

Metal-Asia

Commercial Proposal for Supply

Robotic Composite Layup Cells with CNC Control

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Executive Summary

Robotic Composite Layup Cells are integrated production systems built on industrial robot manipulator platforms with automated tape and fiber placement systems for manufacturing polymer composite components. These cells provide manufacturing flexibility, enabling processing of complex contoured parts with variable geometry without requiring dedicated fixed-purpose machinery. Metal-Asia.pw designs and delivers robotic layup cells tailored to your specific application requirements, with full project lifecycle support from audit through commissioning as part of our **Global Procurement Solutions** with **Direct Factory Access** and **Complete Supply Chain Transparency**.



Robotic layup cell with 6-axis manipulator for automated composite fiber placement

Process Capabilities of Robotic Layup Cells

Robotic layup cells combine the capabilities of AFP, ATP, and manual layup technologies. With 6 degrees of freedom from the robot and additional axes from the workpiece positioner, the cell can process complex geometries: double-curvature surfaces, internal cavities, structures with integral stiffeners and variable cross-sections.

Technical Specifications — Robotic Layup Cell

Parameter	Value / Range
Robot type	6-axis industrial manipulator
Robot payload	90-500 kg (cell-size dependent)
Reach	2500-4000 mm

Parameter	Value / Range
Positioning repeatability	+/- 0.05-0.08 mm
Number of additional axes	1-7 (linear track, rotary table, tilt-rotate table)
Tool type (end-effector)	AFP head (1-32 tow), ATP head (wide tape), or hybrid
Processable material width	3.175-300 mm (head-type dependent)
Supported materials	Thermoplastic prepregs (PEEK, PEI, PPS), thermoset prepregs, dry fiber
Heating type	Laser NIR, IR lamps, hot gas (configurable)
Laser power (when applicable)	2-6 kW
Layup speed	0.1-1.0 m/s
Layup accuracy (TCP)	+/- 0.1 mm
Maximum part envelope	up to 6000x2000x1500 mm (configuration dependent)
Maximum part weight on positioner	up to 5000 kg
Programming system	Offline CAD/CAM (CATIA, Siemens NX), teach pendant

Complete Equipment Scope of Supply — Robotic Layup Cell

Robotic Platform

Item	Description	Technical Specifications	Qty	Unit
1	6-axis industrial robot	Payload 90-500 kg, reach 2500-4000 mm, 6 rotation axes, IP65	1-2	pcs.
2	Linear track (7th axis)	Travel 2000-12000 mm, speed 1.5-2 m/s, positioning +/- 0.05 mm	1	set
3	Robot pedestal	Height 400-1000 mm, steel construction, vibration isolation, anchor mounting	1-2	pcs.
4	Rotary workpiece positioner	Payload 500-5000 kg, rotation speed 0-10 rpm, servo drive	1	pcs.
5	Tilt-rotate table (optional)	2 axes (tilt +/- 135 deg, rotate 360 deg), payload 500-3000 kg	1	pcs.
6	Workpiece gripper	Vacuum or mechanical clamp, adaptive, per customer drawings	1	set

Tooling System (End-Effector)

Item	Description	Technical Specifications	Qty	Unit
7	AFP placement head	8-32 tows, width 3.175-12.7 mm, individual feed and cut	1	pcs.
8	Or: ATP placement head	Width 75-300 mm, roller feed, cutting system	1	pcs.
9	Or: Hybrid AFP/ATP head	Combined, switchable configuration	1	pcs.
10	Quick tool changer	Pneumatic/mechanical changer, change time < 10 sec	1	set
11	Heating system	Laser NIR 2-6 kW or IR lamps, adjustable power	1	set
12	Thermal monitoring system	IR pyrometer + thermal imager, closed-loop, accuracy +/- 3 degC	1	set
13	Compaction assembly	Pneumatic drive, force 100-2000 N, width 50-150 mm	1	pcs.
14	Material feeding system	Electric drives, tension sensors, roller guides	1	set
15	Cutting system	CNC pneumatic knife, ultrasonic cutter (optional)	1	set
16	Creel system	4-32 spools, adjustable tension, brake mechanisms	1	set

Control System and Software

Item	Description	Technical Specifications	Qty	Unit
17	Robot controller	Industrial PC, multitasking OS, support for additional axes	1	set
18	Cell PLC	I/O modules, communication modules, 15" HMI	1	set
19	Operator HMI panel	Touch display 15-21", process visualization, diagnostics	1	pcs.
20	Offline programming software	CAD/CAM (CATIA, NX, Mastercam), CAD import, simulation, verification	1	lic.
21	Cell control software	Robot-positioner coordination, process control, data logging	1	lic.
22	Machine vision system	2D/3D camera, layup quality control, defect detection	1	set
23	Teach pendant	Portable panel 10", IP65, emergency stop, joystick	1	pcs.

Safety and Auxiliary Systems

Item	Description	Technical Specifications	Qty	Unit
24	Cell safety fencing	Perforated panels 2000-2500 mm, safety light curtains, interlock	1	set
25	Laser safety enclosure (for laser heating)	Shading panels per IEC 60825, indicators, emergency stops	1	set
26	Exhaust ventilation system	2000-5000 m ³ /h, filtration, vapor concentration monitoring	1	set
27	Laser chiller	5-15 kW cooling, temperature 18-22 degC	1	pcs.
28	Compressed air station	8-15 bar, 500 L receiver, dryer, filters	1	set
29	Fire suppression system	Smoke/heat detectors, gas-based extinguishing module	1	set
30	UPS	15-30 kVA, autonomy 15-30 min	1	pcs.

Customs Classification and HS Codes

HS Code	Product Description
8477.10.00	Industrial robot manipulators
8479.71.00	Machines for processing plastics materials
8515.11.00	Laser equipment for thermal processing
8479.89.97	Other machines with individual functions
8466.20.00	Parts and accessories for robots
9031.49.00	Automatic control instruments
8419.39.80	Equipment for thermal processing
9027.80.00	Instruments for physical analysis
8479.60.00	Heat treatment machines
9024.10.00	Machines for physical analysis

Engineering Audit and Project Design

Prior to robotic cell delivery, Metal-Asia.pw engineers conduct an [engineering audit](#) of your production facility to determine the optimal equipment configuration. The audit covers part portfolio analysis, throughput requirements, infrastructure evaluation, and cell layout development.

Technical Documentation Package

- Technical specification for robotic layup cell
- Technical datasheets for all components

- Process layup card
- Cell layout with equipment placement and safety zones
- Operation and maintenance manuals in English

Factory and Site Acceptance Testing

- FAT at manufacturer's facility
 - Robot-positioner coordination verification
 - Complex contoured sample layup testing
 - Laminate quality control (thickness, orientation, defects)
 - SAT at your facility
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Installation Supervision and Commissioning

[Installation supervision for robotic layup cells](#) includes the complete workflow from equipment unloading through production startup.

Commissioning Sequence

1. Robot(s), linear track, and positioner installation
 2. Geometric alignment and TCP calibration
 3. Placement head mounting and material feed adjustment
 4. Heating system connection and calibration
 5. Thermal monitoring system calibration
 6. Standard layup trajectory programming
 7. Safety system and light curtain setup
 8. Operator and process engineer training (40-80 hours)
 9. Trial production run and final acceptance
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Integrated Service Portfolio

Metal-Asia.pw provides comprehensive [procurement services from China](#) with worldwide delivery.

- [Engineering audit](#) — requirements analysis, technical specification, layout
 - [Equipment sourcing](#) — optimal cell configuration
 - [Customs and logistics](#) — delivery and customs clearance
 - [Manufacturer audit](#) — reliability verification
 - [Integrated engineering systems](#) — auxiliary equipment
 - [Installation and commissioning](#) — full handover
 - [Composite production lines](#) — full catalog
 - NDT quality control (UT, RT), chemical composition verification
 - Documentation for customs clearance and regulatory compliance
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Why Metal-Asia.pw: Direct Access, Full Transparency

Criteria	Direct Procurement from China	Metal-Asia.pw Turnkey Delivery
Manufacturer verification	No on-site audit capability	In-person visit, capacity verification
FAT at factory	Difficult to organize	Full oversight, video reporting
Documentation	Chinese language only	Complete English package
Customs clearance	Classification risks	Accurate HS codes
Installation and commissioning	Separate contract	Included in scope
Service and spare parts	Long lead times	Regional inventory, 72-hour response
Compliance	No certification support	CE/UL support, ASTM/ISO documentation
Personnel training	Not provided	40-80 hours on-site

Frequently Asked Questions (FAQ)

Q1: What advantages do robotic layup cells offer over dedicated machines?

Robotic cells provide manufacturing flexibility: a single cell can process a wide range of part geometries with different shapes without major reconfiguration. The 6 robot axes enable processing of complex contoured surfaces inaccessible to gantry systems. Investment in a robotic cell pays off for low-to-medium volume production (50-5000 parts per year).

Q2: How long does cell changeover take for a new part?

With offline programming, changeover takes 15-60 minutes (loading new program, tool change if needed, calibration). With teach pendant programming, changeover takes 2-8 hours depending on geometry complexity.

Q3: Can multiple placement head types be used in one cell?

Yes, with a quick tool changer the cell can operate with AFP heads (for complex geometries), ATP heads (for flat panels), and specialized tools (for fabric layup or stitching). Tool change time is under 10 seconds.

Q4: What are the floor and foundation requirements?

Requirements: reinforced concrete foundation minimum 200 mm thick, concrete class minimum C25/30, surface flatness per DIN 18202, Class N. Allowable foundation load minimum 500 kg/m². For high-precision cells, a foundation decoupled from the main floor with a deformation joint is recommended.

Q5: How is operator safety ensured within the cell?

Safety is ensured through multiple measures: physical cell fencing 2000-2500 mm height, safety light curtains at all entrances, door interlocks during robot motion, emergency stops (buttons and pull-cord), and laser safety enclosure when laser heating is used (per IEC 60825).

Q6: What is the service life of a robotic layup cell?

With proper operation and scheduled maintenance, robotic layup cells have a service life of 15-20 years. Robots have an MTBF of 50000-100000 hours. Placement heads require replacement of wear components (rollers, knives) every 2000-5000 hours.

Q7: Can the cell integrate with plant-level automation systems?

Yes, robotic cells support standard industrial communication protocols (OPC UA, Ethernet/IP, Profinet, Modbus TCP) and integrate with MES, ERP, and SCADA systems. Real-time data exchange on process parameters, equipment status, and product quality is supported.

Q8: What warranty coverage is provided?

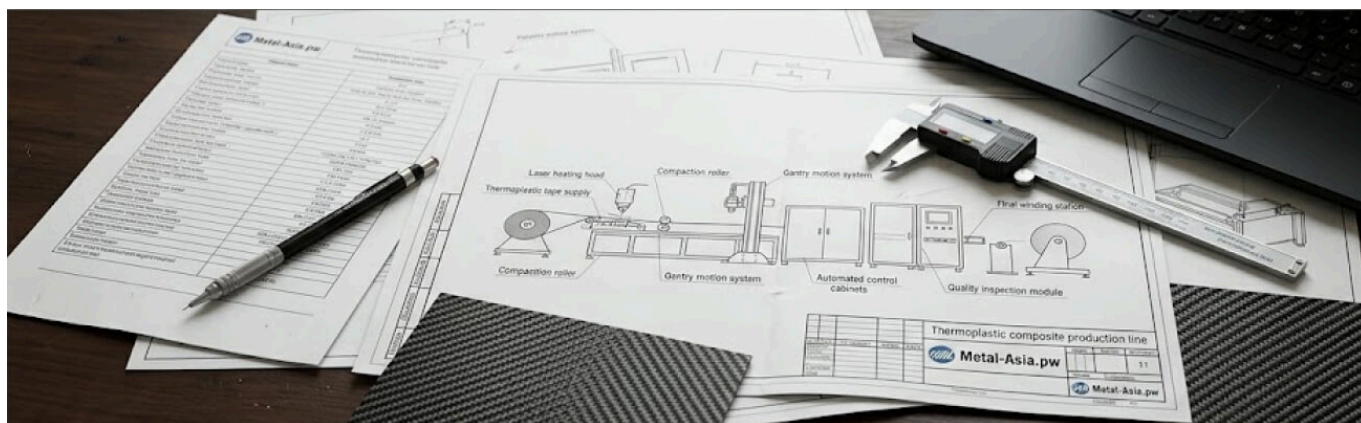
Warranty period is 12 months from commissioning or 18 months from shipment. Coverage includes: component replacement, engineer dispatch, remote support. Extended warranty and post-warranty service are available.

Contact Information

For robotic composite layup cell supply inquiries:

- **Official Website:** www.metal-asia.pw
- **Client Relations:**
 - WhatsApp: +86 132 50100874
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For our full service portfolio, visit Metal-Asia.pw.



Turnkey robotic composite layup cells from China with worldwide delivery and installation support