved variable	0~65535	0	●
P19.06	Cutting time	0~65535	0	●
P19.07	Calculated length	0.0~1000.0	0	●
P19.08	Original diameter at total cutting length counting	0.1~1000.0mm	0.0mm	●
P19.09	Actual length	0.0~1000.0	0	●

**Note:** During machine upgrade, AI2, AI3, AO2, RO2 and HDO are unavailable.

## 5. Operation instruction

### 1. Structure diagram of key components

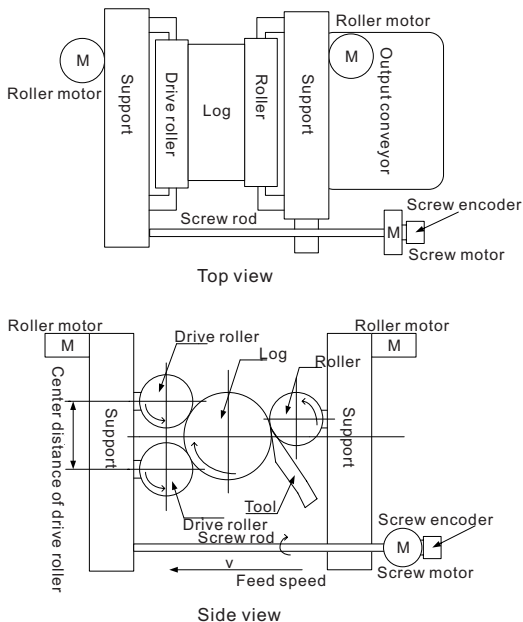


Figure 1

2. Press the key Start. The inverter starts working and the roller motor starts at first (the inverter outputs and the relay controls the contactor of the roller motor).
3. After the start of roller motor and the start delay time of screw motor, the screw motor starts. Press the key Fast forward and the screw motor will feed at fast



forward speed; otherwise, calculate feed speed by the actual log diameter (get the displacement of tool table via encoder input of screw motor, calculate the actual log diameter and work out feed speed of screw motor according to math model). When the cutting log diameter reaches the set remaining value, the roller motor will stop immediately. Simultaneously, the screw motor will retract at fast backward speed to close position (set opening position), feed again and cycle in turn. At retracting, when the stop time of roller motor is larger than the restart time, it will start again.

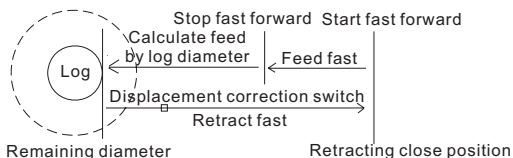


Figure 2

At feeding, press the key Fast backward and the screw motor will retract fast; while at retracting or calculating feed by log diameter, press the key Fast forward and the screw motor will feed fast immediately.

When the cutting log diameter reaches the set remaining value, the tool table often has interference during retracting fast in reverse direction, causing deviation to the monitored displacement. So, in the process of fast backward, the digital input of a photoelectric switch is taken as displacement correction.

After the beginning of rotary cutting, the inverter outputs signals to control the inverter special for veneer peeling lathe to perform cutting, simultaneously, calculate the wood length, output signals again to control cutting when the length reaches the set value, then calculate the length again and cycle in turn.

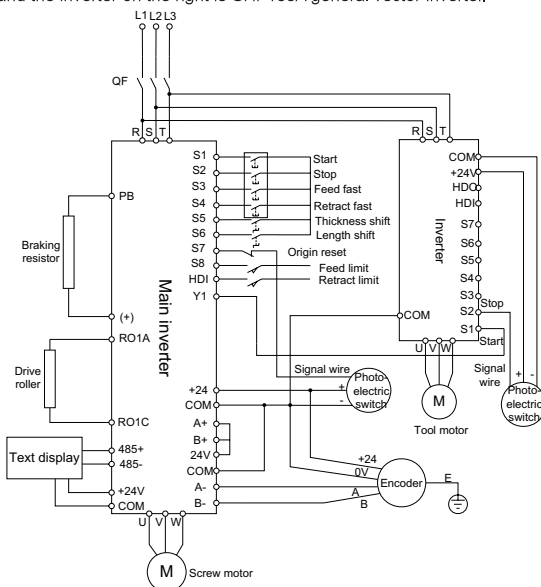
The cutting thickness and the cutting length can be shifted via the corresponding switch during rotary cutting.

At any time, press the key Stop and the inverter will stop outputting immediately.

## 6. Commissioning guideline

1. For speed measurement on roller motor and distance measurement on screw motor, there are various combining ways for encoders and electronic rulers. Currently, we adopt the way of single encoder (incremental encoder) and mount the screw encoder on screw rod.

2. The wiring diagram of veneer peeling lathe and inverter is shown below. (Note: The origin reset photoelectric switch to S7 should be NC switch to avoid interference of origin reset.) The main inverter is Goodrive12 inverter special for veneer peeling lathe and the inverter on the right is CHF100A general vector inverter.



**Note:** If A+ and B+ are external power supply, the voltage range will be 12~24V.

Figure 3

### 3. Operation procedure:

a) After inverter installation and wiring, inspect the functions of the keys on control panel such as start, stop, fast forward and fast backward, and check the moving direction of tool table. If the functions are inconsistent, adjust motor wiring; if the displayed log diameter changes in the different way as the actual diameter changes, adjust A and B wiring of the encoder.

b) Photoelectric switch (NC) inspection: Check whether the switch is normal and the wiring is correct via the on-off state of the indicator or check the functions via following autotuning on origin.

#### c) Static autotuning on motor

At first, set P00.01 to 0, then input the name plate of the motor into the inverter, and set the ratings of P02.01~P02.05 and P00.15 to 2 to begin static autotuning. (Note: Every time the parameter is set, remember to confirm by pressing the key ENT.)

After static autotuning, set P00.01 to 1 and both P00.11 and P00.12 to 0.3s.

#### d) Mechanical parameters and rotary cutting parameters setting

On the display, input the mechanical parameters of veneer peeling lathe including dual-axis center distance, feed pitch, feed drive ratio and encoder pulse; then input rotary cutting parameters including cutting thickness, core setting, opening setting and cutting length.

#### e) Autotuning on origin

After parameters setting, measure the distance between current tool table and drive roller by ruler and input the value to current displacement point (for autotuning on origin). Set P18.27 to 1 to begin autotuning on origin.

After autotuning, find a place to measure the displacement of tool table and drive roller and compare the value (the measured displacement + the radius of drive roller) with the displayed displacement. The consistency of comparison indicates autotuning succeeded. If not, check whether the parameters are set incorrectly. If

any, modify the parameters and redo autotuning on origin.

f) Adjustment on cutting thickness

At first, set the cutting thickness in the display (unit: mm), then find a piece of wood for cutting, measure the thickness after cutting and compare the measured value with the set value. The consistency of comparison indicates no compensation. If not, conduct compensation via thickness compensation (positive number means minus and negative number means plus).

g) Adjustment on cutting length

At first, set the cutting length in the display (unit: mm), then find a piece of wood for cutting, measure the length after cutting and compare the measured value with the set value. The consistency of comparison indicates no compensation. If not, conduct compensation via cutting length coefficient (percentage). The length coefficient is: the set value/the measured value\*100%.

h) Autotuning on large wood

Find a larger piece of wood, peel off the wood, set P18.27 to 2 to begin autotuning on large wood and finish rotary cutting.

i) Autotuning on small wood

After autotuning on large wood, find a smaller piece of wood, peel off the wood, set P18.27 to 3 to begin autotuning on small wood and finish rotary cutting.

j) Adjustment on the last complete piece of wood

Ensure the last piece of wood is complete and measure the length. If inconsistent, conduct compensation via tool end compensation (positive number means minus and negative number means plus).

The completion of a~j steps indicates the end of commissioning and the normal beginning of rotary cutting.



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**Industrial Automation:** ■ Frequency Inverter ■ Servo & Motion Control ■ Motor & Electric Spindle ■ PLC

■ HMI ■ Intelligent Elevator Control System ■ Traction Drive

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201311 (V1.0)