

机器人进入东南亚

五个国家、五个监管机构、一条从深圳工厂到机器人上岗的路径。每个国家的归类、关税、税收、进口资质、无线电核准、安全、电池和数据规则，每一条都给出背后的数字和来源。

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一台离开广东工厂的服务机器人，在东南亚五国海关眼里同时是三样东西：一台机器、一台无线电发射设备和一块锂电池。这三样在每个国家各有一套规则，而这些规则都是为别的产品写的。机器人借用工业机械的税则号、手机和路由器的无线电核准、笔记本电脑的运输规则，以及轮椅和叉车的安全标准。没有人把"机器人版"写下来，所以我们写了。

本文沿着图 1 的路径跟踪一台机器人。每一站给出五个国家各自的规定、要紧的数字和来源。我们自己用它来报到岸成本和交期，公开它是为了让深圳的厂商和雅加达的买家读的是同一页。

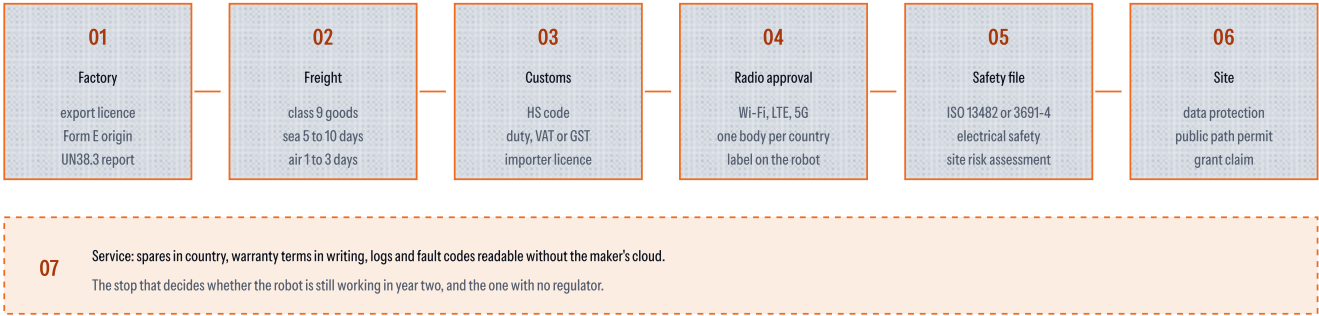


FIG 1 The seven stops. Stops 03 and 04 differ most between countries. Stop 07 is where most imported robots fail, and it is the one with no regulator.

01 归类、关税与税

关税取决于税则号，而机器人在税则号之间的位置很尴尬。协调制度里只有一个为机器人而写的税目：8479.50"未列名的工业机器人"，本意是汽车生产线上的机械臂。清

洁机器人或配送机器人通常按 8479.89"具有独立功能的其他机器"申报，或按 8428 搬运设备申报，而人形机器人根本没有定论。适用哪个税则号会改变关税，所以与报关行要敲定的第一份文件是归类裁定，至少是一份书面意见。

LINE	WHAT CUSTOMS MEANS BY IT	SG	MY	ID	VN	TH	CHINA ORIGIN WITH FORM E
8479.50	Industrial robots, not elsewhere specified. Written for arms on production lines.	0%	0%	5%	0%	0%	Indonesia 0% ● VERIFIED
8479.89	Other machines with an individual function. Where US Customs put AgiBot's humanoids and quadrupeds in ruling NY N356154, and where most service robots land. ³	0%	0%	5%	0%	0%	Indonesia 0%, Thailand 0% ● VERIFIED
8428.90	Other lifting and handling machinery. Argued for warehouse AMRs that carry goods. ⁴	0%	0 to 5%	5%	0%	0 to 5%	Indonesia 0%, Thailand 0%, Malaysia 0% ● VERIFIED
8508.11	Vacuum cleaners with a self-contained motor. Household robot vacuums, and the trap for a commercial cleaning robot described carelessly.	0%	20%	10%	25%	10%	Vietnam 5%, others 0% ● VERIFIED

中国东盟自由贸易区对原产于中国的大多数机械免除关税，前提是货物附有中国签发机构出具的 Form E 原产地证。省下的是整个最惠国税率，所以开不出 Form E 的厂商，无论自己知不知道，报的都是更高的到岸价。增值税或商品及服务税在每个国家都在进口时征收。在新加坡、印度尼西亚、越南和泰国，注册企业可以抵扣，因此只是现金流成本；马来西亚的销售税是单一环节税，不能抵扣，在那里是机器人价格上实实在在的成本。

COUNTRY	DUTY ON A SERVICE ROBOT (8479.89)	TAX AT IMPORT	OTHER LEVIES	IS THE TAX A FINAL COST?
Singapore	0%. Only liquor, tobacco, vehicles and petroleum are dutiable. ⁷ ● VERIFIED	GST 9% on CIF value since 1 January 2024. ⁸	None. Import GST can be suspended under the Major Exporter and similar schemes. ⁹	No, for a GST-registered buyer.
Malaysia	0% MFN. ● VERIFIED	Sales tax. Industrial machinery moved from 0% to 5% on 1 July 2025; unlisted goods pay 10%. ¹⁰ The exact rate for each 8479 line after the 31 July 2026 amendment is unconfirmed. ● REPORTED	Manufacturers importing machinery for their own production are exempt under Sales Tax Policy 4/2025. ¹¹	Yes. Sales tax is single stage and is not credited back, so it is a real 5 to 10% on the robot's price.
Indonesia	5% MFN, 0% with Form E. ● VERIFIED	VAT 12% on a deemed base of eleven twelfths, an effective 11%. ¹²	Income tax prepayment PPh 22: 2.5% of import value with an importer identification number, 7.5% without. ¹³	No. VAT is credited and PPh 22 is a prepayment of the importer's own income tax.
Vietnam	0% under Decree 26/2023 for 8479.50 and most 8479.89 lines. ¹⁴ ● REPORTED	VAT 10% standard, cut to 8% for most goods from 1 July 2025 to 31 December 2026 by Resolution 204/2025. ¹⁵ Whether robots sit in an excluded group is unconfirmed.	Special consumption tax not checked.	No, for a VAT-registered buyer.
Thailand	0% MFN. ● VERIFIED	VAT 7%, extended to 30 September 2027 by Royal Decree 807; the statutory rate is 10%. ¹⁶ ● REPORTED	Excise not checked.	No, for a VAT-registered buyer.

到岸成本算例

一台深圳离岸价 12,000 美元的清洁机器人，加 400 美元海运和保险，到港完税价格 12,400 美元。图 2 显示了按 8479.89 归类并持有 Form E 时各国政府在口岸加收的金额。新加坡在口岸收得最多，但对增值税注册的买家全部退还。马来西亚收得最少，但不退。印度尼西亚的税负看起来最高，直到你注意到其中三分之二会以增值税抵扣

和所得税预缴的形式回来，而没有 Form E 和进口商识别号的话会再高出 704 美元。

● ESTIMATE

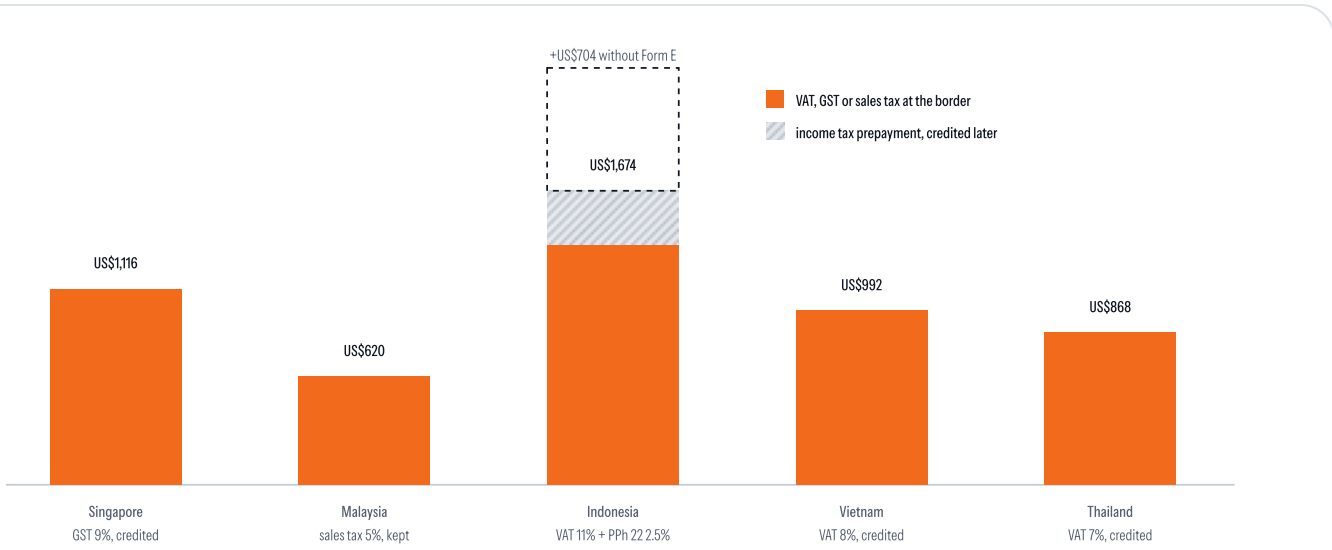


FIG 2 Border taxes on a service robot with a customs value of US\$12,400, entered under 8479.89 with Form E. Duty is zero in all five with Form E. Only Malaysia's sales tax stays a cost for a company buyer. ● ESTIMATE from the rates in the table.

02 谁可以进口

无论哪个国家，进口商都必须是目的国的公司。要求从新加坡的免费在线登记，到印度尼西亚按产品决定谁可以进口的许可制度，不一而足。

COUNTRY	IMPORTER OF RECORD	WHAT THE IMPORT NEEDS	ROBOT-SPECIFIC CATCH
Singapore	Any company with a UEN that activates a Customs Account, free, online. ¹⁷ ● VERIFIED	A customs permit through TradeNet for every shipment, filed by the importer or a declaring agent. ¹⁸	Radio equipment needs an IMDA dealer's licence on the importer's side, which TradeNet checks.
Malaysia	A Malaysian company.	Communications equipment is a restricted import under the Customs (Prohibition of Imports) Order 2023: the SIRIM QAS certificate of approval is applied for through ePermit before the goods clear. ¹⁹ ● REPORTED	Electrical equipment on the Energy Commission's list also needs a certificate of approval or an exemption letter. ²⁰
Indonesia	An Indonesian company with a business identification number (NIB) and the right importer type: API-U to import for resale, API-P to import inputs for its own production. ²¹ ● REPORTED	Goods must be new; used capital goods need separate approval under Permendag 24/2025. ²² Electronics listed in Permendag 21/2025 need an import approval and a surveyor report. ²³	Whether the robot tariff lines are on the 21/2025 list is the open question; the annex could not be read.
Vietnam	A Vietnamese company, including a foreign-invested one whose registration includes import rights. ²⁴ ● REPORTED	No general machinery licence. Used machinery only if under ten years old, under Decision 18/2019. ²⁵	Radio approval through a local applicant, see section 03.
Thailand	A company registered with Thai Customs for e-Customs, with a digital certificate. ²⁶ ● REPORTED	No general machinery licence.	Importers of certified radio equipment reportedly also hold an NBTC seller licence. ²⁷

没有一个国家把机器人、人形机器人或四足机器人本身列为限制进口商品。管制通过无线电模块、充电器、电池，以及（在印度尼西亚）可能通过电子产品清单触及机器人。作为"未发现"的结论，标注● **UNVERIFIED**。

03 无线电型号核准

每台服务机器人至少带一个无线电模块：Wi-Fi、蓝牙，通常还有 LTE 或 5G 模块，常还有 2.4 GHz 遥控器。每一个发射器都需要在每个国家取得电信监管机构的核准，

然后机器人才能销售、进口，在某些国家甚至才能开机。核准绑定型号，所以厂商在两个生产批次之间换了 Wi-Fi 模块，在五个监管机构眼里就是造了一个新产品。这是最常拖延首批发货的一步，因为在中国本土销售的厂商在国内不需要过这一关。

COUNTRY	REGULATOR AND ROUTE	WHO MAY APPLY	WI-FI AND BLUETOOTH	LTE AND 5G MODEM	VALIDITY, FEE, TIME
Singapore	IMDA equipment registration. ²⁸ ● VERIFIED	Only a holder of an IMDA telecommunication dealer's licence (individual licence S\$250 for five years). ²⁹ A foreign maker cannot register directly.	ESER, a free online self-declaration for short-range devices.	SER, a self-declaration for mobile terminals, S\$100 plus S\$50 per family.	Five years. GER, for high-interference kit, S\$350 to S\$500. Label "Complies with IMDA Standards" plus the dealer licence number. ³⁰
Malaysia	MCMC, certified through SIRIM QAS. ³¹ ● VERIFIED	A Malaysian-registered company; a foreign maker only through a local representative. ³²	Compliance approval for sale, or a Special Approval for trials, demonstrations and exhibitions that may not be sold locally. ³³		Five years on a certificate we read for a Wi-Fi and Bluetooth board. ³⁴ Fees and times not published.
Indonesia	Komdigi (formerly Kominfo, SDPPI) under Permenkominfo 3/2024. ³⁵ ● VERIFIED	An Indonesian business with an NIB; a foreign brand appoints an Indonesian representative and files the appointment letter. ³⁶	Test reports from a designated domestic lab or a recognised foreign lab; Komdigi announced in June 2025 that most testing moves into Indonesia by end 2026. ³⁷		Three years. ³⁸ ● REPORTED Fees set as state revenue; current amounts not found.
Vietnam	Ministry of Science and Technology, which absorbed the information ministry on 1 March 2025; product list in Circular 29/2025. ³⁹ ● REPORTED	A Vietnamese-registered importer, distributor, subsidiary or compliance agent. ⁴⁰	Certification plus a declaration of conformity for radio transmitters; the CR conformity mark replaced the ICT mark on 31 December 2024.		Three years with a valid ISO 9001; about seven to eight weeks from a complete file. ⁴⁰
Thailand	NBTC. ⁴¹ ● REPORTED, all from test labs	A Thai person or company, or a Thai representative with power of attorney. ²⁷	Class B or a self-declaration for low-power short-	Class A for cellular.	No expiry; about eight weeks; foreign ISO 17025 reports to RED or FCC rules

COUNTRY	REGULATOR AND ROUTE	WHO MAY APPLY	WI-FI AND BLUETOOTH	LTE AND 5G MODEM	VALIDITY, FEE, TIME
			range devices.		accepted, sometimes with Thai frequency tests.

实际的顺序是先取得模块级核准：使用已认证 Wi-Fi 或蜂窝模块的机器人通常可以复用模块的测试报告，然后再为机器人整机作为宿主产品申请。我们在报交期之前，会向每家厂商索要模块型号及其在任何市场已有的证书。

04 产品安全与电池

本地区的电气安全规则是为消费类电器写的。机器人很少出现在受管制产品清单上，这意味着它很少被要求贴国家安全标志，也意味着要测试报告的是买家而不是监管机构。我们要求充电器和充电桩提供 IEC 62368-1 或 IEC 60335-1 测试报告，电池包提供 IEC 62133-2 报告。

COUNTRY	MANDATORY PRODUCT SAFETY SCHEME	DOES IT CATCH A SERVICE ROBOT?
Singapore	Consumer Protection (Safety Requirements) Registration Scheme: 33 categories of household electrical, electronic and gas appliances must be tested, registered and carry the SAFETY Mark. ⁴² ● VERIFIED	The scheme is for goods supplied to consumers. A commercial robot sold to a business sits outside it; its adapter or charger may not, and a product with a controlled and a non-controlled function is treated as controlled as a whole. ⁴³ We did not check the 33-item list line by line. ● UNVERIFIED
Malaysia	Energy Commission certificate of approval and the ST-SIRIM label for regulated electrical equipment under the Electricity Regulations 1994; the list includes household appliances, adapters, chargers and vacuum cleaners. ⁴⁴ ● REPORTED	The charger, and a cleaning robot that customs calls a vacuum cleaner.
Indonesia	Mandatory SNI standards; vacuum cleaners must meet SNI IEC 60335-2-2. ⁴⁵ ● REPORTED	No mandatory SNI for robots, humanoids or mobile robots found. ● UNVERIFIED
Vietnam	The amended Law on Product and Goods Quality in force from 1 January 2026 with three risk tiers; high-risk goods need certification against a national technical regulation. ⁴⁶ ● REPORTED	No robot-specific technical regulation found.
Thailand	TISI mandatory standards, about 136 categories in 2025, including lithium batteries and charging equipment. ⁴⁷ ● REPORTED	The battery and the charger, possibly, which is reason to ask the maker for TISI status before shipping.

电池的运输

机器人的电池决定它怎么走。锂离子电芯在任何承运人接收之前都需要 UN 38.3 测试摘要，由厂商出具。装在机器人里的电池按 UN 3481"设备内的锂离子电池"以第 9 类危险品运输，散装备用电池按 UN 3480。空运时 IATA 包装指南限制旅客和货物可携带的数量，超过 100 Wh 的电池未经航空公司批准不能进入旅客行李，这对想随身带一台演示机的工程师很要紧。IATA 2026 年指南中的数字：每块电池 100 Wh 以内适用较宽松的第二节规则，超过则是完整的第 9 类；与设备一同包装的电池，以及自 2026 年 1 月 1 日起作为电池驱动车辆运输的机器人，荷电状态不超过 30%；旅客可自由携带 100 Wh 以内的电池，100 到 160 Wh 需航空公司批准且备用电池最多两块，160 Wh 以上不得携带。⁴⁸ ● VERIFIED 人形机器人的电池包有几百瓦时，永远不能作为行李上飞机。海运时同样的电池按《国际海运危险货物规则》运输，附危险品申报。拿不出 UN 38.3 摘要和安全数据表的厂商，以前没有做过国际发货。

05 使用中的机器人：安全标准与公共空间

本地区没有哪个国家像给电梯或车辆发牌那样给服务机器人发牌。适用的是一般性的职业安全法、建筑规范，以及对公共道路上的机器人适用的道路或主动出行法。买家用国际标准填补空白：ISO 13482 个人护理机器人，ISO 3691-4 无人驾驶工业车辆及行为类似的移动机器人，ISO 10218 工业机械臂，ISO/TS 15066 协作机器人。新加坡把这些采纳为新加坡标准，并增加了自己的标准。

WHERE	RULE OR STANDARD	WHAT IT DOES FOR A ROBOT
International	ISO 10218-1 and -2, revised 2025, with the collaborative robot content of ISO/TS 15066 folded in. ⁴⁹ ● REPORTED	Industrial arms and cells. The reference for a humanoid working beside people in a factory until a humanoid standard exists.
International	ISO 13482, personal care robots, being replaced by a wider service robot safety standard at FDIS stage; publication by October 2026 unconfirmed. ⁵⁰ ● UNVERIFIED	The standard most service robot makers cite. Ask which edition the test report is against.
International	ISO 3691-4:2023, driverless industrial trucks, which names autonomous mobile robots in scope. ⁵¹ ● REPORTED	Warehouse and factory mobile robots.
Singapore	SS 713:2025 robot-to-lift and robot-to-door data exchange, promoted from TR 93:2021; TR 104:2022 safe use of mobile robots in warehouses; TR 130:2025 fleet interoperability; SS ISO 18646-2:2025 navigation performance. ⁵² ● VERIFIED	SS 713 is the one to ask a maker about: it is how the robot rides a lift without a human pressing buttons.
Singapore	Active Mobility Act: autonomous mobile robots count as motor vehicles and may not use public paths without an exemption order from the Minister for Transport through LTA; footpath limit 10 km/h; trials request by form to LTA. ⁵³ ● VERIFIED	Any delivery robot on a public footpath. Private premises are outside the Act. Punggol Digital District runs under a precinct-wide exemption, and an AV Act is planned for Parliament in 2027. ⁵⁴
Singapore	Workplace Safety and Health Act, with the WSH guidelines on safe use of machinery as the basis for a risk assessment. ⁵⁵ ● REPORTED	The site's duty, which the robot's safety file has to support.
Malaysia	Occupational Safety and Health (Amendment) Act 2022 in force 1 June 2024; the Factories and Machinery Act repealed; certificates of fitness remain for boilers, pressure vessels and lifting machinery. ⁵⁶ ● REPORTED	No robot-specific DOSH guideline found.
Indonesia, Vietnam, Thailand	No robot-specific deployment or public-path rule found. ● UNVERIFIED	General workplace law and the building owner's rules apply.

06 数据：摄像头、麦克风和视频去了哪里

每台服务机器人都在记录。用于导航的摄像头、用于语音的麦克风，以及把机器人和周围的人定位在某个时刻的日志。五个国家现在都有通用的个人数据保护法，把可识别个人的影像视为个人数据，其中三个国家限制把这类数据传到境外。一台为了"远程支持"把摄像头画面传到厂商在中国的服务器的机器人，在每个国家都构成跨境传输，运营方必须能够说明理由。

COUNTRY	LAW	SENDING ROBOT VIDEO ABROAD	BREACH NOTICE AND CEILING FINE
Singapore	PDPA. A video image of an individual is personal data; CCTV and recordings are covered in the Selected Topics guidelines revised May 2024. ⁵⁷ ● VERIFIED	Allowed when the overseas recipient is bound, usually by contract, to a comparable standard. ⁵⁸	Mandatory notification regime; fines up to 10% of Singapore turnover in the Act (not re-checked this pass).
Malaysia	PDPA as amended in 2024, phased in through 1 June 2025: data protection officer, breach notification, portability. ⁵⁹ ● REPORTED	Whitelist removed; allowed where the destination has a substantially similar law or under listed exceptions, with cross-border guidelines issued in 2025. ⁶⁰	72 hours; up to RM1,000,000 and three years' jail. ⁶¹
Indonesia	PDP Law 27/2022, with implementing regulation GR 33/2026 enacted 16 July 2026 and a compliance deadline of 16 January 2027. ⁶² ● REPORTED	Adequacy, then binding safeguards, then consent for limited transfers; the supervisory agency that would approve the first two does not exist yet, so consent is the working route.	72 hours; up to 2% of annual gross revenue.
Vietnam	Law 91/2025/QH15 in force 1 January 2026 with Decree 356/2025. ⁶³ ● REPORTED	Storing Vietnam-collected data abroad, or using a platform outside Vietnam to process it, is a cross-border transfer; a transfer impact assessment goes to the authority within 60 days of the first transfer.	Up to 5% of prior-year revenue for cross-border violations. ⁶⁴
Thailand	PDPA 2019, with cross-border notifications under sections 28 and 29 in force 24 March 2024. ⁶⁵ ● REPORTED	Adequate countries, otherwise binding corporate rules, standard clauses or certification; no adequacy list published.	Administrative fines up to THB 3 million, THB 5 million for sensitive data sent abroad. ⁶⁶

五个国家都没有一刀切地规定机器人视频必须留在境内。越南最接近，有备案义务和最高的罚款；印度尼西亚缺少监管机构，意味着中国厂商的标准远程支持条款在那里只能依靠同意。我们的合同要求很简单：视频和音频留在部署国境内，除非场地书面同意；厂商的远程访问有日志记录，运营方可以关闭。做不到这一点的厂商，卖不进这里的医院、学校或政府大楼。

07 桌上的钱

本地区各国政府补贴自动化，补贴额度大到足以改变买家的决定。补贴给的是本地买家，所以能在销售中用上它的，是厂商的本地合作伙伴。

COUNTRY	SCHEME	WHAT IT GIVES
Singapore	EDGE grant, open since 30 September 2026, replacing PSG, EDG and MRA. ⁶⁷ ● VERIFIED	Up to 70% of cost for SMEs and 50% for others, capped at S\$100,000 per company per year, within which S\$30,000 for single-function digital solutions and selected automation; the buyer must be Singapore-registered with at least 30% local ownership. ⁶⁸ Separately, a 400% tax deduction on up to S\$50,000 of AI spending a year for YA2027 and YA2028. ⁶⁹
Malaysia	Automation capital allowance. ⁷⁰ ● REPORTED	200% allowance on the first RM10 million of qualifying automation spend, YA2023 to YA2027, for companies operating at least 36 months; Budget 2026 adds accelerated allowances on plant, machinery and ICT bought from 11 October 2025 to 31 December 2026. ⁷¹
Indonesia	Investment incentives. ⁷² ● REPORTED	Import duty and VAT exemption on machinery for promoted investments, a tax holiday for pioneer industries that reportedly name robotics, and an R&D super deduction up to 300%. Robot eligibility not confirmed on a regulator site.
Vietnam	Law 71/2025 on the digital technology industry, incentives from 1 July 2025. ⁷³ ● REPORTED	Import duty exemption on goods that form fixed assets and preferential corporate tax for digital technology producers; whether a robot buyer qualifies is unconfirmed.
Thailand	BOI Notification 4/2569, gazetted 31 March 2026, applications 2026 to 2027. ⁷⁴ ● REPORTED	Import duty exemption on machinery and a three-year corporate tax exemption worth 50% of automation and robotics investment, rising to 100% when at least 30% of machinery value comes from Thai automation makers.

08 文件清单，按顺序

首台设备发货前我们向厂商收取的材料。一周内能备齐全部材料的厂商已经准备好出口；备不齐的，无论价格如何，都还没有准备好。

- 1. **商业发票和装箱单**，写明厂商建议的税则号、与机器人铭牌一致的型号，以及电池的瓦时数。
- 2. **中国签发机构出具的 Form E 原产地证**，以适用中国东盟优惠税率。
- 3. **UN 38.3 测试摘要**和电池的安全数据表，以及给承运人的危险品申报。
- 4. **无线电模块清单**：机器人内每一个发射器的型号、频段、输出功率，以及在任何市场已有的证书。
- 5. **目的国无线电核准申请**，通过本地持证人提交，在船离港前启动。
- 6. **电气安全报告**：充电器、充电桩和电池包按 IEC 标准由认可实验室出具。
- 7. **机器人安全文件**：机器人设计所依据的标准、风险评估和厂商的安全手册。
- 8. **数据地图**：机器人记录什么、发到哪里、厂商哪些人能访问、如何关闭远程访问。
- 9. **书面的保修和备件条款**：按子系统划分的保修期、什么情况下失效、授权第三方能否维修、备件价格表，以及境内库存地点。
- 10. **维修手册、故障码表和诊断访问权限**，让运营方不用给深圳开工单也能让机器人保持运行。

我们没能确定的事

东盟没有公布过对人形或四足机器人的海关裁定，8479.89 的判断依据的是美国裁定。马来西亚 2026 年 7 月之后八位税号级别的销售税税率、印度尼西亚电子产品进口附件、印度尼西亚、马来西亚和越南的无线电核准费用和官方处理时限、泰国监管机构自己页面上的每一条无线电规定、新版 ISO 13482 的发布状态、泰国和越南对机器人的消费税，以及 2026 年的中国东盟协定税率，都还是开放问题。每解决一项我们就更新本页。

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