SERVICE MANUAL

TT3840 / TT3840F / TT4030 / TT3880F

Tractor

Part number 47921938
English
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SERVICE MANUAL

TT3840 Without cab, 8x2, TIER 2, Upgrade, Model Year 2016, TT3840F Without cab, 8x2, Model Year 2016, TT3880F Without cab, 8x2, Model Year 2016, TT3880F Without cab, 12x3, Model Year 2016, TT4030 Without cab, 8x2, 2WD, Model Year 2016, TT4030 Without cab, 8x2, 4WD, Model Year 2016

Link Product / Engine

Product	Market Product	Engine
TT3840 Sem cabine, 8x2, TIER 2, atualização, modelo ano 2016	Latin America	8035.05.716
TT3840F Sem cabine, 8x2, modelo ano 2016	Latin America	8035.05.716
TT3880F Sem cabine, 8x2, modelo ano 2016	Latin America	8045.05.716
TT3880F Sem cabine, 12x3, modelo ano 2016	Latin America	8045.05.716
TT4030 Sem cabine, 8x2, 2WD, modelo ano 2016	Latin America	8045.05.716
TT4030 Sem cabine, 8x2, 4WD, modelo ano 2016	Latin America	8045.05.716

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International symbols

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TT3880F	LA
TT4030	LA

As a guide to the operation of the machine, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

Safety rules

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Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine safety signs, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine damage or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine damage or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Basic instructions Hardware

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General

The TT tractor has been built using metric hardware.

NOTE: *Be sure to use the hardware specified when using tapped holes, as trying to install ametric bolt in an inch thread, or an inch bolt in a metric thread, will damage the thread.*

Certain hardware must be tightened to specific torque specifications. If specific torque specifications are not noted, tighten the hardware to the standard torque chart specification listed in this manual.

Plating

Hardware used on New Holland balers is plated with zinc chromate (gold color). Gold colored hardware has different torquing requirements from unplated or zinc plated (silver color) hardware because of the difference in the coefficient of friction of the plating material. The torque charts in this manual list the correct specifications for gold, silver, and unplated bolts.

Nut Tightening

Whenever possible, the nut should be tightened, not the head of the bolt. When tightening using the bolt head, the clamp load can be lost because some of the torque applied twists the bolt instead of tensioning (stretching) it. The tension on the bolt is what holds the joint together.

Approximately 90% of the torque applied during assembly goes to overcoming friction between the parts. The other 10% is used to tension (stretch) the bolt. After assembly, the frictional forces disappear, which is the basis for the saying 'If it does not fail during assembly, it will not fail in service.' The bolt may later fail due to other factors, but not from being over tightened.

Locknuts

Most locknuts are coated with a special lubricant that is dry to the touch. Anytime a locknut is used, a lower than normal torque is required. Refer to the torque charts in this manual for specific values.

Jam Nuts

When using a jam nut to lock a regular nut, the jam nut should be installed first and tightened to one half the recommended torque, then held in place while installing a regular nut to the recommended torque.

Thread Lubrication

The addition of antiseize compound, Molykote, oil, graphite, or any other lubricant to a bolt decreases the friction between it and a nut. This makes it necessary to reduce the recommended torque to prevent over tensioning of the bolt. When using the torque charts in this manual, decrease the value by 20% whenever a lubricant is used.

General specification - Biodiesel Fuels

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Fatty Acid Methyl Ester Biodiesel (Biodiesel Fuel) consists of a family of fuels derived from vegetable oils treated with methyl esters.

NOTICE: *Biodiesel Fuel blends are approved for your engine only if they comply with* ***EN14214*** *Specification Standards or* ***ASTM D6751****.*

NOTICE: *It is imperative that you check which blend is approved for your engine with your NEW HOLLAND dealer. Be aware that the use of Biodiesel Fuel that does not comply with the Standards mentioned above could lead to severe damage to the engine and fuel system of your machine. The use of fuels that are not approved may void NEW HOLLAND Warranty coverage.*

Biodiesel Fuel Usage Conditions

NOTICE: *The Biodiesel Fuel must meet the fuel Specification mentioned above.*

Biodiesel Fuel must be purchased from a trusted supplier that understands the product and maintains good fuel quality. Biodiesel Fuel must be pre-blended by the supplier. Mixing Biodiesel Fuels on-site can result incorrect mixture that can lead to problems with both engine and fuel system.

Engine performance is affected by the use of Biodiesel Fuel. There may be up to **12%** reduction in power or torque depending on the blend used.

NOTICE: *DO NOT modify the engine and/or injection pump settings to recover the reduced performance.*

The reduced power must be accepted if using any Biodiesel Fuel blend.

Some modification may be required to allow your engine to run Biodiesel Fuel. Consult you dealer for complete information on these modifications.

Biodiesel Fuel has a higher cloud point than Diesel Fuel.

NOTICE: *The use of high Biodiesel Fuel blends are not recommended in cold weather conditions.*

With Biodiesel Fuels, it may be necessary to change the engine oil, engine oil filter and fuel filter elements more frequently than with Diesel Fuels. Biodiesel Fuel can remove rust and particles from the inside of on-site fuel storage tanks that would normally adhere to the sides of the tank. Like particle deposits that commonly occur with Diesel Fuel, these particles can become trapped by the machine fuel filters, causing blockage and shortening filter life. In cold weather, this is more likely to happen. Consult your NEW HOLLAND dealer for information on cold weather operation and proper maintenance intervals when using any Biodiesel Fuel blend.

When handling Biodiesel Fuel, care must be taken not to allow water into the fuel supply. Biodiesel Fuel will actually attract moisture from the atmosphere.

Fuel tanks must be kept as full as possible to limit the amount of air and water vapors in them. It may be necessary to drain the fuel filter water tap more frequently.

Potential oxidation and stability could be a problem with the fuel stored in the machine.

NOTICE: *Machines must not be stored for more than three months with Biodiesel Fuel blends in the fuel system.*

If long storage periods are necessary, the engine must run on Diesel Fuel for 20 hours to flush the Biodiesel Fuel out of the engine fuel system prior to storage.

NOTICE: *Biodiesel Fuel must not be stored in on-site storage tanks for more than three months.*

Any spillage of Biodiesel Fuel must be cleaned up immediately before it can cause damage to the environment and the paint finish of the machine.

Before using Biodiesel Fuel blends you should consult with your dealer to receive full information about the approved blend for your machine and any detailed conditions of its usage.

NOTICE: *Be aware that not fulfilling the requirements and conditions of Biodiesel Fuel usage will void your machine's NEW HOLLAND Warranty coverage.*

Consumables Loctite® Product Chart

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Bonding Adhesives					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recommended Primer or Activator**	**Description**
312	Clear	**9.8 – 17.2 MPa** (**1421 – 2495 psi**)	2 min/24 hrs	736	Typical applications include bonding dissimilar materials such as metals, glass or ceramics and where fast fixturing is required between close fitting parts.
324	Light amber	**34 – 614 MPa** (**4932 – 89061 psi**)	30 min/24 hrs	7075	Is used to bond flat parts together. Especially suitable for joining dissimilar materials, e.g. ferrite to plated materials in electric motors, loudspeakers, etc. This product is specifically formulated for toughness and impact strength.
326	Yellow to light amber	**34 – 300 MPa** (**4932 – 43515 psi**)	3 min/6 hrs	7649 on one surface	Typical applications include bonding ferrites to plated materials in electric motors, loudspeaker hardware and jewelry where fast fixturing is required.
380	Black	**26 MPa** (**3770 psi**)	2 min/24 hrs	none	Is a rubber toughened adhesive with increased flexibility and peel strength along with enhanced resistance to shock.
409	Clear to slightly cloudy	**18 – 26 MPa** (**2611 – 3771 psi**)	2 min/24 hrs	none	Is a general purpose cyanoacrylate adhesive gel. The gel consistency prevents adhesive flow even on vertical surfaces.
426	Black	**4.8 – 20.7 MPa** (**696 – 3003 psi**)	10 sec/40 sec.	none	Is an adhesive gel toughened with elastomers for impact and peel strength along with improved resistance to heat and humidity.
454	Clear to slightly cloudy	**19 – 28 MPa** (**2756 – 4061 psi**)	1 min/72 hrs	none	Is particularly suited for bonding porous or absorbent materials such as wood, paper, leather and fabric.
455	Clear to light yellow	**9.7 MPa** (**1407 psi**)	30 sec/24 hrs	none	Is a general purpose cyanoacrylate adhesive gel with low odor and low blooming properties and is particularly suitable for applications where vapor control is difficult.
480	Black	**22 – 30 MPa** (**3191 – 4352 psi**)	2 min/24 hrs	none	Is a rubber toughened adhesive with increased flexibility and peel strength along with enhanced resistance to shock.
495	Clear to straw colored	**12 – 26 MPa** (**1741 – 3771 psi**)	10 sec/30 sec.	none	Is a general purpose cyanoacrylate instant adhesive.
E60HP	Pale yellow	**29.8 MPa** (**4322 psi**)	3 hrs/24 hrs	none	Is a toughened, mediumviscosity, industrial grade epoxy adhesive with extended work life. Once mixed, the two-component epoxy cures at room temperature to form a tough, off-white, bond line which provides high peel resistance and high shear strengths. The fully cured epoxy is resistant to a wide range of chemicals and solvents, and acts as an excellent electrical insulator.

Surface Preparation			
Product	**Color**	**Active (Steel/Steel) Time**	**Description**
7380	Yellow to light amber	6 hours	Is designed to initiate the cure of Loctite toughened acrylic adhesives.
7471	Yellow to light amber	30 to 70 seconds	Is used where increased cure speed of LOCTITE® anaerobic products is required. It is especially recommended for applications with passive metals or inert surfaces and with large bond gaps. Is particularly recommended when prevailing temperature is low < **15 °C** (**60 °F**).
7649	Green	30 to 70 seconds	Is used where increased cure speed of LOCTITE® anaerobic products is required. It is especially recommended for applications with passive metals or inert surfaces and with large bond gaps. Is particularly recommended when prevailing temperature is low < **15 °C** (**60 °F**).

Retain, Cylindrical Assemblies					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/Steel) Time**	**Recommended Primer or Activator**	**Description**
603	Green	**13.5 – 22.5 MPa** (**1958 – 3264 psi**)	7 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where consistently clean surfaces cannot be assured. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include retaining roller bearings or oil impregnated bushings into housings.
609	Green	**10.3 – 15.8 MPa** (**1494 – 2292 psi**)	25 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include rotor to shafts in fractional and subfractional horsepower motors. Locks bushings and sleeves in housings on shafts. Augments press fits.
620	Green	**17.2 – 24.1 MPa** (**2495 – 3496 psi**)	1 hr 10 min/18 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include locating pins in radiator assemblies, sleeves into pump housings and bearings in auto transmissions. Particularly suitable for applications where temperature resistance up to **200 °C** (**395 °F**) is required.
635	Green opaque	**13.8 – 31.0 MPa** (**2002 – 4497 psi**)	30 min/72 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include rotor to shafts in fractional and subfractional horsepower motors. Locks bushings and sleeves in housings on shafts. Augments press fits.

Retain, Cylindrical Assemblies					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recommended Primer or Activator**	**Description**
638	Green	**13.5 – 25.0 MPa** (**1958 – 3626 psi**)	4 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where bond gaps can approach 0.25 mm (0.01 in.) and where maximum strength at room temperature is required. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include locking bushings and sleeves into housings and on shafts.
648	Green	**13.5 – 25.0 MPa** (**1958 – 3626 psi**)	4 min/1.5 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include holding gears and sprockets onto gearbox shafts and rotors on electric motor shafts.
660	Metallic grey	**17.2 MPa** (**2495 psi**)	15 min/1.5 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where bond gaps can approach 0.50 mm (0.02 in). The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product possesses excellent gap cure characteristics. Typical applications include restoring correct fits on worn shafts, spun bearings, and damaged keyways.
680	Green	**19.3 – 24.1 MPa** (**2799 – 3496 psi**)	20 min/1.1 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where low viscosity is required. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration.

RTV Sealants				
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Description**
5699	Grey	**1.3 – 2.1 MPa** (**189 – 305 psi**)	30 min/14 days	Is designed primarily for flange sealing with excellent oil resistance on rigid flange sealing for example on transmissions and cast metal housings.
587	Blue	NA	2 hrs/24 hrs	Forms tough, flexible gaskets directly on the flange. Sensor-safe, low odor, non-corrosive. Excellent oil resistance and joint movement values. Eight times more flexible than cork/composite gaskets; three times more oil resistant than conventional silicones. Temperature range **-59 – 260 °C** (**-75 – 500 °F**) intermittent; resists auto and shop fluids.
593	Black	**1.5 MPa** (**218 psi**)	5 min/24 hrs	Is designed for superior bonding and sealing properties to most surfaces (not recommended for concrete). This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. It is formulated to withstand extreme temperature cycling, UV light and ozone. The thixotropic nature reduces the migration of liquid product after application to the substrate.

RTV Sealants				
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Description**
595	Clear	**1.5 MPa** (**218 psi**)	5 min/24 hrs	Is designed for superior bonding and sealing properties to most surfaces (not recommended for concrete). This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. It is formulated to withstand extreme temperature cycling, UV light and ozone. The thixotropic nature reduces the migration of liquid product after application to the substrate.
596	Red	NA	5 min/24 hrs	Is specifically formulated for gasketing and sealing where high temperatures **315 °C** (**600 °F**) are experienced such as exhaust manifolds - crossovers, high temperature ovens and furnaces. Applications where sealing and bonding are required under frequent exposure to temperatures above **235 – 315 °C** (**450 – 600 °F**).

Gasket Sealants					
Prod-uct	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recom-mended Primer or Activator**	**Description**
509	Blue to green-ish paste	**8 – 9 MPa** (**1160 – 1305 psi**)	1 hr/72 hrs	7471 or 7469	Provides resistance to low pressures immediately after assembly of flanges. It seals close fitting joints between rigid metal faces and flanges. Typically used as a form-in-place gasket on rigid flanged connections, e.g. gearbox and engine casings, etc. The thixotropic nature reduces the migration of liquid product after application to the substrate.
515	Opaq-ue, dark purple	**6 – 14 MPa** (**870 – 2031 psi**)	30 min/18 hrs	7471 or 7469	It seals close fitting joints between rigid metal faces and flanges and will flex with minor flange movements. Provides resistance to low pressures immediately after assembly of flanges. Typically used as a form-in-place gasket for pumps, thermostats, compressors, transmission housings and axle covers.
518	Red	**7.5 – 8.5 MPa** (**1088 – 1233 psi**)	30 min/8 hrs	7471 or 7469	Typical applications include sealing close fitting joints between rigid metal faces and flanges. Provides resistance to low pressures immediately after assembly of flanges. Typically used as a form-in-place gasket on rigid flanged connections, e.g. gearbox and engine casings, etc.
542	Brown	**9 – 25 Nm** (**80 – 222 lb in**)	20 min/8 hrs	7471 or 7469	Is designed for the locking and sealing of metal pipes and fittings. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration.
545	Purple	**2 Nm** (**20 lb in**)	30 min/24 hrs	7471 or 7469	Is designed for the locking and sealing of metal pipes and fittings. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product is specially formulated to offer lubricity for easy assembly.
567	Off white	**0.3 – 1.7 Nm** (**3 – 15 lb in**)	4 hrs/72 hrs	7471 or 7469	Is designed for the locking and sealing of metal tapered threads and fittings.
569	Brown	**1.1 – 2.8 Nm** (**10 – 25 lb in**)	2 hr/24 hrs	7471 or 7469	Is designed for the locking and sealing of plastic and metal pipes and fittings.

Gasket Sealants					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recommended Primer or Activator**	**Description**
592	White	**0.113 – 0.330 Nm** (**1 – 3 lb in**)	72 hrs	none	Is a medium strength anaerobic sealant with Teflon® for tapered pipe threads. The high lubricating properties of this compound prevent galling on pipe threads and fittings. It will provide immediate low pressure sealing and allow the readjustment of fittings shortly after assembly. After 72 hours the joint is sealed to pipe burst pressure.
598	Metallic black	**1.31 MPa** (**190 psi**)	25 min/72 hrs	none	This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. Typical applications include oil pans, transmission pans, valve covers, valves and guides, timing gear covers, and differential covers. This product is typically used in applications with an operating range of **-54 – 260 °C** (**-65 – 500 °F**).

Thread Locker and Sealing					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recommended Primer or Activator**	**Description**
204	Pink	**12.4 – 24.9 Nm** (**110 – 220 lb in**)	10 min/72 hrs	none	Is a dry-to-the-touch, preapplied film for threaded fasteners. It remains inert on the fastener until assembly of the threads releases a quick curing resin. The resin fills all the voids in the threads and cures to securely lock and seal the assembly.
222	Purple	**4 – 14 Nm** (**35 – 124 lb in**)	20 min/3 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require easy disassembly with standard hand tools.
242	Blue	**5.6 – 17 Nm** (**50 – 150 lb in**)	3 min/6 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools.
243	Blue	**7 – 24 Nm** (**62 – 212 lb in**)	10 min/1 hr	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools.
246	Blue	**2 – 5.7 Nm** (**18 – 50 lb in**)	10 min/6 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Particularly suitable for heavy duty applications such as bolts used in transmissions, construction equipment or railroad assemblies where resistance to heavy shock, vibration and stress level is required along with exposure to elevated temperatures.
262	Red	**22 – 40 Nm** (**195 – 354 lb in**)	15min/7 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.
271	Red	**16.9 – 34 Nm** (**150 – 300 lb in**)	10 min/24 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.
277	Red	**32 – 40 Nm** (**283 – 354 lb in**)	30 min/7 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.

Thread Locker and Sealing					
Product	**Color**	**Strength**	**Fixture/Full Cure (Steel/ Steel) Time**	**Recommended Primer or Activator**	**Description**
290	Green	**10 – 40 Nm** (**90 – 355 lb in**)	20 min/4 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners. Because of its low viscosity and capillary action, the product wicks between engaged threads and eliminates the need to disassemble prior to application.
425	Dark blue	**0.23 – 8.5 Nm** (**2 – 75 lb in**)	2 min/24 hrs	7113	Is designed as a fast curing, low strength adhesive for locking metal and plastics fasteners. The product is designed for pre- or post-application. LOCTITE® 425™ cures quickly on plated metal and plastics fasteners; fixturing is achieved in less than 2 minutes and full strength within 24 hours.

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Engine

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Engine and crankcase - 001

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Engine - General specification

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	TT3840	TT3840F	TT3880F
Number of rolls	3		4
Loop	Diesel, 4 stroke		
Injection	Direct		
Piston diameter	**104 mm**		
Piston stroke	**115 mm**		
Injection Sequence	1–2–3		1–3–4–2
Engine speeds			
Idle speed	**650 RPM** +/- **25 RPM**		
Maximum RPM without load	**2750 – 2790 RPM**		
Nominal speed	**2500 RPM** +/- **50 RPM**		
Total cylinder capacity	**2931 cm³**		**3908 cm³**
Compression ratio	18:01 Aspirated 16.5:1 Turbo		
Maximum Power	**40.45 kW** (**55 Hp**)		**56 kW** (**76.14 Hp**)
Rotation for maximum power	**2500 RPM**		
Rotation for maximum torque	**1500 RPM**		**1500 RPM**
Number of main bearing housings	4		5
Crankcase	Cast iron		
Maximum working inclination, transverse, and longitudinal	**35°**		
Rev counter	Incorporated in control panel		
Acionamento	Originated from the distribution shaft gear		
Gauge calibrated for engine at	**1800 RPM**		
Sistema de distribuição			
Spread	With overhead valves controlled by cams, rods, and rocker arms through the distribution control shaft located on the base and controlled by the crankshaft through helical gears.		
Aspiration			
Start:	12° before TDC		
End:	31° after BDC		
Discharge			
Start:	50° before BDC		
End:	16°		
Play between the rocker arms and valves to control the valve opening and closing diagram	**0.45 mm**		
Roll diameter	**104.000 mm**		
Play between distribution gear teeth	**0.160 mm**		
Internal diameter of distribution gear bushes (installed and finished in the seat)	**37.050 – 37.075 mm**		
Diameter of transmission gear bushing seat	**36.975 – 37.000 mm**		
Play between bushing seat and relative bushes	**0.050 – 0.100 mm**		
Maximum acceptable play from wear	**0.150 mm**		
Interference between the bush and seat on transmission gear	**0.063 – 0.140 mm**		
External diameter of bushings on the control shaft:			
Front	**54.875 – 54.930 mm**		
Middle	**54.375 – 54.430 mm**		

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Back		**53.875 – 53.930 mm**	
Interference between the bushes (control shaft) and the housings in the block		**0.070 – 0.150 mm**	
External diameter of seats on the control shaft:			
Front		**50.970 – 51.000 mm**	
Middle		**50.470 – 50.500 mm**	
Back		**49.970 – 50.000 mm**	
Internal diameter of the bushes on the control shaft (installed and finished in the block):			
Front		**51.080 – 51.130 mm**	
Middle		**50.580 – 50.630 mm**	
Back		**50.080 – 50.130 mm**	
Play between the seats and bushes		**0.080 – 0.160 mm**	
Maximum acceptable play from wear		**0.200 mm**	
Longitudinal play of control shaft		**0.070 – 0.220 mm**	
Bloco			
Pad		Cast iron monoblock, incorporates housings for distribution shaft / tappet fittings	
Cylinder hole diameter		**106.850 – 106.900 mm**	
Grinding		**0.400 – 0.800 mm**	
External diameter oversize		**0.200 mm**	
Diameter of housing for the main bushings covers		**84.200 – 84.230 mm**	
Diameter of housings for control shaft bushings:			
Front		**54.780 – 54.802 mm**	
Middle		**54.280 – 54.305 mm**	
Back		**53.780 – 53.805 mm**	
Diameter of tappet housings		**15.000 – 15.018 mm**	
Tappet oversize		**0.100 mm** - **0.200 mm** - **0.300 mm**	
Main bearing seat bore diameter		**84.200 – 84.230 mm**	
Virabrequim e mancais			
Crankshaft (balancing)		With integral counterweights	
Standard diameter of main seats		**79.791 – 79.810 mm**	
Main seat diameter undersizes		**0.254 – 0.508 mm** / **0.762 – 1.016 mm**	
Main bushings bushes standard thickness		**2.168 – 2.178 mm**	
Main bushings bushes undersizes (internal diameter)		**0.254 – 0.508 mm** / **0.762 – 1.016 mm**	
Play between the seats and the main bushings		**0.034 – 0.103 mm**	
Maximum acceptable play from wear (main bushings)		**0.180 mm**	
Link conrod seat standard diameter		**63.725 – 63.744 mm**	
Link conrod seat diameter undersizes		**0.254 – 0.508 mm** / **0.762 – 1.016 mm**	
Link conrod standard thickness		**1.805 – 1.815 mm**	
Link conrod internal diameter undersizes		**0.254 – 0.508 mm** / **0.762 – 1.016 mm**	
Play between the seats and the link conrod bushings		**0.033 – 0.087 mm**	
Maximum acceptable play from wear (link conrod bushings)		**0.180 mm**	
Crankshaft thrust link conrod standard thickness		**3.378 – 3.429 mm**	
Thrust link conrod additional thicknesses		**0.127 – 0.254 mm** / **0.381 – 0.508 mm**	
Total width of thrust link conrods		**31.766 – 31.918 mm**	
Width of crankshaft main bushings		**32.000 – 32.100 mm**	

	TT3840	TT3840F	TT3880F
Longitudinal play of installed crankshaft	**0.082 – 0.334 mm**		
Maximum longitudinal play from wear (crankshaft)	**0.400 mm**		
Maximum ovalization and conicity of main seats and link conrod after grinding	**0.010 mm**		
Maximum ovalization and conicity from wear of main seats and link conrod	**0.050 mm**		
Maximum warping tolerance, supporting the crankshaft on the end seats	**0.100 mm**		
Maximum acceptable tolerance, both directions, in the link conrod seat alignment (3 cylinder engine), or each pair of link conrod seats (4 cylinder engine) relative to the main seats.	**0.250 mm**		
Maximum tolerance of eccentricity between the external surface of the main seats and the crankshaft center (imaginary line)	**±0.100 mm**		
Maximum permitted perpendicular tolerance for the flywheel support flange surface in relation to the crankshaft center, using a hundredths calibrator gauge supported on the front in a diameter of **108 mm** (total calibrator gauge reading)	**0.025 mm**		
Maximum permitted coaxial tolerance for the flywheel centering flange in relation to main seats (total calibrator gauge reading)	**0.040 mm**		
Bielas			
Roll diameter	**104 mm**		
Link conrods	Cast iron with lubrication orifice		
Diameter of the link conrod bush seat	**41.846 – 41.884 mm**		
External diameter of link conrod bush	**41.979 – 42.017 mm**		
Interference between the bush and link conrod seat	**0.095 – 0.171 mm**		
Internal diameter of the link conrod bush (measure after installing)	**38.004 – 38.014 mm**		
Diameter of bush seat on the link conrod	**67.407 – 67.422 mm**		
Maximum tolerance for parallelism between the two controlled link conrod shafts at **25 mm**	**± 0.070 mm**		
Maximum difference in link conrod weight in the same engine	**25 g**		
Pistões			
Pistons	Light alloy with three rings, two being sealants and one oil scraper		
Standard diameter of pistons with **57 mm** skirting base measured perpendicularly to the piston pin shaft	**103.852 – 103.870 mm**		
Maximum play from wear	**0.300 mm**		
Piston clearance in liner	**0.174 – 0.212 mm**		
Piston oversize	**0.600 mm**		
Piston lug from TDC relative to the block	**0.355 – 0.761 mm**		
Diameter from pin to piston	**37.983 – 37.990 mm**		
Piston pin housing diameter	**38.000 – 38.006 mm**		
Play between the pin and piston housings	**0.010 – 0.023 mm**		
Clearance between piston pin and bushing	**0.014 – 0.031 mm**		

	TT3840	TT3840F	TT3880F
Play in piston ring groove (upper)		**0.090 – 0.122 mm**	**0.105 – 0.155 mm**
Maximum acceptable play from wear	**0.060 mm**		
Maximum difference in piston weight in the same engine	**20 g**		
Play between the rings and piston channels (vertically):			
1st Ring	**0.090 – 0.122 mm**		
2nd Ring	**0.060 – 0.092 mm**		
3rd Ring	**0.040 – 0.075 mm**		
Maximum admitted play from wear (between rings and channels)			
1st Ring	**0.500 mm**		
2nd Ring	**0.200 mm**		
Play between ring ends (installed)			
1st Ring	**0.400 – 0.650 mm**		
2nd Ring	**0.300 – 0.550 mm**		
3rd Ring	**0.300 – 0.600 mm**		
Maximum acceptable play between ends from wear	**1.200 mm**		
Tuchos			
Diameter of housing in the block	**15.000 – 15.018 mm**		
Standard tappet external diameter	**14.950 – 14.970 mm**		
Play between tappet and block	**0.030 – 0.068 mm**		
Maximum acceptable play from wear	**0.15 mm**		
Tappet oversize	**0.100 mm** - **0.200 mm** - **0.300 mm**		
Balancins - Válvulas			
Rocker arm hole diameters	**18.016 – 18.031 mm**		
Rocker arm holder shaft diameters	**17.982 – 18.000 mm**		
Play between shaft and rocker arm holders	**0.016 – 0.052 mm**		
Maximum acceptable play from wear	**0.15 mm**		
Characteristics of rocker arm separation spring			
Rated length of free spring	**59.5 mm**		
Length of spring with a load of **46 – 52 N** (**10.34 – 11.69 lb**)	**44 mm**		
Valve play for synchronization (diagram)	**0.45 mm**		
Valve play for engine operation (cold)			
Intake valve	**0.30 mm**		
Exhaust Valve	**0.30 mm**		
Path of tappet (from control shaft)			
Intake valve	**5.955 mm**		
Exhaust Valve	**6.027 mm**		
External diameter of rocker arm bush	**21.006 – 21.031 mm**		
Balanceador dinâmico com contrapeso rotativo, consulte **Balancer - Sectional view (10.110)** para as referências.			
Interference between the bushes **(28)** and the seat on the gear **(26)**	–	–	**0.063 – 0.140 mm**
Play between the transmission gear bearing seat **(27)** and bushes **(28)**	–	–	**0.050 – 0.100 mm**
Interference of installation between the bushes and support seat **(20)**	–	–	**0.063 – 0.140 mm**
Play between the gear shaft **(22)** and the related bushes	–	–	**0.050 – 0.100 mm**
Play between the teeth of the sleeve **(17)** that interlinks the gear **(22)** and the gear counterweight **(13)**	–	–	**0.038 – 0.106 mm**

	TT3840	TT3840F	TT3880F
Interference between the front bush **(16)** and seat on the casing **(12)**	–	–	**0.063 – 0.140 mm**
Play between the control shaft **(13)** and the front bush **(16)**	–	–	**0.050 – 0.100 mm**
Interference between the gear counterweight rear bush **(13)** and the support seat **(6)**	–	–	**0.037 – 0.101 mm**
Play between the control shaft **(13)** and the related rear bush	–	–	**0.013 – 0.061 mm**
Interference between the bushes and the related casing on the counterweights **(8)**	–	–	**0.040 – 0.100 mm**
Play between the counterweight revolution shaft **(4)** and the related bushes	–	–	**0.020 – 0.073 mm**
Interference between the transmission gear bush **(9)** and related seat in the casing **(12)**	–	–	**0.037 – 0.101 mm**
Play between the transmission gear shaft **(10)** and the related bush	–	–	**0.013 – 0.061 mm**
Play between the gear teeth (of counterweights)	–	–	**0.080 mm**
Cabeçote			
Head	With valve seats machined directly on the cast and pressed valve guides (steel)		
Original head height	**92 mm**		
Maximum thickness that can be removed	**0.500 mm**		
Diameter of standard valve guide holes in the head	**13.950 – 13.983 mm**		
External diameter of standard valve guide	**13.993 – 14.016 mm**		
Interference between the casings and valve guides on the head	**0.005 – 0.050 mm**		
Internal diameter of valve guides (installed in the head)	**8.023 – 8.043 mm**		
Diameter of valve rods	**7.985 – 8.000 mm**		
Assembly play between the valve rod and valve guides	**0.023 – 0.058 mm**		
Maximum acceptable play from wear	**0.130 mm**		
Maximum decentralization of guided valve on the rod measured at 360° from the indicator contact point supported on the valve head contact surface	**0.030 mm**		
Valve guide oversize	**0.200 mm**		
Valve housing angle in the head			
For the intake valve	55° - 65°		
For the exhaust valve	40° - 50°		
Cam lift			
For the intake valve	**5.250 mm**		
For the exhaust valve	**5.677 mm**		
Valve lift			
For the intake valve			**9.31 mm**
For the exhaust valve			**10.06 mm**
Valve face angle			
For the intake valve	60°23'-60°37'		
For the exhaust valve	45°23'-45°37'		
Diameter of valve head			
For the intake valve	**45.300 – 45.500 mm**		
For the exhaust valve	**37.500 – 37.750 mm**		

	TT3840	TT3840F	TT3880F
Distance from the valve face relative to the head plane	**0.700 – 1.000 mm**		
Maximum acceptable distance	**1.300 mm**		
Characteristics of springs for intake and exhaust valves:			
Rated length of free spring	**44.600 mm**		
Length of spring with valve closed, with a load of **256 – 284 N** (**57.551 – 63.846 lb**)	**34 mm**		
Length of spring with valve opened, with a load of **502 – 544 N** (**112.854 – 122.296 lb**)	**23.800 mm**		
Injector lug in relation to the head plane:			
BOSCH injector, part no. 4792442, 4800029, 4824170, 99451588	**0.300 – 1.100 mm**		
STANADYNE injector, part no. 4802394, 4802391, 99439239	**0.250 – 1.050 mm**		
OMAP injector, part no. 4800031and 4800032	**0.150 – 0.950 mm**		
Valve synchronization			
Inlet opening (before TDC)	**12°**		
Inlet closing (after BDC)	**31°**		
Exhaust opening (before BDC)	**50°**		
Exhaust closing (after TDC)	**16°**		

Engine - Torque

TT3840F	LA
TT3840	LA
TT3880F	LA
TT4030	LA

Angular tightening torque

Part to tighten	Turnbuckle	Tightening torque	Angle
Head fixing bolts **(2)**, **Engine - Sectional view (10.001)**	M12 x 1.25	**70 N·m** (**51.63 lb ft**)	**130 ± 5°** + **140 ± 5°**
Main journal fixing bolts **(4)**, **Engine - Sectional view (10.001)** of the crankshaft	M14 x 1.5	**80 N·m** (**59.00 lb ft**)	**90°**
Connecting rod journal bolts **(5)**, **Engine - Sectional view (10.001)**	M11 x 1.25	**40 N·m** (**29.50 lb ft**)	**60°**
Engine flywheel fixing bolts **(3)**, **Engine - Sectional view (10.001)**	M12 x 1.25	**40 N·m** (**29.50 lb ft**)	**60°**

Tightening torques

Parts	Turnbuckle	Torque value
Fixing bolts of the rocker shaft supports	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Hub fixing nut on the crankshaft	M30 x 1.5	**300 N·m** (**221.3 lb ft**)
Fan and alternator drive pulley fixing bolts **(6)**, **Engine - Sectional view (10.001)**	M12 x 1.25	**49 N·m** (**36.1 lb ft**)
Dynamic balancer fixing bolts for the four-cylinder models	M12 x 1.25	**110 N·m** (**81.13 lb ft**)
Intake manifold fixing bolts	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Alternator and belt tensioner fixing nut	M12 x 1.25	**55 N·m** (**40.57 lb ft**)
Water pump to engine fixing bolts	M10 X 1.25	**55 N·m** (**40.57 lb ft**)
Nuts for injector fixing stud	M8 X 1.25	**25 N·m** (**18.44 lb ft**)(*)
Valve cover fixing nuts	M8 X 1.25	**15 N·m** (**11.06 lb ft**)

Parts	Turnbuckle	Torque value
Fixing bolts of the rocker shaft supports	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Oil pump and respective cover fixing bolts	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Distribution box and cover fixing bolts	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Flanged intermediate pin fixing bolts	M10 X 1.25	**55 N·m** (**40.57 lb ft**)
Control shaft retaining plate bolts	M8 X 1.25	**35 N·m** (**25.81 lb ft**)
Nuts for valve play adjustment bolts	M8 x 1	**22 N·m** (**16.23 lb ft**)
Exhaust manifold fixing bolts	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Injection pump fixing bolts	M8 X 1.25	**25 N·m** (**18.44 lb ft**)
Engine sump fixing bolts to:		
Front and rear distribution cover	M10 X 1.25	**39 – 49 N·m** (**28.76 – 36.14 lb ft**)
Engine flywheel and cylinder block cover:	M10 X 1.25	**49 – 59 N·m** (**36.14 – 43.52 lb ft**)

(*) Tighten the nuts in two phases

Engine - Special tools

TT3840F	LA
TT3840	LA
TT3880F	LA
TT4030	LA

NOTICE: *The operations described in this section should only be performed using the ESSENTIAL tools that appear below with the symbol (X). However, for greater safety and to obtain the best results as well as saving time and effort, it is recommended that these essential tools be used together with the specific tools listed below and certain tools that should be made according to the construction designs supplied in this manual.*

List of specific tools required for the various operations contained in this section.

X	**380000569**	Tractor Separation Stand
	290740	Hook to lift the engine
X	**380000301**	Rotary trestle to service the engine
	292870	Universal manometers, seals, and tubes for lubricating pressure control kit
	293240	Kit to control engines with turbo charger
	293679	Wrench to disassemble the oil filters
X	**296118**	Device to control the engine belt tension
X	**380000221**	Pliers to assemble the piston rings
X	380000994	Belt to assemble pistons on the cylinders
X	380000304	Device for angular tightening of engine bolts
X	**380000226**	Crankshaft pulley hub puller
X	**380000232**	Wrench to adjust valve play
X	**291046**	Mandrel to assemble and disassemble the valve guides
X	**380000222**	Valve guide countersinker
X	**294028**	The reamer to make the lower opening on the exhaust valve guides
X	**380000242**	Bush to assemble the valve guides (with **380000219**)
X	292177	Set of reamers for the valve guide
X	380003037	Valve spring compressor
X	380003042	Kit to assemble and grind the injector holder sleeve in the head
X	**380000223**	Extractor for the water pump turbine
X		Punch to assemble the cooling water pump turbine seal (repair)
X	**380000549**	Sliding Hammer
X	**380000292**	Transmission clutch and PTO centralizer

Testing the injection pump on the bench

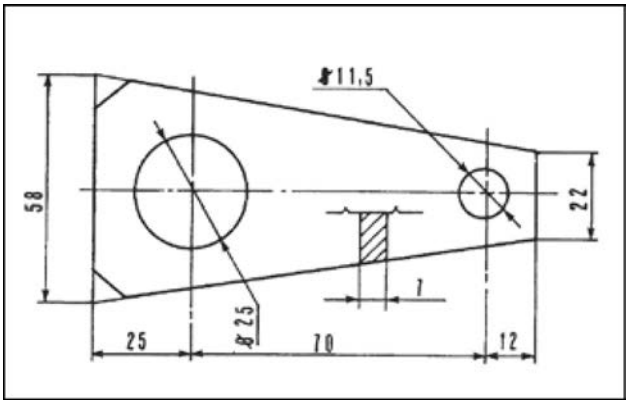
X	**380000228**	Dial gauge (**1/100 mm** scale, **5 mm** travel, **40 mm** with **380000229**)
X	**380000229**	Device to synchronize the BOSCH injection pump to the engine
X	**380000322**	Extractor for the injection pump drive gear

X	380000215	Hand pump to test the injector nozzles

Tools for the injector nozzles

X	**380000829**	Screw tap to install tool 75297687
X	**380000830**	Milling cutter guide for injector nozzles
X	380000831	Reamer for the injector nozzle sleeve
X	75297687	Injector nozzle sleeve extractor
X	**380000833**	Milling cutter to adjust injector nozzle protection
X	**380000834**	Device to install the injector nozzle sleeves
X	75290944	Valve guide reamer
X	**380000322**	Injection pump gear extractor

50075: Hook to lift the engine. Dimensions in mm. Material: UNI C40.



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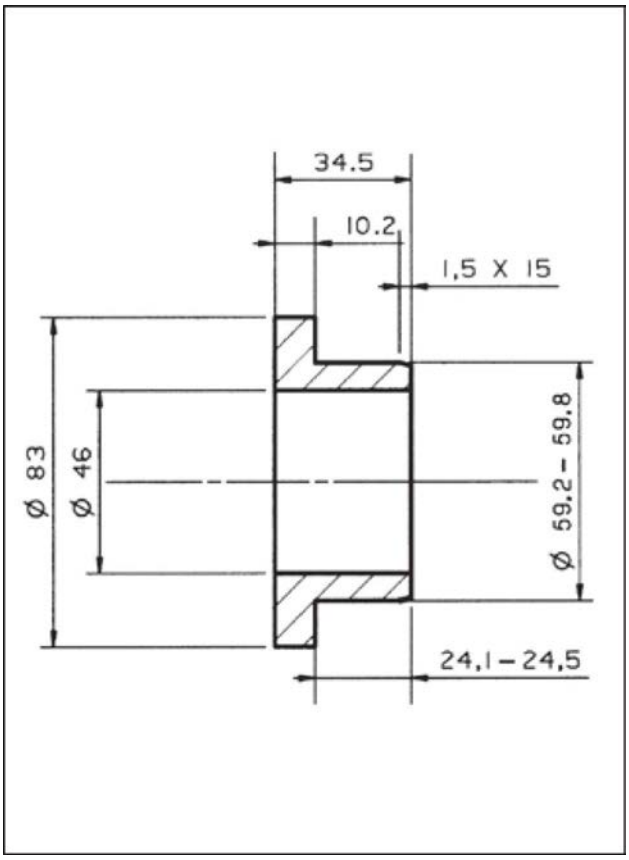
86512999: Crankshaft front retainer installer. Dimensions In mm. Material: UNI C40.



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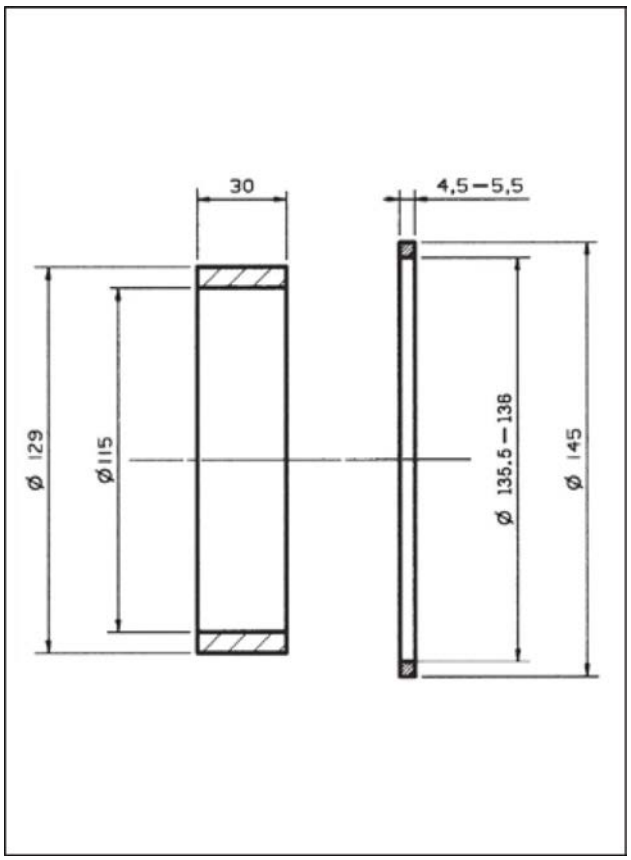
50139: Crankshaft rear retainer installer. Dimensions In mm. Material: UNI C40.



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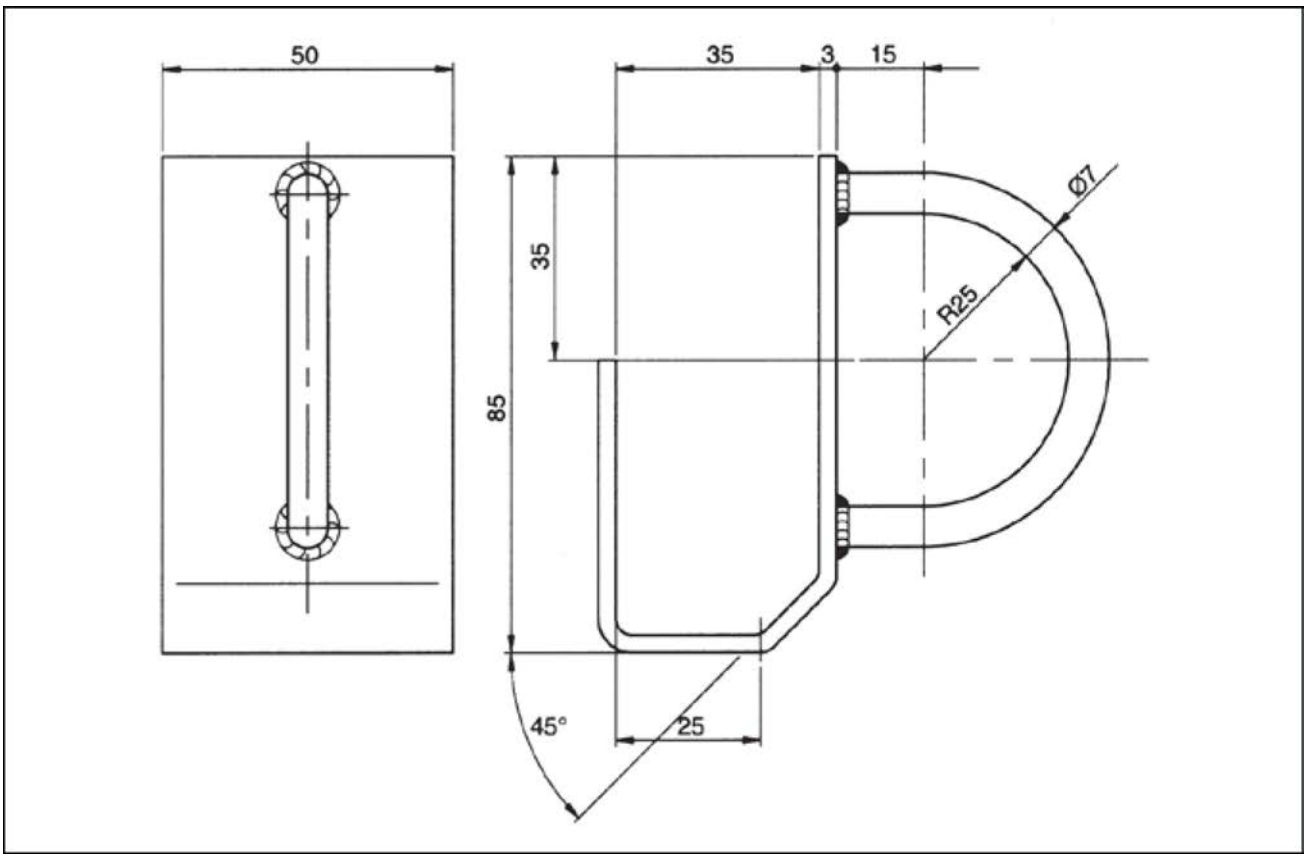

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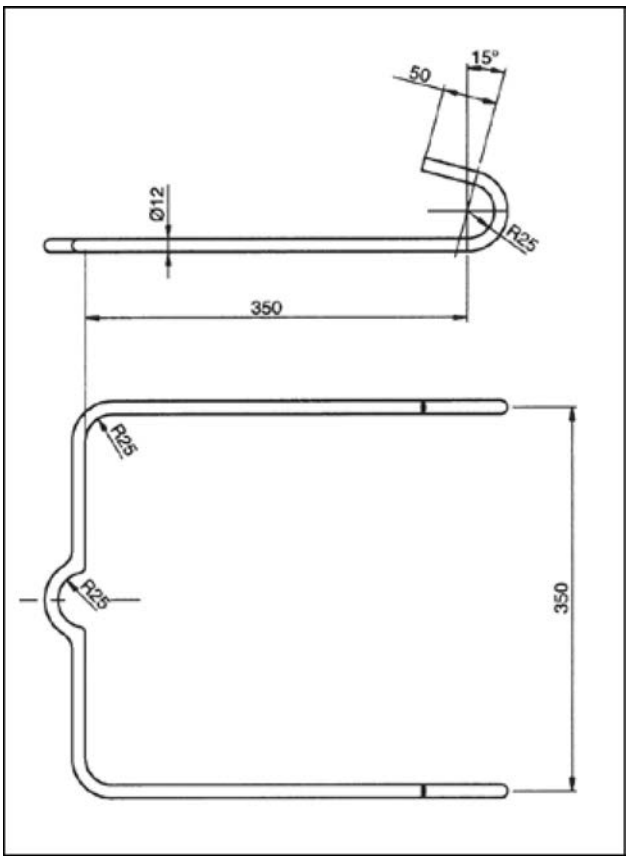
50131: Supports for lifting the hood: special tool (two units). Dimensions in mm. Material: UNI Fe 42C .

50132: Front hook for lifting the hood. Dimensions in mm.
Material: UNI C40.



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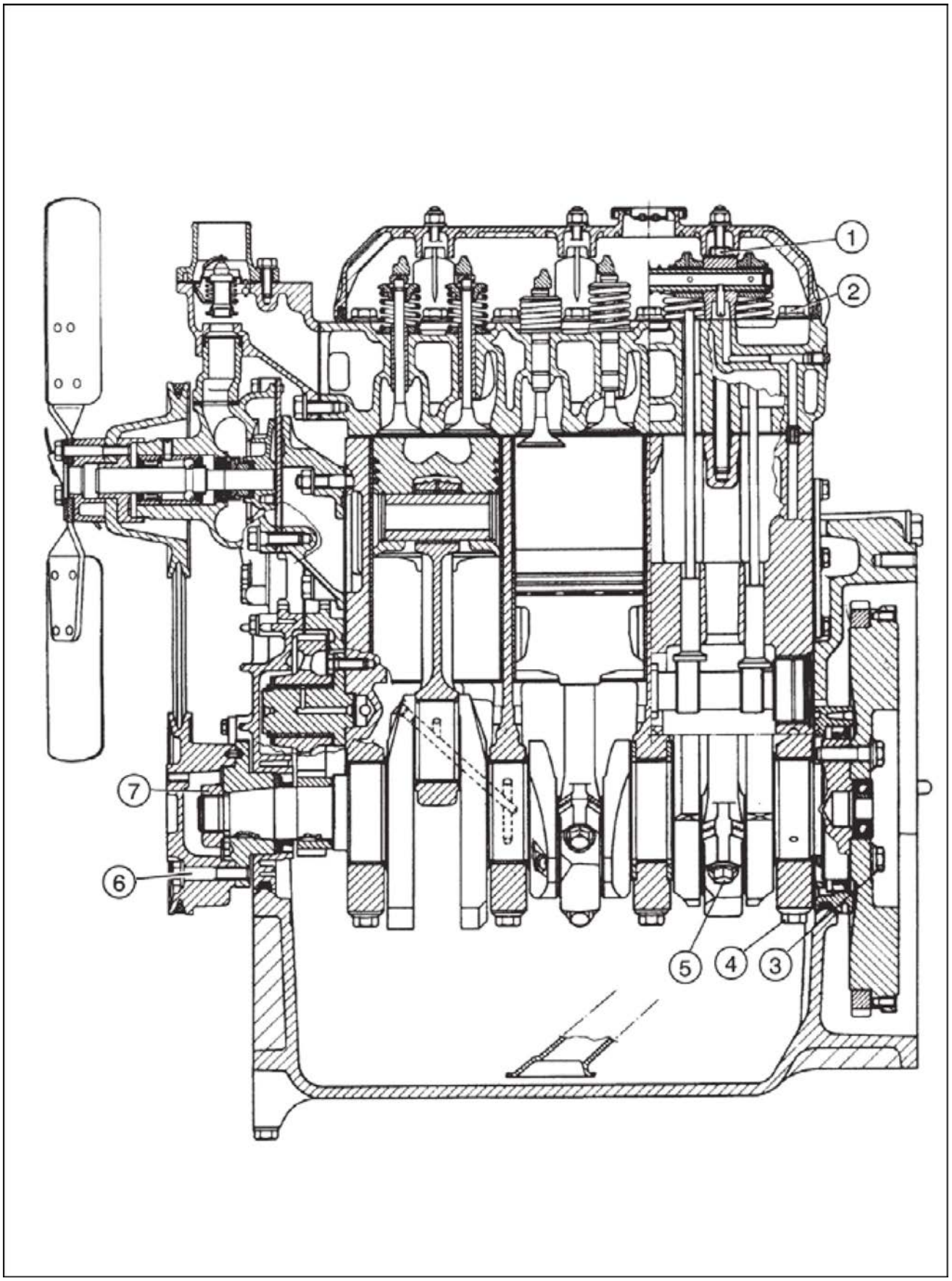
Engine - Sectional view

TT3840F	LA
TT3840	LA
TT3880F	LA
TT4030	LA

Longitudinal section of the 3 cylinder engine



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