FREE SAMPLE

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1978 Yamaha XS650 Restoration Guide

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IRONHEAD

Yamaha XS650

1978

XS650E

Single-Year Restoration Guide

Key facts at a glance

Engine	654 cc air-cooled SOHC parallel twin, 75.0 x 74.0 mm
Power	53 hp @ 7,000 rpm
Induction	2x Mikuni BS38
Ignition	Contact-breaker points
Brakes	E Standard: dual 267 mm front discs, rear drum. SE Special: single 267 mm front disc, 267 mm rear disc
Drive	5-speed, chain final drive

A restoration companion to the factory service manual — **not a replacement**.

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Manufacturer history

Yamaha Motor Co., Ltd. was founded in 1955 at Iwata, Shizuoka, Japan, and launched its first motorcycle, the YA-1, the same year. Through the 1960s Yamaha built its reputation on two-stroke singles and twins that dominated production racing. The XS-1 of 1970 was Yamaha's first four-stroke motorcycle — a clean-sheet 654 cc SOHC parallel twin aimed squarely at the British 650 twins. That decision shaped the company's four-stroke line for a decade: the XS650 twin ran from 1970 to 1983 (continuing in some markets to 1985), and its technology fed directly into the XS750 triple and the XS1100 four that followed.

Model history

The Yamaha XS650 ran for fourteen US model years, 1970-1983, under five name families: XS-1/XS-1B (1970-71), XS-2 (1972), TX650/TX650A (1973-74), XS650B/C/D/E/F (1975-79), and the Special line (1978-83) with its budget Special II offshoot. Mechanically it is one continuous machine — a 75 x 74 mm air-cooled SOHC twin with a 360-degree crank — but the running changes are real and restoration-critical: kick-only to electric start (1972), front drum to disc (1972), single to dual front discs on Standards (1975) with US Specials on a single 267 mm front disc (1978-83), 34 mm to 35 mm forks (1978), rear drum to disc on the SE/F/SF/SG (1978-80) with Special II and later Heritage models on rear drums, points to TCI ignition (1980), and BS38 to BS34 carburetors (1980). The year-change register in this guide is the authority for what belongs on your bike.

About this guide

This paid guide covers exactly one model year: the Yamaha XS650 XS650E, model year 1978. It is organized as a workshop record: establish identity, preserve evidence, inspect before replacing, apply only cited specifications, and write down every unresolved uncertainty. It is deliberately narrow so that unsupported year claims and invented values do not become part of your restoration file.

An IronHead guide is a **restoration companion to the factory service manual, not a replacement**. What this guide gives that the manual doesn't: the correct work sequence, the model-year change points that decide parts interchange, what to measure before cleaning, what not to do, finishes and markings and fastener practice, honest parts sourcing, and honest value guidance. What it never does: invent a number, present generated art as a real bike, or promise anything it cannot verify.

How this guide is sourced

Every numeric value in this guide exists as a row in the verified spec tables, with the source named. Sources are reputable marque references, published specification sheets, and the maintenance specifications printed in Yamaha's own supplementary service literature. Anything the record does not support is omitted or explicitly flagged **[UNVERIFIED — not in factory literature]**, **[confirm against factory manual]**, or **[CONFLICT]**. Your bench authority remains the factory service manual for the Yamaha XS650 — Haynes Manual #341 (Yamaha 650 Twins 1970-1983) is the widely available workshop companion. Confirm every torque, clearance, and jet number against the manual for your year before machining or final assembly.

This year: the 1978 XS650E

Model designation: **XS650E** | Yamaha model code: **2F0** | Frame serial numbers begin at **2F0-000101**. Engine numbers use the same code prefix as the frame serial (owner-community convention — verify against the stamping on your engine). Frame numbers are stamped on the steering head; the engine number is stamped on the left crankcase. Record both before ordering any part.

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Variants sold this year

Variant	Code	Serial begins	Factory colors
XS650E Standard	2F0	2F0-000101	Star Black, Spruce Metallic Green
XS650SE Special	2M0	2F0-100101	Vintage Burgundy, New Midnight Black

What is unique about this model year

- First year of the Special: teardrop tank, stepped seat, buckhorn-style bars, cast-alloy wheels.
- Beefier 35 mm front fork; floating single-piston disc calipers.
- Special II (wire wheels, rear drum, less chrome) also appears in 1978 without a letter code.
- The Standard continues one more year (1979 F) — do not mistake a 1978 for the final Standard.

Source: CHOPPER-TABLE, FRWIKI, MCSPECS, CMB.

Year-change register

Every running change across the covered years, with why it matters. The row marked ■ **THIS GUIDE** is your bike. When a component does not match the register entry for your year, record the mismatch, preserve the removed part, and resolve the identity from the factory service literature before ordering a replacement. Do not convert a mismatch into a year claim the register does not support.

Year	Designation	Key changes
1970	XS-1	Launch year of the XS650 — Yamaha's first four-stroke motorcycle.; Kick start only; no electric starter.; Drum brakes front and rear (twin-leading-shoe front).
1971	XS-1B	Second and final year of the 256-code series; kick start only.; Round taillight with chromed bracket; no seat strap.; Front fork gaiters deleted; 27-degree head with 98 mm trail.
1972	XS-2	Electric starter added — first year of electric start.; Front disc brake (298 mm, single) replaces the front drum; rear remains drum.; 53 hp @ 7,000 rpm, 8.7:1 compression, Mikuni-Solex BS38 carburetors.
1973	TX650	Renamed TX650 to match Yamaha's TX model family.; Fuel tank grows to 14.0 L; front fork carries the mount for a second brake caliper.; Single front disc, rear drum; compression release still fitted.
1974	TX650A	New, stronger electric starter — the compression-release mechanism is deleted.; The square left-exhaust tappet cover is retained even though the release is gone — a visual tell.; Second-generation geometry: 27-degree head, 115 mm trail, 1,435 mm wheelbase; tank 15.0 L.
1975	XS650B	XS name returns; dual front disc brakes (267 mm) standard.; Heavier, reinforced frame; weight 212 kg (US).; 53 hp @ 7,200 rpm, 54 N-m @ 6,800 rpm; 15 L tank; 1,435 mm wheelbase.
1976	XS650C	New instruments; French Blue livery.; Front brake caliper moved behind the fork leg for better handling (owner-community record — confirm against parts book).; Mechanically a carryover of the 1975 B.
1977	XS650D	Final year of the 34 mm front fork; floating single-piston calipers arrive with the 1978 E.; Pre-1977 and post-1977 front brake discs use a different offset — wheels interchange, discs do not.; Dual 267 mm front discs, rear drum; 50-53 hp band depending on market.
1978 ■ **THIS GUIDE**	XS650E	First year of the Special: teardrop tank, stepped seat, buckhorn-style bars, cast-alloy wheels.; Beefier 35 mm front fork; floating single-piston disc calipers.; Special II (wire wheels, rear drum, less chrome) also appears in 1978 without a letter code.
1979	XS650F	Rear disc brake (267 mm) fitted — first year of the rear disc.; Final year of the Standard in the US.; Special II (2F): wire wheels and rear drum in place of the disc/alloy setup.
1980	XS650G	TCI transistorized electronic ignition replaces points — first TCI year.; Mikuni BS34 carburetors replace the BS38.; Claimed output steps to 50 hp @ 6,800 rpm; torque 54 N-m @ 5,600 rpm.
1981	XS650H	Rear brake reverts to a 180 mm single-leading-shoe drum on the Special line.; TCI ignition and BS34 carburetors continue.; Two Special variants only — the Standard is gone.
1982	XS650SJ	Special only, in New Yamaha Black.; Single 267 mm front disc and rear drum brake on the US SJ (dual front discs appear in EU sheets and as an optional parts-fiche kit — confirm against your bike).; 72-spoke wire wheels with steel rims, black-chrome finish; 130/90S-16 rear tire on the 16 in rear wheel.
1983	XS650SK	Final US model year — the Heritage Special (SK).; Carries the 1982 SJ mechanical package forward.; European/RoW production of the XS650 continues into 1984-85; the 1983 SK closes the US run.

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Verified specification tables

The spec table is the law of this guide: every number below is cited to its source, with the year band it applies to. A spec that changed mid-run is two rows, never one blurred row. Values flagged **[confirm against factory manual]** are corroborated by reputable references but should be checked against the factory manual before machining or final assembly.

Engine

Specification	Value	Applies to	Source
Engine type	Air-cooled SOHC parallel twin, 4-stroke	1970-1983	HAYNES341
Displacement	654 cc	1970-1983	FRWIKI (654 cm3); ITWIKI lists 653 cm3 for 1972 — 654 used per Yamaha convention
Bore x stroke	75.0 x 74.0 mm	1970-1983	ITWIKI, FRWIKI
Compression ratio	8.4:1 **[confirm against factory manual]**	1973-1981	MOTODATA (1975), MCSPECS (1978E) — 1973-74 not separately published
Max power	53 hp @ 7,000 rpm	1970-1979	ITWIKI (1972); MOTODATA lists 53 hp @ 7,200 for 1975
Max torque	54 N-m @ 6,800 rpm	1978-1979	MCSPECS (1978E)
Valve train	Chain-driven single overhead camshaft, 2 valves/cylinder	1970-1983	HAYNES341, FRWIKI
Valve clearance (cold) — intake	0.05 mm	1974-1979	MANUALLIB p.22 (XS650D supplementary manual)
Valve clearance (cold) — exhaust	0.15 mm	1974-1979	MANUALLIB p.23 (XS650D supplementary manual)
Cylinder head bolt torque	3.0-3.5 m-kg (29-34 N-m / 21.7-25.3 ft-lb)	1974-1979	MANUALLIB p.19 (XS650D supplementary manual maintenance specs)
Head nut practice note	Owner-community practice: ~28 ft-lb max on the 8 large acorn nuts; do not exceed 30 ft-lb *(practice note, not a factory figure)*	1970-1983	XS650COM — practice note, NOT a factory figure
Cam chain adjustment	Plunger bob 0.010-0.020 in at idle with adjuster finger-tight **[confirm against factory manual]**	1970-1983	XS650COM (owner-community procedure) — confirm against manual

Fuel

Specification	Value	Applies to	Source
Carburetors	2x Mikuni BS38 (Solex-type) constant-velocity	1970-1979	ITWIKI, FRWIKI
Fuel tank capacity	15.0 L	1974-1979 (Standard)	DEWIKI, MOTODATA, MCSPECS

Electrical

Specification	Value	Applies to	Source
Ignition	Contact-breaker points, battery/coil	1970-1979	FRWIKI (contact breaker), HAYNES341
Starting	Electric + kick	1972-1983	FRWIKI, ITWIKI
Spark plug	NGK BP7ES **[confirm against factory manual]**	1970-1983	XS650COM (owner-community standard) — confirm against factory manual
Brake fluid	DOT 3	1972-1983	MANUALZZ (Yamaha XS650 Shop Manual FAQ)

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Chassis

Specification	Value	Applies to	Source
Frame	Steel-tube double cradle	1970-1983	HAYNES341, FRWIKI
Front fork	Telescopic, 35 mm	1978-1983	FRWIKI
Front axle nut torque	2.9 m-kg (28 N-m / 21 ft-lb)	1974-1979	MANUALLIB pp.31-33 (XS650D supplementary manual)
Rear suspension	Swingarm, dual preload-adjustable shocks	1970-1983	HAYNES341, ITWIKI
Wheelbase	1,435 mm	1974-1983	DEWIKI (1974), MCSPECS (1978)

Wheels & brakes

Specification	Value	Applies to	Source
Front brake	Dual 267 mm discs	1975-1979 (Standards B/C/D/E/F)	DEWIKI, MCSPECS (1978E), CMB
Front brake	Single 267 mm disc (US) **[confirm against factory manual]**	1978-1983 (Specials, Special II, Heritage)	XS650COM (owner record: single-disc 1980 SG, 1981 SH, 1983 Heritage; EU/Oceania got duals) — confirm 1978-79 SE/SF against factory manual
Front brake note	Pre-1977 and post-1977 front discs use different offsets — wheels interchange, discs do not *(practice note, not a factory figure)*	1970-1983	FRWIKI — confirm against parts book
Rear brake	Drum (single leading shoe)	1970-1977 (all); 1978 (E Standard)	ITWIKI, FRWIKI, MCSPECS (1978E)
Rear brake	Single 267 mm disc	1978 (SE Special); 1979 (F Standard, SF Special); 1980 (SG Special)	MTECH (1978 SE 2M0-25338-20 rear disc); PZILLA (1978 XS650SE rear-disc fiche); XS650AU; CMB (1979 rear disc fitted); FRWIKI
Rear brake	Drum	1978-1980 Special II (no-code, 2F, G)	FRWIKI, BIKEUR (Special II rear-drum downgrade)
Front tire	3.50H-19	1978-1979	MCSPECS, MOTODATA
Rear tire	4.00-18	1970-1979	ITWIKI, MCSPECS
Wheels	Wire-spoke, steel rims	1970-1977; 1978-79 Standards (E/F); Special II (2F, G, H)	ITWIKI, FRWIKI, BIKEUR
Wheels	Cast-alloy (mag) wheels	1978-1981 Specials (SE, SF, SG, SH)	FRWIKI, CMB, XS650AU

Capacities

Specification	Value	Applies to	Source
Engine oil	2.5 L (2.6 US qt)	1970-1983	MOTODATA, MCSPECS, COZA
Oil change interval	Every 3,200 km (2,000 mi)	1970-1983	MANUALZZ (Yamaha XS650 Shop Manual FAQ)
Tire pressure — front	28 psi (2.0 kg/cm2)	1978-1979	MANUALZZ (XS650E shop-manual figure)
Tire pressure — rear	32 psi (2.3 kg/cm2); 40 psi (2.8) with passenger	1978-1979	MANUALZZ (XS650E shop-manual figure)
Dry weight	191 kg (wet 217 kg)	1978-1979	MCSPECS, COZA
Seat height	810 mm	1978-1979	MCSPECS

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Sequenced procedures

Work in this order. Each procedure answers: why this order, what breaks if you don't, what to measure first. Stop when the measured motorcycle, its year designation, or the cited source disagrees with the sequence.

Procedure 1 — Scope and identity record

SCOPE	Yamaha XS650 XS650E, model year 1978
TIME ON BENCH	Record the condition of the assembly before cleaning, machining, refinishing, or reassembly.
PREREQUISITE PARTS / DOCUMENTS	The factory service manual for the Yamaha XS650 XS650E, model year 1978; the year-change register and spec tables in this guide; a labeled parts tray and a written measurement record.
CAUTION	Yamaha XS650 XS650E, model year 1978. Stop when the measured motorcycle, its year designation, or the cited source record disagrees with the work sequence. Do not substitute an unverified later-model part or claim.

1. Write the covered identity at the top of the restoration record: Yamaha XS650 XS650E, model year 1978, code 2F0.
2. Record the frame serial (steering head) and engine number before anything is cleaned — stampings are evidence.
3. Photograph the complete motorcycle from all four sides, plus every marking, decal, and inspection daub.
4. Separate cited facts (this guide's spec tables) from your observations and from unresolved uncertainty.
5. Inspection checkpoint: stop if the motorcycle falls outside the covered year scope — do not stretch the guide.

Procedure 2 — Year-change register check

SCOPE	Yamaha XS650 XS650E, model year 1978
TIME ON BENCH	Record the condition of the assembly before cleaning, machining, refinishing, or reassembly.
PREREQUISITE PARTS / DOCUMENTS	The factory service manual for the Yamaha XS650 XS650E, model year 1978; the year-change register and spec tables in this guide; a labeled parts tray and a written measurement record.
CAUTION	Yamaha XS650 XS650E, model year 1978. Stop when the measured motorcycle, its year designation, or the cited source record disagrees with the work sequence. Do not substitute an unverified later-model part or claim.

1. Compare the motorcycle against the year-change register for your year; check off each change point present.
2. Verify the ignition system matches the year: Contact-breaker points, battery/coil. A converted bike must be recorded as converted.
3. Verify brake configuration matches the year: E Standard: dual 267 mm front discs, rear drum. SE Special: single 267 mm front disc, 267 mm rear disc.
4. Record every component that disagrees with the register; keep removed parts labeled by the designation under which they were found.
5. Inspection checkpoint: do not convert a mismatch into a year claim the register does not support.

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