



QUALITY MANUALS | FIRST EDITION

IAF AFTERMARKET SPARE PARTS & INVENTORY MANUAL

Service availability across
the vehicle lifecycle

STABLE RELEASE

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Demand forecasting and inventory control
Part compatibility and distribution
Lifecycle planning, returns and assurance

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Publication identity and use

IAF Aftermarket Spare Parts & Inventory Manual

This manual provides the requirements, operating procedures and evidence framework for its defined automotive supply, distribution and packaging activities. Apply it through a controlled site implementation plan and equipment-specific work instructions.

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Reading and applying requirements

“Shall” identifies a requirement when adopted by a site, programme or agreement. “Should” identifies a recommendation. An example is illustrative; it is not a machine setting, test acceptance limit or completed operating record. Annex worksheets may be reproduced for controlled internal use.

Controlled implementation

Stable Release identifies the completed publication text. Site approval, process validation, competence authorization and equipment release are recorded when performed. A missing safety limit, test criterion or release authority prevents activation of the affected operation. Mandatory law, product requirements and validated equipment instructions remain applicable.

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Contents

Every entry links to its section. Page numbers include the cover.

1 Purpose, scope and service availability	5
2 Terms, lifecycle and stock states	6
3 Responsibilities and decision rights	7
4 Part master, catalogue and identifier control	8
5 Authenticity, sourcing and supplier assurance	9
6 Original, alternative and remanufactured part strategy	10
7 Fitment verification and controlled substitution	11
8 Demand history and data preparation	12
9 Segmentation and service policy selection	13
10 Forecast model portfolio and lifecycle drivers	14
11 Intermittent demand and declining activity	15
12 Forecast validation, uncertainty and overrides	16
13 Replenishment parameters and inventory position	17
14 Central, regional and distributor stock design	18
15 Distributor ordering and constrained-stock allocation	19
16 Receipt, condition classification and put-away	20
17 Warehouse preservation and cycle counting	21
18 Picking, packing and dispatch assurance	22

Contents - continued

Every entry links to its section. Page numbers include the cover.

19 Backorders, urgent repairs and service recovery	23
20 Customer returns, warranty and stock re-entry	24
21 Repairable units, cores and exchange inventory	25
22 Safety alert, recall and traceability response	26
23 MOL planning and service continuity	27
24 Phase-out, last-time buy and obsolete stock	28
25 Digital parts, software and information protection	29
26 Performance, audit and continual improvement	30
Annex A Part master and compatibility approval	31
Annex B Forecast selection and sparse-demand example	32
Annex C Reorder calculation and policy record	33
Annex D Cycle count and inventory discrepancy	34
Annex E Return, warranty and containment record	35
Annex F MOL review and last-time-buy decision	36
Annex G Implementation gates and document interfaces	37

Using the annexes

Enter actual values, evidence references, names and dates in the worksheets. A blank, unsigned or illustrative record is not proof of completion. Retain the record with its governing instruction and revision.

1 Purpose, scope and service availability

1.1 This manual governs automotive service parts from demand identification and sourcing through stocking, distribution, installation support, returns and end-of-service planning. It applies to manufacturers, central and regional warehouses, distributors, repair networks and contracted fulfilment services. Scope shall identify products, territories, channels and the vehicle populations supported.

1.2 The objective is to make the correct, safe and compatible part available when needed while controlling excess stock, obsolescence and loss. Availability shall be measured against actual customer need and usable inventory. Stock that is held, expired, incompatible or inaccessible shall not be presented as a service solution.

1.3 The system shall cover mechanical, electrical, electronic, body, glazing, trim, software-dependent and energy-storage parts as applicable. Include kits, consumables, repairable units, exchange cores and remanufactured products. Special handling, hazardous-goods, software and product-safety requirements remain applicable to each category.

1.4 The organization shall translate this manual into approved catalogue rules, replenishment policies, warehouse instructions, distributor agreements and service support procedures. Market-specific legal duties, customer commitments and validated product information determine the actual service horizon and technical limits; this manual does not create a universal support period.

1.5 IAF-MAN-SCL-001 governs physical supply and trade flows; IAF-MAN-IPC-001 governs packaging; IAF-MAN-OTC-001 governs connected-system and software controls. Membership, recognition, accreditation and mark permissions follow their separate IAF decision processes and are not automatically granted by using this manual.

2 Terms, lifecycle and stock states

2.1 A stock-keeping unit (SKU) is a controlled stock identity at the defined level of management. A part number identifies a product design or approved service identity; a SKU may also distinguish condition, pack size or ownership. The master shall explain the relationship rather than using these terms interchangeably.

2.2 MOL means the middle-of-life or in-service phase in this manual: vehicles are operating and require maintenance, repair and replacement support. It does not mean minimum order lot. Beginning-of-life covers introduction and launch; end-of-life covers controlled phase-out and the remaining service obligations. Production end and service end are separate events.

2.3 Demand is the customer or service requirement at its original need date. Sales and shipments are fulfilment outcomes and may understate demand during stockouts. A backorder is an accepted unfulfilled requirement. Lost sales, cancellations, warranty claims and returns shall be recorded separately to avoid a false demand history.

2.4 Inventory shall distinguish usable on-hand, allocated, available to promise, on order, in transit, inspection hold, quarantine, expired, core and scrap. Ownership, location, condition, serial or lot identity and customs restrictions are separate attributes. A returned core shall not be counted as a saleable replacement unit.

2.5 Service-level measures shall identify whether they describe immediate unit fill, complete order-line fill, on-time delivery or probability of avoiding a stockout during a replenishment cycle. These are different outcomes. A safety-stock factor linked to a cycle probability does not by itself establish the same percentage unit fill rate.

3 Responsibilities and decision rights

3.1 The Aftermarket Director owns service strategy, network coverage and lifecycle commitments. Demand Planning owns the forecast baseline and its validation. Inventory Planning owns approved stock policies and replenishment parameters. Procurement owns source continuity, commercial terms and supplier commitments.

3.2 Product Engineering owns compatibility, interchangeability, technical alternatives, approved repair content and supersession rules. Quality owns source acceptance, authenticity concerns, condition classification, nonconforming disposition and release. A buyer, salesperson or warehouse operator shall not approve technical equivalence through a commercial stock substitution.

3.3 Warehouse Management owns physical custody, location accuracy, preservation, picking and dispatch execution. Distributor Management owns network agreements, sell-through visibility and service performance. Customer Service owns accurate promises, order changes and communication. Finance owns valuation, provisions, credits, deposits and adjustment controls.

3.4 Product Safety or the designated recall authority owns safety-event escalation and recall decisions. Technical service specialists own authorized installation, coding and repair instructions. Information Security and Privacy control catalogue, customer, vehicle and software data. Competence and absence cover shall be documented for every release function.

3.5 Approval limits shall distinguish inventory policy, exceptional purchase, stock adjustment, customer credit, part substitution and product release. Conflicts of interest shall be declared and managed. Any employee may hold a suspect or unsafe part and report the concern without retaliation; commercial urgency does not enlarge technical authority.

4 Part master, catalogue and identifier control

4.1 The part master shall contain the approved part number, description, revision, condition class, unit, pack conversion, dimensions, mass, source, lifecycle state and product family. Add lot or serial requirements, manufacture and expiry data, storage conditions, transport restrictions, warranty basis and technical document links as applicable.

4.2 Catalogue fitment shall identify vehicle or equipment population using sufficient attributes such as model, build range, powertrain, market, left or right position, hardware revision and software dependency. A broad model-year label may be insufficient where variants overlap. Record the source and approval of fitment data.

4.3 Supersession shall distinguish one-way replacement, fully interchangeable replacement, conditional replacement and non-interchangeable redesign. A change from part A to part B does not prove that A can replace B. Define any associated kit, paired replacement, calibration, software or installation requirement.

4.4 Part identity shall remain separate from marketing claims and brand appearance. A product photograph or matching connector shall not establish compatibility. Barcode and label changes shall preserve legacy lookup and transaction history while preventing duplicate active identities for the same stock condition.

4.5 Master changes require Engineering and Quality review where technical meaning changes, and Planning or Finance review where stocking or valuation changes. Test the effect on open orders, kits, warehouse stock and distributor catalogues. Retain prior versions and the actual activation date so that shipped parts remain traceable.

5 Authenticity, sourcing and supplier assurance

5.1 Procurement shall buy through approved sources for the defined part family and condition. Verify legal identity, manufacturing or distribution role, traceable origin of supply, quality controls and ability to provide required evidence. An attractive price or familiar packaging is not sufficient assurance of product authenticity.

5.2 Risk assessment shall consider safety consequence, shortage pressure, market scarcity, prior counterfeits, unapproved brokers, relabelled stock and altered shelf-life data. Higher-risk purchases require stronger provenance and inspection. Keep commercial approval separate from technical acceptance of an exceptional source.

5.3 Incoming checks shall use relevant identity, packaging, serial or lot, physical, electrical or functional evidence. An authentication code shall be checked through the controlled process; possession of a copied valid code does not alone establish authenticity. Preserve the link between each received lot and its source documents.

5.4 Suspected counterfeit, stolen, tampered or misrepresented stock shall be physically and electronically held. Quality shall assess the affected population, previous shipments and required notifications. Do not return suspect stock to a source in a way that enables uncontrolled recirculation or destroys necessary evidence.

5.5 Supplier performance shall include authenticity, fitment accuracy, defects, delivery reliability, change notification and aftersales support. Scope reduction or suspension requires a recorded decision and containment of open orders. Approval shall be reassessed after significant site, source, design or ownership changes.

6 Original, alternative and remanufactured part strategy

6.1 The organization shall define each marketed condition and source category clearly. Original branded, original-equipment sourced, independently manufactured alternative, remanufactured, refurbished and used parts shall not be presented as interchangeable labels. Describe the actual provenance and processing without implying an approval that has not been obtained.

6.2 An alternative part shall be evaluated for intended function, fit, materials, performance, durability, safety, regulatory suitability and installation conditions. Engineering shall define evidence proportional to consequence. Dimensional similarity, a supplier equivalence list or a lower price does not establish suitability for every vehicle variant.

6.3 For safety-critical or software-dependent parts, approval shall address system interaction, diagnostics, calibration, hardware and software versions, security provisioning and field support. A mechanically fitting electronic module may still be incompatible or unsafe. Restrictions shall be visible before quotation and picking.

6.4 Remanufactured or repaired units require an approved process, acceptance criteria, traceable input, replaced components, test results and truthful condition marking. Define core eligibility and exclusions. Cleaning and repainting alone shall not justify a remanufactured claim or restore an unverified service life.

6.5 Commercial strategy may offer several approved options, but each shall state condition, compatibility, warranty basis and material limitations accurately. Customer acceptance does not waive mandatory safety or legal requirements. Keep condition classes and prices distinct in catalogue, inventory, invoices and returns.

7 Fitment verification and controlled substitution

Owner: Technical Service and Product Engineering, supported by Customer Service. Trigger: a parts enquiry, catalogue ambiguity, superseded item or proposed alternative.

Step / owner	Required action and evidence
1 Identify the application	Obtain the necessary vehicle or equipment identity, build attributes, installed part and repair purpose. Limit personal data to what is needed. Record missing or conflicting information before proposing a part.
2 Check the catalogue	Use the current controlled fitment and supersession data. Verify position, variant, hardware, software and market restrictions. Do not rely solely on a search-engine result, photograph or informal cross-reference.
3 Assess the option	For an alternative, confirm approved equivalence scope and associated kit, paired change, coding or calibration. Escalate any unverified application to Engineering. A distributor may not extend the approved scope itself.
4 Confirm the promise	Communicate the exact part, condition, availability, dependencies and installation requirements. Record any approved option selected by the customer. Never describe held or unconfirmed pipeline stock as immediately available.
5 Release fulfilment	Bind the approved choice to the order and warehouse pick. Prevent an automatic substitute from changing condition or technical compatibility. Preserve the approval and catalogue revision used for the decision.
6 Capture feedback	Record misfit, installation difficulty, diagnostic incompatibility and repeat failure. Hold affected catalogue applications when justified. Correct the master through controlled review and assess earlier shipments.

If fitment cannot be established, the order shall remain technically unresolved. Urgency may trigger expedited verification, but it shall not convert uncertainty into an unsupported compatibility claim.

8 Demand history and data preparation

8.1 Demand Planning shall assemble a consistent history by part, location, channel and period. Keep original order quantity and need date, shipped quantity, backorders, cancellation reason, lost-sales signals and stock availability. Reconcile unit conversions, split shipments and duplicate orders before model fitting.

8.2 Stockouts censor observed sales. Zero shipments during a stockout shall not automatically be treated as zero demand. Estimate unserved demand only through an approved method using available evidence, and retain the original observations, adjustment, uncertainty and reviewer. Do not manufacture demand to justify stock already purchased.

8.3 Separate recurring maintenance demand from campaigns, accidents, recalls, warranty spikes, promotions, fleet contracts and one-time bulk orders. Model exceptional events explicitly where possible. Removing outliers requires a recorded reason; genuine high-consequence demand shall not be deleted merely because it worsens forecast accuracy.

8.4 Returns shall be analysed as a distinct flow with reason and condition. Netting all returns against demand can hide fitment errors or create negative demand unsuitable for nonnegative models. Repeated orders from a customer seeking scarce stock shall be reconciled without losing the underlying unmet need.

8.5 Preserve time zone, calendar, observation frequency, missing periods and data revisions. Distinguish missing data from a verified zero. Maintain a frozen historical snapshot for each forecast evaluation so that later corrected data do not silently improve a past forecast score.

9 Segmentation and service policy selection

9.1 Segment parts by annual consumption value, demand frequency and variability, safety or service criticality, replenishment risk, lifecycle state and substitutability. A low-value intermittent component may be essential to restoring a vehicle. Financial value alone shall not determine the service priority.

9.2 For demand-pattern analysis, record the number of observation periods, nonzero demand events and variability of positive quantities. Average interval is observed periods divided by positive-demand events, when events exist. If no events exist, classify the evidence as insufficient or dormant rather than dividing by zero.

9.3 Criticality shall consider vehicle immobilization, safety consequence, contractual support, repair complexity and the availability of an approved alternative. Assign service policies at an operationally manageable level, with documented exceptions for critical parts. Review the classification after field failures or fleet changes.

9.4 The stocking decision shall compare local stock, regional pooling, central supply, make-to-order, repair exchange and supplier-held stock. Include realistic transport, inspection and repair lead times. A central pool cannot meet a short response promise if the validated delivery route takes longer.

9.5 Segment boundaries and service targets shall be approved, monitored and revisited. Do not use arbitrary universal thresholds as evidence that a specific part is safe to discontinue. Keep the rationale and financial exposure visible to the Aftermarket, Quality and Finance decision owners.

10 Forecast model portfolio and lifecycle drivers

10.1 Use a documented model portfolio suited to the available data. Candidates may include recent-average, last-period, seasonal baseline, exponential smoothing, event-based and installed-base models. Complex models shall demonstrate operational benefit against a simple baseline and shall not be selected solely for a better in-sample fit.

10.2 For stable recurring demand, assess level, trend, seasonality, calendar effects and known service campaigns. Forecast at a frequency consistent with replenishment decisions. Aggregation may improve signal, but the method for allocating a group forecast back to parts and locations shall preserve totals and meaningful differences.

10.3 Installed-base models shall identify supported vehicle population, age, usage, failure or maintenance incidence, repair propensity, parts per repair and channel capture. An approximate requirement can be built from population multiplied by event incidence and parts per event, with explicit uncertainty and timing. Avoid counting the same repair in both historical and campaign demand.

10.4 New-part forecasts shall use engineering expectations, analogous parts and early field evidence with wide uncertainty where warranted. For supersessions, map demand from the old part only within the approved replacement scope. A new number does not necessarily create a new independent demand population.

10.5 Forecast outputs shall include horizon, unit, data cut-off, model version, assumptions and uncertainty representation. Planning overrides shall have owner, reason, amount, expiry and subsequent evaluation. Automated forecasts support accountable decisions; they shall not silently change service commitments or last-time-buy quantities.

11 Intermittent demand and declining activity

11.1 For sparse demand, separate the size of a positive demand event from how often such events occur. One suitable candidate maintains a smoothed positive quantity and a smoothed interval between positive events. Update these states only when a positive event arrives; the ratio of quantity to interval estimates demand per period.

11.2 This interval-based candidate shall be initialized from observed data without future information. Define the first interval, smoothing parameters and treatment of missing periods. It can retain a positive forecast during long inactivity and may be biased; it shall not be assumed suitable for an obsolete or rapidly declining part.

11.3 A second candidate maintains a probability of positive demand and a mean positive quantity. Each observed period updates the probability toward 1 if demand is positive and toward 0 if demand is zero. The quantity estimate updates only for positive demand. Forecast demand per period is probability multiplied by positive quantity.

11.4 For the probability update, multiply the previous probability by (1 minus beta), then add beta for a positive event and add zero for a zero-demand period. Update positive quantity by weighting the old estimate by (1 minus alpha) and the new positive quantity by alpha. Select alpha and beta between 0 and 1 using historical validation, not universal defaults.

11.5 Missing observations shall not be treated as zero activity. Campaigns, stockouts and catalogue changes require separate handling. Validate the forecast and resulting stock policy through chronological testing and demand scenarios; a point forecast alone does not establish the distribution of demand during replenishment. Annex B includes a numerical example.

12 Forecast validation, uncertainty and overrides

12.1 Evaluate models by rolling the forecast origin forward through history. At each origin, train only on information then available and test the actual decision horizon. Randomly mixing future and past observations can leak information and is unsuitable for this evaluation. Preserve the baseline, candidate and override results.

12.2 Assess both forecast error and inventory consequences. Mean absolute error uses the average absolute forecast error. Weighted absolute percentage error uses total absolute error divided by total actual demand over the same evaluated population; if total demand is zero, report it as not applicable and use an absolute measure.

12.3 Bias shall state its sign convention. In this manual, positive aggregate forecast-minus-actual indicates overforecasting. Do not hide persistent overstock in a small average error produced by offsetting parts. Evaluate critical segments, new parts and sparse demand separately, with sample size and data limitations visible.

12.4 Uncertainty shall reflect demand variability, lead-time variation, lifecycle changes and exceptional events. Use suitable empirical scenarios or a validated statistical model. Do not attach a symmetric normal interval to a sparse nonnegative forecast without testing its suitability. Report tail risks that materially affect service or excess stock.

12.5 Approve a model or override only after reviewing service, stock, cost and operational feasibility. Monitor drift and define triggers for rollback, recalibration or manual review. Retain model version, training data, forecast snapshot and approval so that consequential inventory decisions can be reconstructed.

13 Replenishment parameters and inventory position

13.1 The stock policy shall identify review method, service objective, replenishment lead time, reorder point or order-up-to target, safety allowance, minimum quantity, pack multiple and maximum exposure. Parameters shall be owned and reviewed after supplier, demand, lifecycle or service changes. Separate commercial purchasing constraints from calculated need.

13.2 For a continuous-review policy, a reorder point covers expected demand during replenishment plus an approved uncertainty allowance. Under fixed lead time and independent period demand, the standard deviation over lead time equals period standard deviation multiplied by the square root of the number of periods. A selected factor times that value gives an illustrative safety stock under the model assumptions.

13.3 For variable, correlated or intermittent demand and lead time, use a validated lead-time-demand distribution or simulation. Do not simply apply a normal formula to every part. The chosen service measure and treatment of backorders shall be explicit; a cycle-service target and unit fill rate require different interpretations.

13.4 Define inventory position consistently: usable on-hand plus confirmed open supply minus outstanding unfilled demand. Do not subtract the same allocation twice as both reservation and backorder. Exclude expired, quarantined or technically incompatible stock; assess uncertain pipeline separately. Available-to-promise is a time-phased commitment measure, not the same calculation.

13.5 For periodic review, the protection horizon includes review interval plus replenishment lead time. Evaluate proposed orders against target position, pack multiples, minimum quantities, expiry, capacity and lifecycle exposure. Record an override when constraints force excess stock. Annex C provides a worked calculation and policy approval record.

14 Central, regional and distributor stock design

14.1 The network owner shall allocate stock across central, regional and distributor locations according to service need, demand pooling, transport reliability, handling capability and total exposure. Define which site stocks each class, which site replenishes it and the permitted lateral-transfer routes.

14.2 Network calculations shall distinguish external customer demand from internal replenishment. Do not sum distributor orders and the same end-customer consumption as two separate demands. Where only sell-in data are available, state the visibility limitation and monitor the risk of channel loading and hidden downstream inventory.

14.3 Central pooling can reduce duplicated stock but increases dependence on transport and central availability. Validate the promised response time including cut-off, pick, dispatch, transit and receipt. Critical local coverage shall be based on consequence and feasible emergency delivery, not a universal centralization rule.

14.4 Consignment, supplier-managed and distributor-owned stock require explicit ownership, access, consumption posting, insurance, count, return and obsolescence responsibilities. Physical possession does not automatically establish ownership or authority to transfer. Financial and operational views shall reconcile without counting consigned stock twice.

14.5 Rebalance stock using actual need, remaining life, compatibility, transport condition and ownership permissions. Evaluate whether a transfer merely moves excess inventory to another ledger. Record shipment and receipt under one linked transfer and investigate mismatches before the receiving location promises the stock.

15 Distributor ordering and constrained-stock allocation

Owner: Distributor Operations and Customer Service. Apply consistent rules to normal orders, replenishment proposals and supply shortages while respecting applicable commercial obligations.

Step / owner	Required action and evidence
1 Validate the order	Confirm distributor identity, authorized territory or channel where applicable, part, condition, quantity, unit and requested date. Resolve duplicates, incompatible kits and obsolete catalogue entries before acceptance.
2 Establish availability	Use released usable stock and credible time-phased supply. Check existing commitments, transport cut-offs and technical restrictions. Separate firm promise, estimate and unresolved backorder in the customer response.
3 Allocate fairly	When stock is constrained, apply the approved priority rules for safety, immobilized vehicles, contractual commitments and demonstrated need. Record exceptions and approve; prevent repeated speculative orders from capturing all stock.
4 Confirm the promise	State the exact quantity, part option, dispatch or delivery basis and open balance. Obtain agreement to material changes. Preserve the original need date and subsequent promise history.
5 Execute and reconcile	Bind allocation to the pick and shipment. Communicate shortages, split shipments and revised estimates. Update the open order only from actual events; a label print is not a dispatch confirmation.
6 Review behaviour	Monitor fill, cancellations, returns, downstream stock and urgent-order patterns. Correct catalogue or planning issues. Investigate persistent channel overstock and unsupported allocation overrides.

Commercial account holds and product-safety holds are separate statuses. Releasing one shall not silently release the other. Avoid sharing one distributor's confidential demand or pricing with competitors.

16 Receipt, condition classification and put-away

Owner: Warehouse Receiving with Quality. Every incoming unit shall be classified by identity, condition and acceptance status before entering saleable inventory.

Step / owner	Required action and evidence
1 Match the delivery	Reconcile purchase or transfer order, ASN, source, part, revision, unit and quantity. Record actual arrival and custody evidence. Preserve discrepancies instead of adjusting expected data to match the delivery.
2 Verify identity	Check approved source, labels, lot or serial mapping and relevant authenticity evidence. Distinguish new, remanufactured, refurbished, used and core condition. Hold ambiguous or conflicting identities.
3 Inspect preservation	Check damage, corrosion, contamination, protective packaging, environmental evidence and remaining life. Apply the defined inspection plan. Unopened packaging is not proof of acceptable storage history.
4 Assign disposition	Record released, inspection hold, quarantine or rejection status and the authorized decision. Required technical tests shall be completed before stock is treated as available for fulfilment.
5 Put away	Use an approved location compatible with mass, dimensions, security, preservation and hazard controls. Scan the physical location and quantity. Keep ownership and customs restrictions visible.
6 Close the receipt	Reconcile system quantity, exceptions, supplier claim and financial record. Escalate recurring errors. Preserve the receiving evidence and link it to future picks, returns and recalls.

Never mix new and returned stock under one undifferentiated bin balance. A supplier credit or purchase-order closure does not establish that a physically held part can be sold.

17 Warehouse preservation and cycle counting

17.1 Warehouse instructions shall define storage orientation, stacking, load limits, environmental conditions, contamination protection and access for each part family. Separate hazardous goods, batteries, pyrotechnic items, chemicals, tyres, glass and sensitive electronics where their risk controls require it. Use product-specific limits rather than generic warehouse assumptions.

17.2 Expiry and remaining-life controls shall remain linked to manufacture, receipt, opening and any authorized retest. Pick earlier-expiring usable stock when required. Repacking or moving a part does not restart its shelf life. Quarantine expired goods until competent disposition; do not extend dates by changing the label.

17.3 Cycle-count frequency shall reflect value, criticality, movement, prior discrepancies and access risk. Counts shall be independent of the recorded balance where practicable. Control transaction timing, in-progress picks, transfers and units of measure so that a timing difference is not mistaken for physical loss.

17.4 Investigate discrepancies before adjustment. Review receiving, picking, pack conversions, damage, unposted transfers, duplicate messages and unauthorized access. A count adjustment requires reason, evidence and approval within the defined authority; repeated small adjustments shall be assessed cumulatively.

17.5 Report location accuracy and quantity accuracy with explicit tolerances and denominator. Preserve original counts and recounts. Use Annex D to record the discrepancy and its closure. Product-safety or authenticity concerns discovered during a count require Quality containment beyond the accounting correction.

18 Picking, packing and dispatch assurance

Owner: Warehouse Fulfilment. Trigger: a released order or transfer. Output: a correctly identified, protected and traceable shipment with confirmed custody.

Step / owner	Required action and evidence
1 Release the pick	Confirm technical choice, quantity, condition, destination and any restrictions. Check allocations and required kit components. Prevent held or expired stock from appearing on a normal pick task.
2 Verify the item	Scan location, part, revision, lot or serial and quantity. Follow the approved expiry sequence. Resolve mismatches at the source; do not bypass the scan because the package appears similar.
3 Complete the kit	Verify all mandatory components, instructions and approved matched sets. Identify partial kits as incomplete. A missing seal, fastener or coding requirement can make an otherwise correct part unusable.
4 Pack and label	Use the qualified packaging instruction under IAF-MAN-IPC-001. Protect surfaces, terminals and sensitive functions. Preserve truthful product and condition labels and required transport markings.
5 Verify dispatch	Reconcile order, physical contents, pack count, destination and carrier suitability. Perform the defined independent check for critical or high-risk items. Record seal or tamper evidence where required.
6 Confirm custody	Record actual carrier handover, shipment identity and open-order balance. Provide tracking with its known status. Retain the part-to-customer linkage for service support and possible containment.

A printed shipping label or packed order awaiting collection is not a completed shipment. Returns instructions shall reflect the item's condition and transport risks rather than directing every part into ordinary parcel services.

19 Backorders, urgent repairs and service recovery

19.1 Backorders shall retain original need date, promised dates, customer consequence, part identity, quantity and reason. Distinguish supplier shortage, stock discrepancy, quality hold, technical uncertainty and transport delay. A backorder shall not disappear merely because the customer was asked to place a new order.

19.2 For an immobilized vehicle or other critical service event, confirm the real requirement and approved repair route. Assess available stock across the network, qualified alternatives, exchange units and credible supply. Urgency shall not justify a counterfeit-risk source, incompatible substitute or unauthorized software workaround.

19.3 Priority allocation shall use documented criteria and approval. Communicate realistic estimates and material changes to the affected customer or distributor. Keep forecast arrival, confirmed dispatch and delivered status distinct. Where uncertainty is high, state it in the service communication rather than issuing a false guaranteed date.

19.4 Emergency transfers and premium freight require review of technical acceptance, packaging, dangerous-goods conditions, ownership and trade requirements. Record cost and decision authority. The fastest mode may not accept the actual product condition, especially for batteries or regulated components.

19.5 After recovery, reconcile duplicate orders, unused emergency stock, credits and installation outcome. Review repeated shortages by cause and update stocking, supplier or catalogue controls. Track service restoration separately from shipment: delivery of a part does not prove that the vehicle was successfully repaired.

20 Customer returns, warranty and stock re-entry

Owner: Returns Coordinator with Quality and Finance. A return authorization permits a controlled receipt; it does not predetermine refund, warranty acceptance or resale suitability.

Step / owner	Required action and evidence
1 Authorize the return	Capture order, part, serial or lot, condition, reason and relevant installation history. Identify transport risks and give suitable return instructions. Do not request shipment of an unsafe item through an unapproved route.
2 Receive on hold	Verify returned identity and custody against the authorization. Photograph relevant condition safely. Keep returned goods physically and electronically separate from released new stock.
3 Assess the cause	Quality or Technical Service evaluates misfit, damage, defect, misuse, incomplete kit, counterfeit concern or no-fault-found condition. Preserve evidence and distinguish customer allegation from confirmed finding.
4 Decide disposition	Authorize return-to-stock, repair, remanufacture, supplier return, investigation or scrap. Re-entry requires verified identity, condition, remaining life and packaging. Installed or altered stock shall not be silently relabelled as new.
5 Settle commercially	Finance applies the approved credit, deposit or warranty decision with the contractual basis. Keep the financial outcome distinct from technical disposition and product-safety reporting.
6 Close and learn	Update stock, customer case, supplier claim and failure data. Link repeat failures to the affected population. Verify that re-entered stock carries the truthful condition and traceability.

No-fault-found is an investigation outcome, not automatic evidence that the customer's reported problem was impossible. Annex E records returns and containment decisions.

21 Repairable units, cores and exchange inventory

21.1 The exchange programme shall define eligible part families, core acceptance, deposit conditions, identity, required completeness and exclusions. Keep deposits and core ownership separate from saleable-stock valuation. A received core may have no recoverable value until inspected.

21.2 Core flows shall preserve original serial or lot, application, reported fault and condition. Segregate damaged, unsafe, contaminated or unidentified units. A remanufacturing partner shall receive an accurate description and the necessary handling information; an ordinary return label is not a technical acceptance.

21.3 Planning shall model exchange demand, core return delay, acceptance rate, repair yield, repair turnaround and condemnation. Do not assume one sale produces one timely usable core. Calculate serviceable supply from actual recoverable outcomes and test exposure when return or repair performance deteriorates.

21.4 Remanufacture shall follow an approved process with defined replaced components, inspection, tests, software state and release evidence. Preserve the lineage between input core, work performed and outgoing unit. A replacement serial scheme shall not erase provenance or permit the same unit to appear twice in inventory.

21.5 Review whether repair or reuse remains technically and economically viable during MOL and phase-out. Disposition condemned cores to prevent uncontrolled re-entry and protect stored data. Record actual recovery route, ownership clearance and destruction or material recovery evidence where required.

22 Safety alert, recall and traceability response

Owner: designated Product Safety authority, supported by Quality, Distribution and Customer Service. Trigger: credible safety information, an approved recall or a critical identity concern.

Step / owner	Required action and evidence
1 Escalate and preserve	Record the allegation or finding, affected product identity and available evidence. Escalate immediately through the defined route. Do not delay protective action until a complete root-cause report exists.
2 Define the population	Use part, revision, source, lot, serial, manufacture and shipment history to identify potentially affected stock and customers. State uncertainty and expand containment when the boundary cannot be established reliably.
3 Block movement	Apply physical and system holds across warehouses, distributors, in-transit stock and returns. Confirm receipt of instructions. A central-system block is insufficient if downstream parties can still dispatch independently.
4 Communicate and act	Issue authorized, accurate instructions through approved channels and fulfil applicable notification duties. Protect personal information. Define stop-use, inspection, replacement or other actions through competent product decisions.
5 Reconcile outcomes	Track quantities identified, contacted, held, recovered, repaired, replaced and unresolved. Prevent double counting across transfers. Keep evidence of completed corrective action for each required unit or population.
6 Verify closure	The accountable authority confirms completion criteria, unresolved exposure and continued monitoring. Release stock only through an explicit decision. Feed learning into sourcing, fitment, forecasting and record controls.

Exercise both backward and forward traceability. A mailing list or proof that a notice was sent does not establish that affected parts were recovered or corrected.

23 MOL planning and service continuity

23.1 During the in-service phase, Planning shall maintain a view of the supported vehicle population, age, usage, retirement, repair patterns and geographic distribution. Review how ageing changes failure incidence and how fleet retirement reduces future demand. Current vehicle production volume alone is a poor proxy for this service requirement.

23.2 Product Engineering shall maintain repairability, compatibility, supersession and diagnostic knowledge. Preserve approved service instructions, special tools, software dependencies and training. A stocked part cannot restore service if the required coding, security access or installation capability is no longer available.

23.3 Procurement shall review supplier continuity, tooling condition, material availability and declining-volume economics. Identify long-lead components and sub-tier obsolescence before they interrupt service. Maintain ownership and access rights for tooling and technical data needed for an approved contingency.

23.4 Service strategy shall consider continued manufacture, smaller batches, pooled stock, qualified alternative parts, repair exchange and remanufacturing. Additive or digital manufacture requires approved design rights, material, process and verification; possession of a drawing file is not permission or evidence of a conforming part.

23.5 MOL reviews shall connect field failure trends to forecast, stock policy, supplier actions and product safety. Record decisions and their impact on the full remaining service horizon. A temporary fall in sales shall not be treated as proof that the supported fleet has no continuing need.

24 Phase-out, last-time buy and obsolete stock

24.1 Phase-out begins with a documented trigger such as product redesign, supplier exit, tooling retirement or planned end of support. Identify the remaining legal, contractual and declared service commitments by market and product. Production discontinuation shall not automatically terminate spare-parts support.

24.2 A last-time-buy analysis shall cover the remaining service horizon, installed-base attrition, failure and repair scenarios, existing usable stock, credible open supply, repairable returns, approved alternatives, expiry and storage degradation. Use a range of outcomes and financial exposure; a single historical average is insufficient for a long uncertain horizon.

24.3 Define the decision sequence: verify obligations, review alternatives, calculate scenarios, assess storage and technical viability, approve quantity and funding, confirm supply quality, and monitor the residual population. Annex F records the evidence and accountable acceptance. Buying a quantity that cannot remain usable does not secure continuity.

24.4 Excess, slow-moving and obsolete stock shall be identified using demand, lifecycle, compatibility and condition. Distinguish accounting provision from physical disposal. A write-down does not remove product-safety or ownership obligations, and a low carrying value does not authorize uncontrolled resale.

24.5 Disposal or recovery requires authorization, traceability, environmental handling and prevention of counterfeit re-entry. Remove or control branding and digital identity as appropriate without falsifying product history. Retain evidence and update catalogue, inventory, tools and service instructions so that obsolete parts are not inadvertently reordered.

25 Digital parts, software and information protection

25.1 The aftermarket architecture shall connect catalogue, ERP, WMS, distributor ordering, service cases and returns with clear system ownership. Validate units, identities, status changes, duplicate handling and message reconciliation. A failed interface shall not expose quarantined stock as available or erase an open backorder.

25.2 Software-dependent parts shall carry the applicable hardware, software, calibration and entitlement requirements. Protect approved software packages, signing or provisioning services and per-device credentials. Warehouse staff shall not clone identifiers or reuse secrets to make an incompatible module appear functional.

25.3 Programming and secure provisioning shall follow approved technical methods and the relevant controls in IAF-MAN-OTC-001. Preserve identity, package version, authorization, test results and final state. A successful file transfer alone does not establish that an electronic replacement is fit for release.

25.4 Protect vehicle, customer, repair, pricing and technical information through role-based access and appropriate retention. Use only the data necessary to establish fitment and support the service. Shared portals shall prevent one distributor from viewing another's confidential transactions.

25.5 Continuity plans shall support controlled catalogue lookup, order capture, stock hold and later reconciliation during system outages. Test backups and restoration. Manual records require unique identities and approval; recovery shall prevent double shipment, duplicate credits and untraceable part-to-customer relationships.

26 Performance, audit and continual improvement

26.1 Management shall review immediate unit fill, complete-line fill, on-time delivery, backorder age, service restoration, inventory accuracy, forecast error, excess stock, returns and authenticity incidents. State the population, time window and exclusions. A high aggregate fill rate can conceal shortages of low-volume critical parts.

26.2 Financial measures shall use consistent cost and ownership bases. Inventory turns compare annualized cost of consumption or sales with average inventory value on the same basis. If the denominator is zero or the period is unrepresentative, explain the limitation. Do not compare retail revenue with cost-valued stock and label the result standard inventory turns.

26.3 Assurance shall trace sample orders from fitment decision through pick, shipment, installation feedback and return. Verify that incompatible substitutions, expired stock and held lots cannot pass normal fulfilment controls. Sample distributor records and physical inventory rather than relying only on central dashboards.

26.4 Personnel shall demonstrate competence for technical lookup, stock control, handling, returns, product safety and software-related tasks within their scope. Review competence after changes or errors. Management review shall occur at least annually and after material service or safety failures, with decisions and corrective-action effectiveness recorded.

26.5 Control all master data, forecasts, parameters, approvals, custody, recall and disposal evidence through IAF-GUI-DOC-001. Determine retention from product, legal and contractual needs and preserve investigation holds. Annex G provides the implementation gates and IAF policy interfaces.

Annex A Part master and compatibility approval

Form ASI-A. Part: _____ Revision: _____ Owner: _____ Catalogue release: _____
Effective date: _____

Field	Required entry
Product identity	Description / source / manufacturer identity / condition: _____
Stock identity	SKU / unit / pack conversion / lot or serial requirement: _____
Application	Vehicle, build range, market, position and variant: _____
Dependencies	Hardware, software, calibration, kit and paired replacement: _____
Supersession	Old and new identities / direction / restrictions: _____
Alternative approval	Function, fit, safety, performance and evidence scope: _____
Preservation	Storage, expiry, remaining life and special handling: _____
Supply and lifecycle	Approved source / lead time / MOL or phase-out state: _____
Customer information	Truthful condition, warranty basis and installation information: _____
Approval	Engineering / Quality / Planning / change record: _____

Excluded or unresolved applications: _____

Affected stock, orders and distributor catalogues reviewed: _____

A conditional replacement shall remain conditional in every downstream system. The approval does not extend to unlisted variants or an unverified reverse substitution.

Annex B Forecast selection and sparse-demand example

Form ASI-B. Part group / location: _____ Data cut-off: _____ Forecast horizon and period: _____ Owner: _____

Control	Entry
Data	History, zero periods, stockouts, returns and adjustments: _____
Candidate	Model, initialization, parameters and lifecycle assumptions: _____
Validation	Rolling origins, decision horizon, baseline and sample size: _____
Outcomes	Absolute error, bias, service and stock exposure: _____
Override	Amount, reason, owner, expiry and later evaluation: _____
Approval	Selected method, restrictions, model version and review: _____

Illustrative occurrence and quantity smoothing

Assume the current positive-demand probability is 0.25 and positive-event quantity is 4 units. Use $\beta = 0.10$ and $\alpha = 0.20$ for this example. The next-period forecast is $0.25 \times 4 = 1$ unit. These parameters illustrate arithmetic; they are not prescribed settings.

After an observed zero-demand period, probability becomes $0.90 \times 0.25 = 0.225$; positive quantity stays 4. The next forecast is 0.9 unit. After the following observed demand of 6 units, probability becomes $(0.90 \times 0.225) + 0.10 = 0.3025$; positive quantity becomes $(0.80 \times 4) + (0.20 \times 6) = 4.4$. The next forecast is $0.3025 \times 4.4 = 1.331$ units.

The updates use only observed periods. A missing-data period is not a verified zero, and the fractional forecast is an expected rate rather than an instruction to order a fraction of a part.

Annex C Reorder calculation and policy record

Illustrative continuous-review calculation

Assume independent daily demand with mean 20 units and standard deviation 6 units, fixed usable-stock replenishment lead time of 9 days and an illustrative uncertainty factor of 2. Lead-time demand is $20 \times 9 = 180$ units. Its standard deviation is $6 \times \text{square root of } 9 = 18$ units. Safety stock is $2 \times 18 = 36$; reorder point is 216 units.

If usable on-hand is 120, confirmed open supply is 80 and outstanding unfilled demand is 30, inventory position is $120 + 80 - 30 = 170$ units. This is below the reorder point. With a separately approved order-up-to position of 300, the unrounded requirement is 130. A 24-unit order multiple rounds this to 144, subject to minimum quantity, capacity, life and funding checks.

These values are illustrative. The calculation assumes a suitable demand model and fixed lead time. A factor of 2 is not a universal service guarantee. Do not double-subtract reservations already included in the 30-unit unfilled demand.

Policy approval field	Entry
Scope and method	Part / location / continuous or periodic review / service measure: _____
Data and assumptions	Demand, usable lead time, uncertainty and validation: _____
Parameters	Reorder point / target / review interval / order constraints: _____
Constraints	Expiry, maximum exposure, storage and lifecycle restrictions: _____
Decision	Planner / service owner / Finance / actual date: _____
Review	Trigger, next review and override history: _____

Annex D Cycle count and inventory discrepancy

Form ASI-D. Count: _____ Location: _____ Date / time: _____ Counter: _____
Transaction cut-off: _____

Record field	Entry
Identity	Part / revision / condition / owner / lot or serial: _____
Counting basis	Unit, pack conversion, method and in-progress movement control: _____
First count	Physical count and original evidence: _____
Independent recount	Recount / person / reason / reconciliation: _____
System comparison	Recorded balance / timing differences / true variance: _____
Cause investigation	Receipt, pick, transfer, damage, unit or access issue: _____
Product impact	Identity, expiry, safety or authenticity concern / hold: _____
Adjustment	Quantity / value / reason / authority and transaction: _____
Corrective action	Owner / due date / control change: _____
Closure	Verified location and status / effectiveness / date: _____

Quantity accuracy formula and tolerance used: _____

Reviewer: _____ Adjustment approver: _____ Closure: _____

Retain the first count even if a recount agrees with the ledger. Repeated discrepancies require investigation of the process, not repeated unexamined adjustments.

Annex E Return, warranty and containment record

Form ASI-E. Case: _____ Original order: _____ Part / serial or lot: _____ Returned condition: _____

Decision field	Entry
Reported issue	Customer account of fault, fitment or damage / date: _____
Return readiness	Authorization, transport condition and instructions: _____
Receipt	Actual identity, custody, condition and hold location: _____
Assessment	Tests, evidence, confirmed findings and unresolved questions: _____
Population	Related stock, shipments and potential safety exposure: _____
Containment	Physical and system blocks / parties notified / confirmation: _____
Disposition	Stock re-entry, repair, investigation, supplier return or scrap: _____
Commercial outcome	Credit, warranty, deposit and contractual basis: _____
Traceability closure	Units held, recovered, corrected and unresolved: _____
Authority	Quality / product safety where relevant / Finance / dates: _____

For a safety campaign, attach the authorized population, communications and unit-level completion log. Do not treat a sent notice or issued credit as evidence that corrective action reached the affected product.

Annex F MOL review and last-time-buy decision

Form ASI-F. Product family: _____ Review trigger: _____ Supported markets: _____
Decision owner: _____

Planning area	Evidence and decision
Service obligation	Remaining support horizon and basis by market or contract: _____
Installed base	Population, age, use, retirement and uncertainty: _____
Demand scenarios	Failure, maintenance, campaign and repair assumptions: _____
Existing supply	Usable stock, open orders, repair yield and return delay: _____
Alternatives	Qualified sources, supersessions, repair and technical restrictions: _____
Technical continuity	Tools, drawings, rights, software, coding and competence: _____
Storage viability	Expiry, degradation, preservation, space and retest basis: _____
Financial exposure	Scenario quantities, cost, excess risk and funding: _____
Decision	Approved buy or alternative / authority / conditions: _____
Monitoring	Consumption review, residual stock and end-of-service actions: _____

Scenario range and selected quantity rationale: _____

Engineering: _____ Aftermarket: _____ Finance: _____ Date: _____

Approval shall state assumptions and review triggers. It does not convert an uncertain long-term forecast into a guaranteed demand or service outcome.

Annex G Implementation gates and document interfaces

Implementation gate	Required evidence
1 Define the service	Supported population, territories, condition classes and commitments.
2 Establish identity	Approved catalogue, fitment, supersession and source controls.
3 Validate planning	Clean demand history, tested forecasts and approved stock policies.
4 Prepare operations	Storage, handling, fulfilment, returns, systems and competent people.
5 Pilot and release	Representative orders, traceability exercise, gaps closed and approval.
6 Sustain service	Performance, MOL reviews, safety response and corrective actions.

Operational acceptance

Scope / locations / open actions: _____

Evidence reviewed / acceptance decision / actual date: _____

Accountable operating director and technical approvals: _____

Controlled interfaces

IAF-QM-001 and IAF-GUI-DOC-001 govern quality oversight, controlled records and revisions. IAF-MAN-SCL-001 governs supplier, transport and trade flows; IAF-MAN-IPC-001 governs protective packaging and returns; IAF-MAN-OTC-001 governs connected systems and software provisioning. Battery-related handling also interfaces with IAF-MAN-GAA-001.

The applicable IAF privacy, whistleblowing, complaints, conflict and mark policies govern data, reporting, impartial decisions and public claims. This manual does not change admission or recognition rights. Assign record owners, retention triggers, access and disposal authority; preserve legal and product-investigation holds.