
AETEC PTE. LTD.



COMMERCIAL BUDGETARY QUOTATION

Robotic Nomex Honeycomb Assembly

ABB PoWa 20 with inspection and selectable adhesive application

Prepared by	Prepared for
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Reference	Issue date	Currency
AETEC-DSO-NOMEX-BQ-20260910-RevA	10 September 2026	SGD excluding GST

AETEC proposes one robotic assembly cell for pre-cut flexible Nomex, a nominal 1 m grid and 50 mm pitch. The common scope includes supported handling, independent fixture tension and inspection. Select one of the three commercial configurations below; do not add the package totals together.

Configuration	Included adhesive equipment	Budget SGD
Option 1 Spray	Spray head, automatic fixture shields and local extraction	433,600.00
Option 2 Drip	441-point metered needle head; no fixture cover hardware	400,720.00
Dual mode requested	Both heads, spray shields, extra profiler head and mode integration	461,300.00

These amounts are engineering budget estimates, not supplier quotations or a binding offer. Use an initial planning range of $\pm 25\%$; final scope, supplier quotations and actual-material trials determine the firm commercial offer. Budget reference only; no official QBook number is assigned.

CONFIDENTIAL COMMERCIAL DOCUMENT



1 Common equipment and tooling

The common scope is counted once in every configuration. Amounts include the described hardware as budget allowances; final make/model and quantities follow design freeze. The selected adhesive package is additional.

Item	Description	Qty	Unit SGD	Amount SGD
H01	ABB PoWa 20 CRB 1920-20/1.67, controller, pendant and standard robot software	1 set	65,000.00	65,000.00
H02	Raised robot pedestal and assembly cell structural frame	1 lot	12,500.00	12,500.00
H03	Keyed full-length strip magazine with pickup presentation and single-sheet sensing	2 set	6,400.00	12,800.00
H04	1,120 mm handling EOAT, 20 support zones, soft end grips, F/T sensor and local cameras	1 set	33,500.00	33,500.00
H05	Automatic robot coupler with three tool-side plates, lock sensing and utility interfaces	1 set	13,800.00	13,800.00
H06	Located 1 m open core carrier with fixed lower support rails	1 set	7,400.00	7,400.00
H07	Fixed datum clamp with replaceable paper pads	42 pc	140.00	5,880.00
H08	Floating spring clamp, guide, preload adjuster and back-off mechanism	42 pc	310.00	13,020.00
H09	Fixture jaw and spring-displacement sensing with distributed I/O	1 lot	6,900.00	6,900.00
H10	Three retractable comb rails with actuation and position sensing	1 set	4,900.00	4,900.00

Equipment carried forward SGD 175,700.00

The 84 end clamps comprise 42 datum units and 42 independent spring units. H09 covers their feedback and I/O. H04 includes the local EOAT cameras; H12 covers the separate overhead inspection cameras. These are separate functions.



2 Inspection controls and engineering

Item	Description	Qty	Unit SGD	Amount SGD
H11	Three-position tool parking rack and located tool nests	1 set	2,800.00	2,800.00
H12	Overhead inspection camera with lens, lighting and mount	4 set	3,200.00	12,800.00
H13	Vision processor, camera integration hardware and image record interface	1 set	6,800.00	6,800.00
H14	Laser profiler controller and one sensor head on the selected adhesive tool	1 set	16,500.00	16,500.00
H15	PLC, HMI, electrical cabinet, power distribution and standard cell wiring	1 lot	17,200.00	17,200.00
H16	Cell safeguarding, interlocks, safety control and protective-function design allowance	1 lot	14,800.00	14,800.00
H17	Shared vacuum and pneumatic services, regulators, valves and manifolds	1 lot	6,200.00	6,200.00
H18	Supported carrier parking and cure trolley	1 set	3,800.00	3,800.00

Common hardware subtotal SGD 256,600.00

Engineering and integration

Item	Description	Qty	Unit SGD	Amount SGD
E01	Nomex handling and adhesive coupon development	160 h	90.00	14,400.00
E02	Mechanical detail design and robot/tool load review	300 h	85.00	25,500.00
E03	Electrical and pneumatic detail design	140 h	85.00	11,900.00
E04	Robot, PLC and vision integration for common assembly and inspection	360 h	95.00	34,200.00
E05	Machine assembly, wiring support and alignment	240 h	75.00	18,000.00
E06	Workshop FAT, trial records and recovery verification	120 h	85.00	10,200.00
E07	Singapore site installation, SAT and operator training	96 h	95.00	9,120.00
E08	Technical documentation and AETEC static web app handover	40 h	85.00	3,400.00

Engineering subtotal SGD 126,720.00

COMMON BASE TOTAL SGD 383,320.00

Hours and rates are budget-estimating quantities for the defined scope. They do not establish an open-ended time-and-materials arrangement. Changes after design freeze require an agreed commercial variation.



3 Adhesive configuration details

Option 2 Intersection drip

Item	Description	Qty	Unit SGD	Amount SGD
D01	Metered needle valve, fluid reservoir, regulator and dispense controller	1 set	7,500.00	7,500.00
D02	Purge cup and shot-mass verification hardware	1 set	2,400.00	2,400.00
D03	Needle tooling, fluid routing and initial cleaning accessories	1 lot	1,800.00	1,800.00
D04	441-point recipe development, dose trials and dispense integration	60 h	95.00	5,700.00

Drip addition SGD 17,400.00 Complete drip cell SGD 400,720.00

The drip-only configuration omits shield leaves, lift/fold actuators, shield I/O and the spray containment/extraction allowance. The common profiler is mounted on the drip head. D04 covers the 441-point pattern, shutoff/retract sequence and dose trials.

Option 1 Spray with automatic protection

Item	Description	Qty	Unit SGD	Amount SGD
S01	Metered spray valve, fluid supply and atomizing-air control	1 set	8,700.00	8,700.00
S02	Rigid perimeter shield leaves with corner and edge protection	4 pc	1,200.00	4,800.00
S03	Guided 290 mm shield lift assemblies	4 set	1,150.00	4,600.00
S04	90 degree fold actuators and linkages	4 set	720.00	2,880.00
S05	Replaceable liners, outward drains and under-core catch tray	1 lot	4,100.00	4,100.00
S06	Shield sensing, pneumatic controls and sequence integration hardware	1 lot	3,600.00	3,600.00
S07	Local spray containment and extraction/filter unit allowance	1 set	14,000.00	14,000.00
S08	Spray/cover control integration and coating coupon development	80 h	95.00	7,600.00

Spray addition SGD 50,280.00 Complete spray cell SGD 433,600.00

The spray configuration includes four automatic perimeter leaves and the lower catch tray. Local spray panels/extraction are additional to the shared robot guarding. The allowance assumes a qualified non-flammable adhesive process; solvent/explosive-atmosphere equipment is outside this budget.

4 Dual mode total and optional additions

The requested dual-mode configuration installs both adhesive heads and retains the shields for spray. It uses separate fluid circuits. Drip leaves the shields stowed; spray requires all closed-position and extraction permissives. The additional profiler head avoids moving a sensor between tools.

Item	Description	Qty	Unit SGD	Amount SGD
X01	Additional profiler sensor head for the second adhesive tool	1 pc	6,500.00	6,500.00
X02	Dual-mode selection, separate fluid recipes and cross-calibration	40 h	95.00	3,800.00

Cost element	Amount SGD
Common base	383,320.00
Drip addition	17,400.00
Spray and cover addition	50,280.00
Dual-mode additions	10,300.00
DUAL-MODE BUDGET TOTAL	461,300.00

Planning range

Configuration	Lower planning value	Upper planning value
Spray	325,200.00	542,000.00
Drip	300,540.00	500,900.00
Dual mode	345,975.00	576,625.00

The $\pm 25\%$ range describes early estimating uncertainty and is not a contingency charge added to the quoted totals. No commercial discount has been assumed. GST, if applicable, is additional at the prevailing rate.

Separately selectable additions

Item	Description	Qty	Unit SGD	Amount SGD
O01	Extra complete tension carrier with clamps and sensing	1 set	33,200.00	33,200.00
O02	Additional cell-size recipe and change parts after a separate design review	1 lot	18,500.00	18,500.00
O03	Additional Singapore commissioning support	1 day	950.00	950.00

Optional additions are excluded from all package totals. O03 assumes one engineer, an 8-hour standard working day and local site access. Larger panels, different Nomex formats and extra process stations require separate assessment.

5 Deliverables schedule and acceptance

Included deliverable	Defined scope
Mechanical system	One ABB robot cell, full-length handling tool, one 1 m carrier, 84 clamps, two magazines and the selected adhesive equipment.
Controls and inspection	PLC/HMI sequence, robot program, tool identity, grip/tension feedback, camera inspection, height scan and adhesive release gate.
Engineering handover	Mechanical/electrical drawings, BOM, operating and recovery instructions, FAT/SAT records, technical proposal and Cloudflare upload package.
Trials and training	Workshop FAT and Singapore installation/SAT allowance listed in E06/E07; operator and basic maintenance training.

Indicative lead time

Allow **20 to 24 weeks** from order, agreed design inputs and receipt of representative material. Supplier availability, material feasibility and timely reviews control the release schedule.

Period	Primary activity
Weeks 1 to 4	Actual Nomex and adhesive trials; confirm blank geometry, inspection criteria and selected route.
Weeks 5 to 8	Freeze mechanism, robot load, optical arrangement, controls and cell layout.
Weeks 9 to 16	Procurement, fabrication, software development and machine assembly.
Weeks 17 to 20	Dry runs, full-size material trials, adhesive qualification and FAT.
Weeks 21 to 24	Installation, SAT, training and handover.

Acceptance is against a jointly agreed FAT/SAT protocol after the POC establishes feasible grip, insertion, inspection and adhesive limits. The animation time is not a contractual takt or yield guarantee. Agree the test quantity, dimensional limits, dose/coverage criteria, recovery cases and cured bond requirements before manufacturing release.

Manual replenishment of pre-cut magazines and supported carrier unloading are included as operator tasks. Automatic upstream cutting, bulk paper replenishment and a robot panel-unloading tool are not included.

6 Payment warranty and commercial terms

Proposed payment milestones apply to the selected package value. The example below uses the requested dual-mode budget; final milestone amounts follow the accepted quotation and purchase order.

Milestone	Share	Dual-mode example SGD
Purchase order confirmation	30%	138,390.00
Design confirmation	30%	138,390.00
Delivery	20%	92,260.00
SAT completion and handover	20%	92,260.00
Total	100%	461,300.00

Downpayment is due upon order confirmation. Progressive and balance invoices are proposed on Net 30-day terms. This budget is valid for discussion for 30 days from issue; firm pricing requires supplier confirmation and scope freeze.

Warranty and support

Proposed 12-month limited warranty from delivery for supplied equipment and workmanship, with remote troubleshooting during the warranty period. Wear parts, paper pads, needles, filters, adhesive, contamination, misuse and unauthorized modifications are excluded. Scheduled onsite visits and consumables are outside the stated warranty unless included in the final order.

Change control and ownership

Additional requirements or changes to the agreed blank, cell size, adhesive, inspection standard, throughput, site interfaces or operating conditions are subject to an agreed variation before work proceeds. Cancellation charges are based on completed work and committed materials and vendor costs.

Physical equipment transfers to the customer on full payment. Application software is supplied for the customer's internal use under the agreed commercial terms; AETEC retains its pre-existing software and engineering intellectual property. Delivery of editable engineering and controller source files is to be defined in the final order.

The technical proposal is the scope companion to this commercial estimate. No customer authorization, purchase order or supplier commitment is implied by the issue of this document.



7 Budget assumptions and exclusions

Basis	Budget condition
Material and blanks	Customer supplies released A/B drawings, actual pre-cut Nomex and sufficient adhesive/samples for handling, bonding and full-panel trials. Current 50 mm height and 0.13 mm thickness are provisional.
Adhesive	One qualified material system per installed head. Budget includes initial dispensing hardware; production resin, solvent cleaning systems and automatic two-component mixing are excluded.
Inspection	Four overhead cameras plus one common profiler/controller; dual mode adds a second head. Optical presence and height do not certify internal bond strength.
Site	One Singapore installation with ready power, clean dry air, network access and agreed access windows. Building works, incoming utilities and long external extraction ductwork are excluded.
Cure and output	Supported ambient cure parking is included. A thermal oven, controlled-humidity cure, skin bonding press and separate destructive-test machine are excluded.
Safety	Defined robot cell safeguarding and protective-function integration are included. Hazardous-area certification, solvent/explosive spray conversion and third-party certification are excluded.
Service boundaries	Production loss, facility shutdowns, overseas travel, extended site attendance and ongoing production consumables are excluded.

Price basis and next commercial release

All line rates are AETEC project-planning estimates prepared for this concept. No ABB, vision or dispensing supplier has issued a confirmed quotation for these amounts. Robot load and option compatibility, the 84-clamp implementation, adhesive qualification and optical performance remain major estimating variables.

The next commercial release should attach the finalized scope and supplier offers, replace allowances with negotiated values, assign the authorized AETEC quotation number, and agree customer acceptance and payment terms. The present detailed quantities make the estimate reviewable without treating provisional figures as committed supplier prices.