ROTAX
AIRCRAFT ENGINES

SERVICE INSTRUCTION

STANDARDIZATION OF THE IGNITION UNIT FOR ROTAX® ENGINE TYPE 912 AND 914 (SERIES)

SI-912-013
SI-914-016

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲ WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of the engine type:

- 912 A from S/N 4,410.630
- 912 F from S/N 4,412.874
- 912 S from S/N 4,923.058
- 912 UL from S/N 4,406.291
- 912 ULS from S/N 5,643.680
- 912 ULSFR from S/N 4,429.972
- 914 F from S/N 4,420.426
- 914 UL from S/N 4,418.712

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

Due to our commitment to ongoing further development, we are now standardizing the ignition unit. This also includes modified wire routing, wire quality, wire lengths, fasteners and plug connections.

1.4) Subject

Standardization of the ignition unit for ROTAX® engine type 912 and 914 (Series)

1.5) Compliance

NONE - For Information Only

◆ NOTE: The standardized ignition unit is used in standard production starting from the engine numbers described in section 1.1.

1.6) Approval

The technical content of this document is approved under the authority of DOA Nr. MOT. JA-03.

1.7) Manpower

none

1.8) Mass data

Change of weight - - - none

d03243

1.9) Electrical load data

no change

1.10) References

In addition to this technical information refer to current issue of

- Operator's Manual (OM)
- Installation Manual (IM)
- Line Maintenance Manual (MM-Line)
- Heavy Maintenance Manual (MM-Heavy)
- Illustrated Parts Catalog (IPC)

1.11) Interchangeability of parts

- Old and new parts are not interchangeable!
  It is therefore only possible to upgrade an old model ignition unit to the new design by replacing it entirely.
- However, all old parts are still available as spare parts.

◆ NOTE: See the applicable Illustrated Parts Catalog to order parts.

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Centers.

2.2) Company support information

Cost of conversion to other engine versions or additional work, including simultaneous overhaul, are not covered and will not be borne or reimbursed by ROTAX® .

2.3) Material requirement per engine

parts requirement:

Fig.no.	New part no.	Qty/engine	Description	Old part no.	Application
(2)	853125	1	Connector bracket	n. a.	Ignition electric set
(2)	966726	2	Electronic module	965358 / 966721	Ignition electric set
(2)	966218	4	Double ignition coil, cpl.	966215 / 966217	Ignition electric set
(4)	965178	1	Trigger coil kit	965177	Ignition unit
(4)	891095	1	Stator	996539 / 886670	Ignition unit
(2)	965784	2	Grounding cable, cpl.	965782	Ignition unit
(2)	265265	2	Connector housing, 6 pole	n. a.	Ignition electric set
(2)	260135	2	Locking grommet	n. a.	Connector housing, 6 pole
(2)	260135	2	Locking grommet	n. a.	Connector receptacle, 6 pole

2.4) Rework of parts

Old parts cannot be reworked or made interchangeable!

2.5) Special tooling/lubricant-/adhesives-/sealing compound - Price and availability

Special pin release tool by an applicable manufacturer are recommended for correct release of the faston electrical connectors from the connector housing.

◆ NOTE: The described pin release tool used at ROTAX® are made by HAZET. However, they are not part of our scope of supply.

Parts requirement:

Fig.no.	part no.	Qty/engine	Description	Application
(1)	4663-6	1	HAZET-pin release tool	plug connections 6 pole

■ CAUTION: In using these special tools observe the manufacturer´s specifications.

3) Accomplishment / Instructions

All the measures must be taken and confirmed by the following persons or facilities:

- ROTAX®-Airworthiness representative
- ROTAX® -Distributors or their Service Centers
- Persons approved by the respective Aviation Authority
- *Persons with type-specific training (applicable only for non-certified engines)*

▲WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation. Secure aircraft against unauthorized operation. Disconnect negative terminal of aircraft battery.

▲WARNING: Perform work on a cold engine only.

▲WARNING: Should removal of a locking device (namely lock tabs, self-locking fasteners) be required when undergoing disassembly/assembly, always replace with a new one.

◆ NOTE: All work has to be performed in accordance with the relevant Maintenance Manual.

Accomplishment

◆ NOTE: The tasks listed are intended to give an understanding of the changes to the new ignition unit and to explain the procedures for repairs to the new unit.

3.1) Remove ignition electric set

See fig. 1

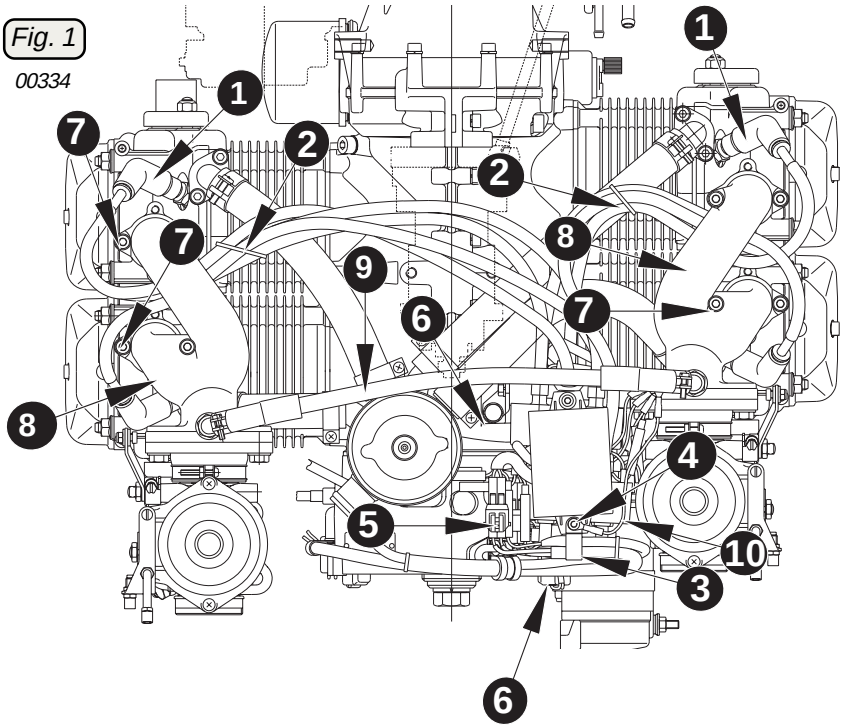
The ignition electric set, consisting of 2 electronic modules and 4 double ignition coils, is attached to the engine on 3 rubber buffers. For removal, detach all 8 spark plug connectors (1) from the spark plugs. Cut the cable straps for the 4 lower spark plug connectors and draw the ignition cables with protection hose through the cylinder heads. Be careful not to lose the ignition cable marking sleeves.

◆ NOTE: On engines with hydraulic propeller governor it is necessary to remove also the spark plug connectors of the 2 upper spark plugs of cylinders 2 and 4 from the ignition cables to allow easy removal of the ignition cables.

Disconnect all cable straps (2) for ignition cable fixation and the plug connectors. Remove cable clamp (3) and grounding cable (10) after removal of Allen screw M5x25 (4) at the electronic module. Disconnect both 6-pole plug connections (5) of the pick-up cables and push the two connector receptacles off of the connector bracket. Detach both fasteners (6) of the ignition electric set (1 x M6 on bracket (ignition housing) and 1 x M8 on crankcase).

Remove 4 Allen screws M6 (7) from each of the two intake manifolds (8). Now, proceeding with great care, the 2 intake manifolds (8) with O-rings, compensating tube (9), fuel line and ignition electric set can be removed. Plug all 4 intake apertures to avoid entry of foreign matter.

Fig. 1
00334



3.2) Disassemble ignition electric set

See figs. 2, 6 and 7

◆ NOTE: Before removal, mark all 8 ignition cables and check the correct application of the marking sleeves ❶ ❷ ❸ ❹ (Top/Bottom) of cylinders no. 1 to 4, to avoid mix-up at reassembly.

Detach the remaining tie wraps (25) from the spark plug connectors and unscrew the spark plug connectors.

Remove Allen screw M5x25 (6) for the electronic modules (7) and pull them out of the connector bracket. Unscrew the two hex. screws M6x16 (8) with the lock washer A6 from the intake manifold and remove the ground cables (9) from the two electronic modules and grounding cable for the pick-up cable harness (26). Make sure the connection between electronic modules and ignition coils is correct.

Double ignition coil renewal

At replacement of a double ignition coil, the following disassembly procedure is required:

Remove hex. nut M6 (11) and rubber buffer (12) with bracket (13). Using Allen wrench, loosen Allen screw M6x16 (14) on the rubber buffer (15) and remove ignition coil bracket (28). Unscrew the two Allen screws (16) and remove ignition coil bracket (17) and rubber buffers (18) with bracket (19).

Loosen the two Allen screws M6x30 (20) on the distance nut M6 (21) and remove connector bracket (42). After detaching the double ignition coils (22) with fixation latch (37), they can be replaced individually. To do this,remove the applicable primary ignition wires (white/blue) from the connector housing using the special pin release tool. The secondary high voltage ignition cables are screwed into the double ignition coil via a threaded prong and therefore are also replaceable.

◆ NOTE: Except for the double ignition coil (23) for spark plug 3 top and 4 bottom, all are attached in the same position, with boss (24) upward.

3.3) Assemble ignition electric set

See figs. 2, 6 and 7

Re-assembly of double ignition coils is in reversed sequence of removal.

Screw applicable secondary high voltage igniton cables, with protection hose, onto the dual ignition coils.

◆ NOTE: The applicable cable length and assignment can be found in the most recent Illustrated Parts Catalog.

Attach the double ignition coils offset and in the correct position, refer to illustration, with fixation latch (37) and connector bracket (42) with the two Allen screws M6x30 (20) and lock washers A6 with distance nut M6 (21). Note the double ignition coil (23) for spark plugs 3B and 4B. It must be attached up side down, compared with the 3 other double ignition coils (see fig. 2).

With the two Allen screws M6x20 (16), lock washer A6 and hex. nut M6, reassemble, the ignition coil bracket (17), ignition coil bracket (19) and the double ignition coils, first only loosely tightening.

Insert ignition cable (27) into the ignition coil bracket (28), and attach the double ignition coils on rubber buffer (15) with the Allen screw (14) M6x16 and lock washer.

◆ NOTE: When replacing the rubber buffers (15), secure them with LOCTITE® 221 on the intake manifold.

Make the faston connector connections of the white/blue primary wires of the double ignition coils; be sure to refer to the wiring diagram (figs. 6 and 7).

■ CAUTION: The different ignition distribution of engine types 912/914 is achieved with the different connector configuration on the 6-pole connector housing (see figs. 6 and 7 item (16)).

Route the grounding wire (9) towards the outside. To achieve correct distance, attach the electronic modules (7) on the ignition coil brackets with Allen screws (6) M5x25.

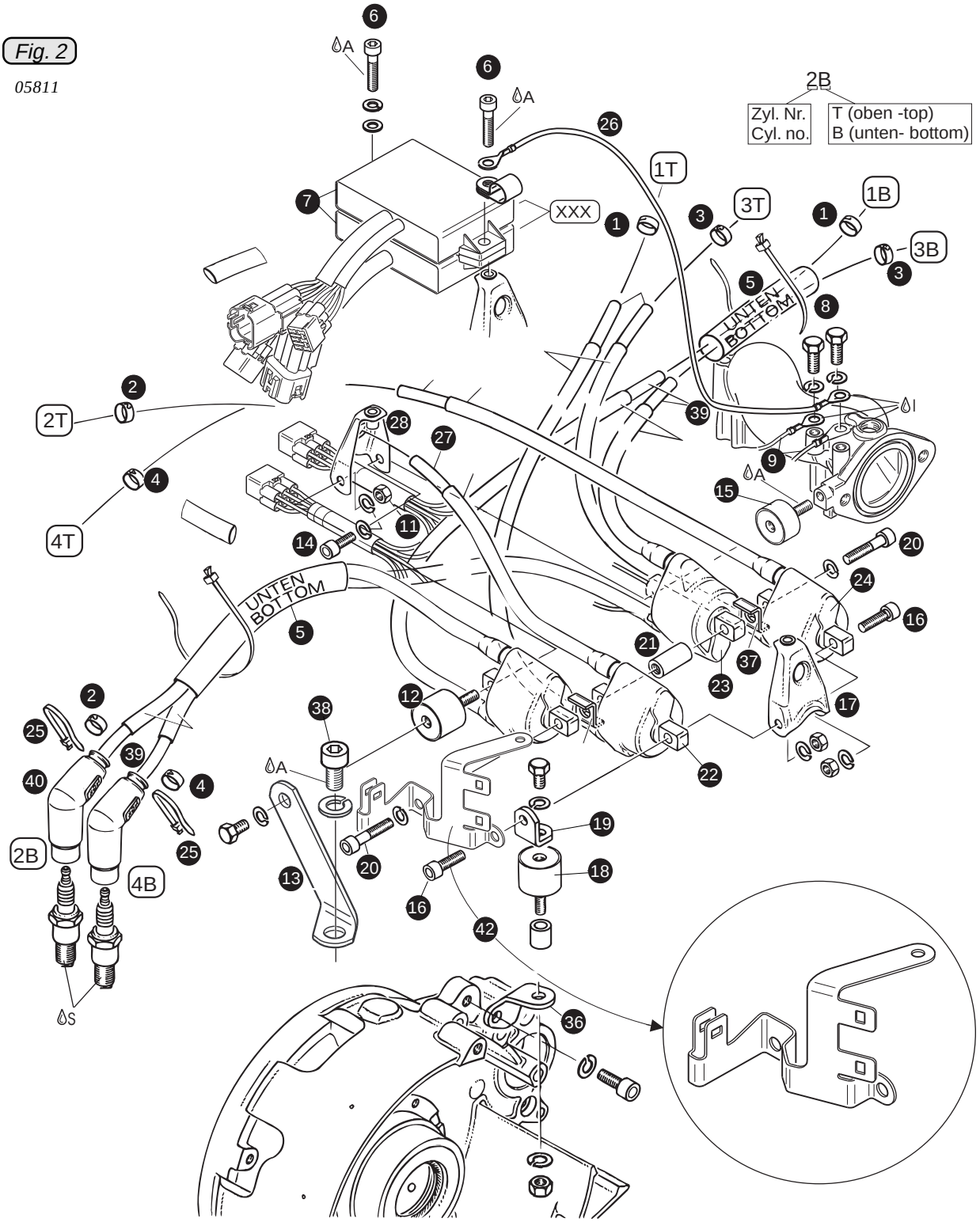
Now all ignition coil fasteners can be tightened. Tighten ignition coil bracket (13) and rubber buffers (12) with hex. nut M6 and lock washer.

Now engage the 6-pole connector receptacle of the electronic module with the connector holder (42) and attach the connector housing of the double ignition coils.

■ CAUTION: Make sure the attachment position A/B and the position on the connector bracket are correct!
Plug connection A —> towards magneto side position
plug connection B —> towards power take off side position

Fig. 2

05811



◊A: LOCTITE 221

◊I: LITHIUMSEIFENFETT
LITHIUM BASE GREASE

◊S: SILIKON WÄRMELEITPASTE / Silicone heat compound

3.4) Install ignition electric set

See Figs. 1, 2, 3, 6 and 7

Place O-rings (33) 34x2 into the groove (34) of the cylinder heads and remove the protections from the intake holes. Install pre- assembled ignition electric set on the two intake manifolds (35) and tighten crosswise with 4 Allen screws and lock washers each to 10 Nm (90 in.lb.). Insert rubber buffers (18) into bracket (36) of the ignition housing and tighten with hex. nut and lock washer.

Place bracket (13) into position and attach ignition electric set with hex. screw (38) M8, washer and lock washer on crankcase. Now retighten screws and nuts of the ignition electric set.

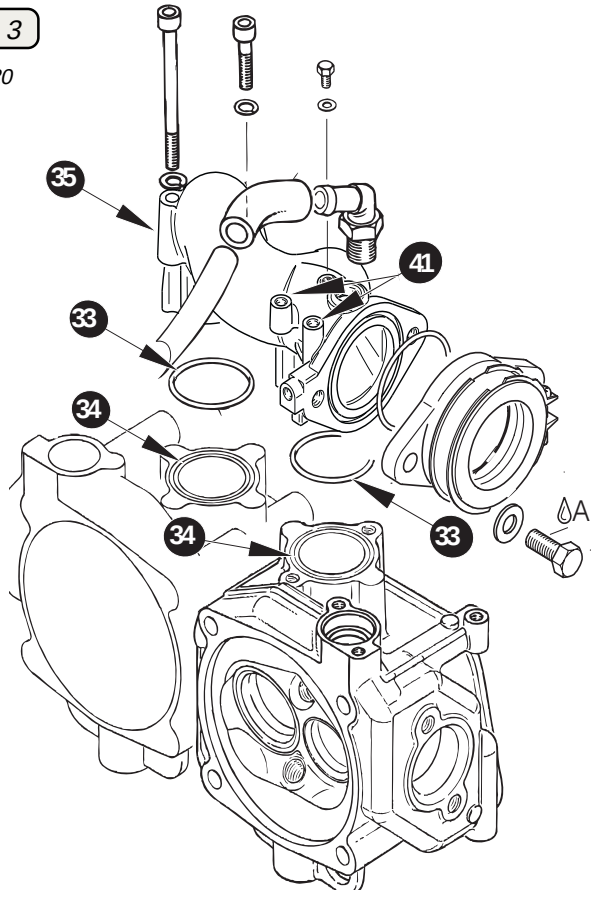
Attach grounding wires (9) and (26) on boss (41) of intake manifold with hex. screw (8) M6x16 and lock washer. Engage the 6-pole connector receptacle of the trigger coil kit with the connector holder (42) and attach the connector housing of the electronic modules.

◆ NOTE: The trigger cable of ignition circuit **A** (top module) is marked at the end of the isolating hose with the colors blue and red. Those of ignition circuit **B** (bottom module) are marked with colors green and colorless (no marking band).

◆ NOTE: Make sure the attachment position on the connector bracket is correct!
Plug connection A —> ”top”
Plug connection B —> ”bottom”

Fig. 3

05820



Route the whole cable assembly into the cable clamp and attach electronic module with Allen screw (6) M5x25 with Loctite 221 on the ignition coil bracket (17).

■ CAUTION: The cable shielding must be fully inserted into the cable clamp ensure the optimum radio noise suppression.

Insert two ignition cables (39) each for the lower spark plugs into the red silicone protection hose (5) and route them between the cylinder heads. Install the marking sleeves (1 - 4) onto the ignition cables, refer to wiring diagram, and screw resistance spark plug connectors (40) onto the ignition cables, attach with tie wraps and place on the spark plugs, refer to the wiring diagram, see figs. 7 and 8.

Attach ignition cables for cylinders 1 - 3 and 2 - 4 with new tie wraps on coolant hose, see fig. 1.

3.5) Stator removal and re-fitting

See fig. 4

Refer to latest Maintenance Manual for stator removal and re-fitting.

◆ NOTE: The new stator design differs from the old one as follows:
- Wire lengths of the charging wires (red) adjusted
- Charging wires integrated into the 6-pole connector receptacle, see wiring diagram figs. 7 and 8
- Wire material and insulation changed
- Serial number applied to stator

◆ NOTE: The wire routing is the same as the old version.

◆ NOTE: Use the pin release tool to remove faston connectors.

3.6) Replace trigger coil kit

Refer to latest Maintenance Manual for trigger coil kit removal and re-fitting.

◆ NOTE: The new trigger coil kit design differs from the old one as follows:
- Wire lengths have been adjusted
- Female faston wire connectors changed
- Wires integrated into the 6-pole connector receptacle, see wiring diagram figs. 7 and 8

◆ NOTE: The wire routing is the same as the old version.

◆ NOTE: Use the pin release tool to remove faston connectors.

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

3.7) Test run

Conduct test run including ignition check and leakage test.

4) Appendix

The following drawings / tables should provide additional information:

Fig. 4

05814

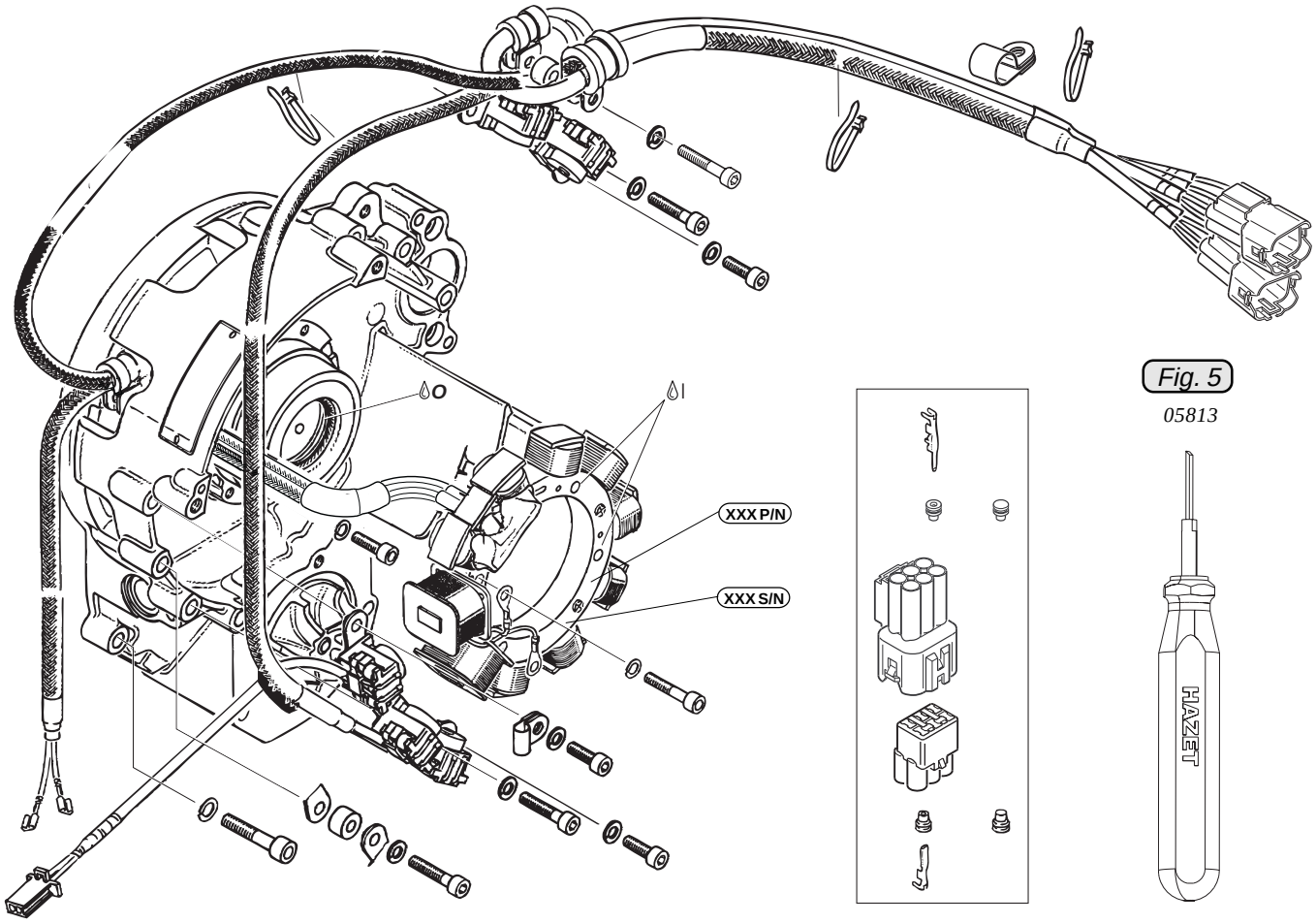


Fig. 5

05813

◆ NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.

Exploded views are **not technical** drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.

Fig. 6

05808

wiring diagram 912 Series

T = top = oben
B = bottom = unten

1. ignition magneto-generator
2. pick-up for ignition circuit A"
3. pick-up for ignition circuit B"
4. pick-up for rev-counter
5. plug receptacle 2-pole
6. electronic tachometer
7. shorting switch for ignition circuit "A" and "B"
8. plug receptacle 6-pole
9. electronic module for circuit "A"
10. electronic module for circuit "B"
11. double ignition coil
12. engine
13. cylinder 1-4
14. spark plugs
15. charging coils
16. plug receptacle 6-pole

V consumer connection
o colour code

ignition circuit A: 1 u. 2 TOP
3 u. 4 BOT
ignition circuit B: 1 u. 2 BOT
3 u. 4 TOP

bl	blue
br	brown
ge	yellow
gn	green
ro	red
rs	pink
sw	black
ws	white
or	orange

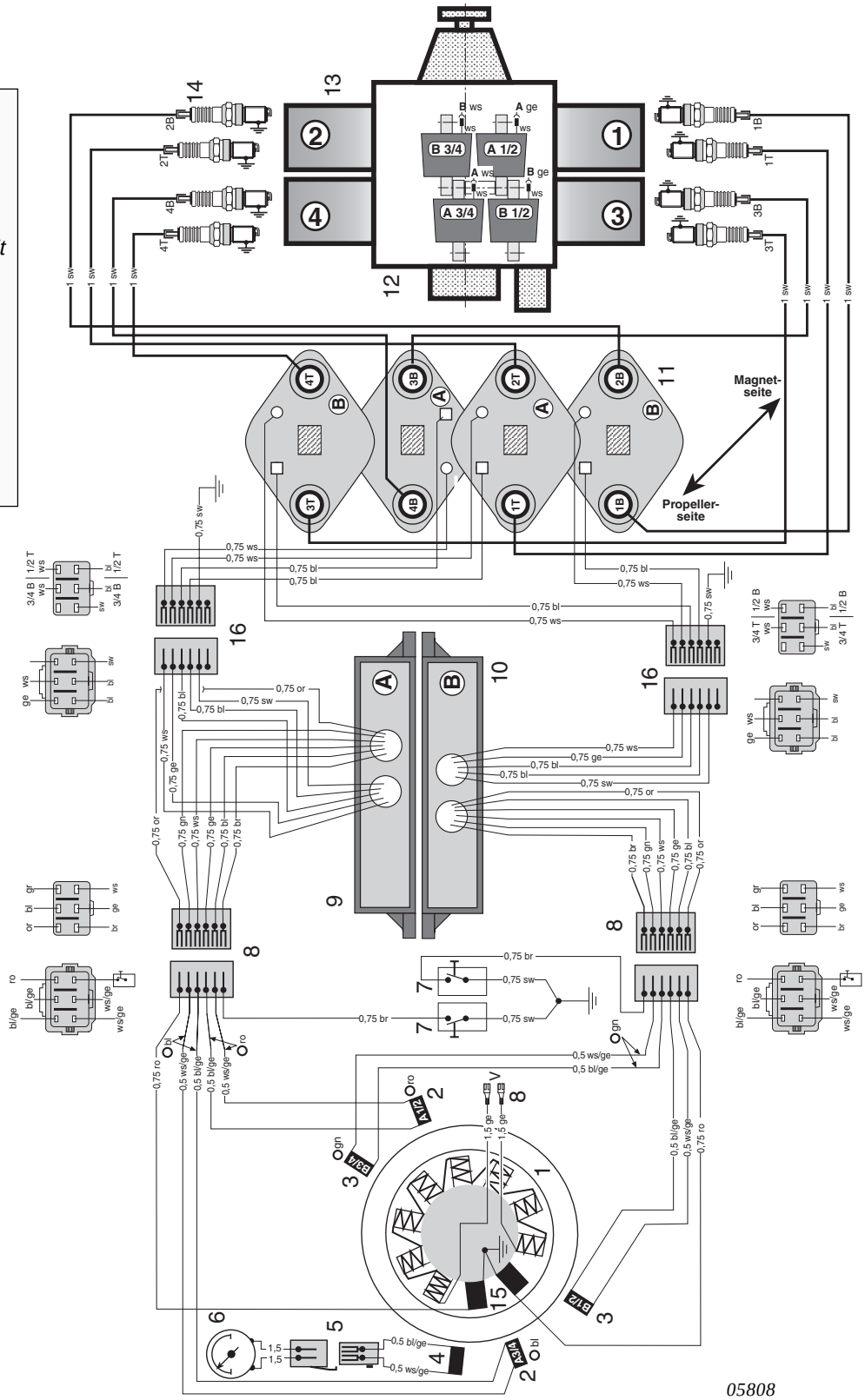


Fig. 7

wiring diagram 914 Series

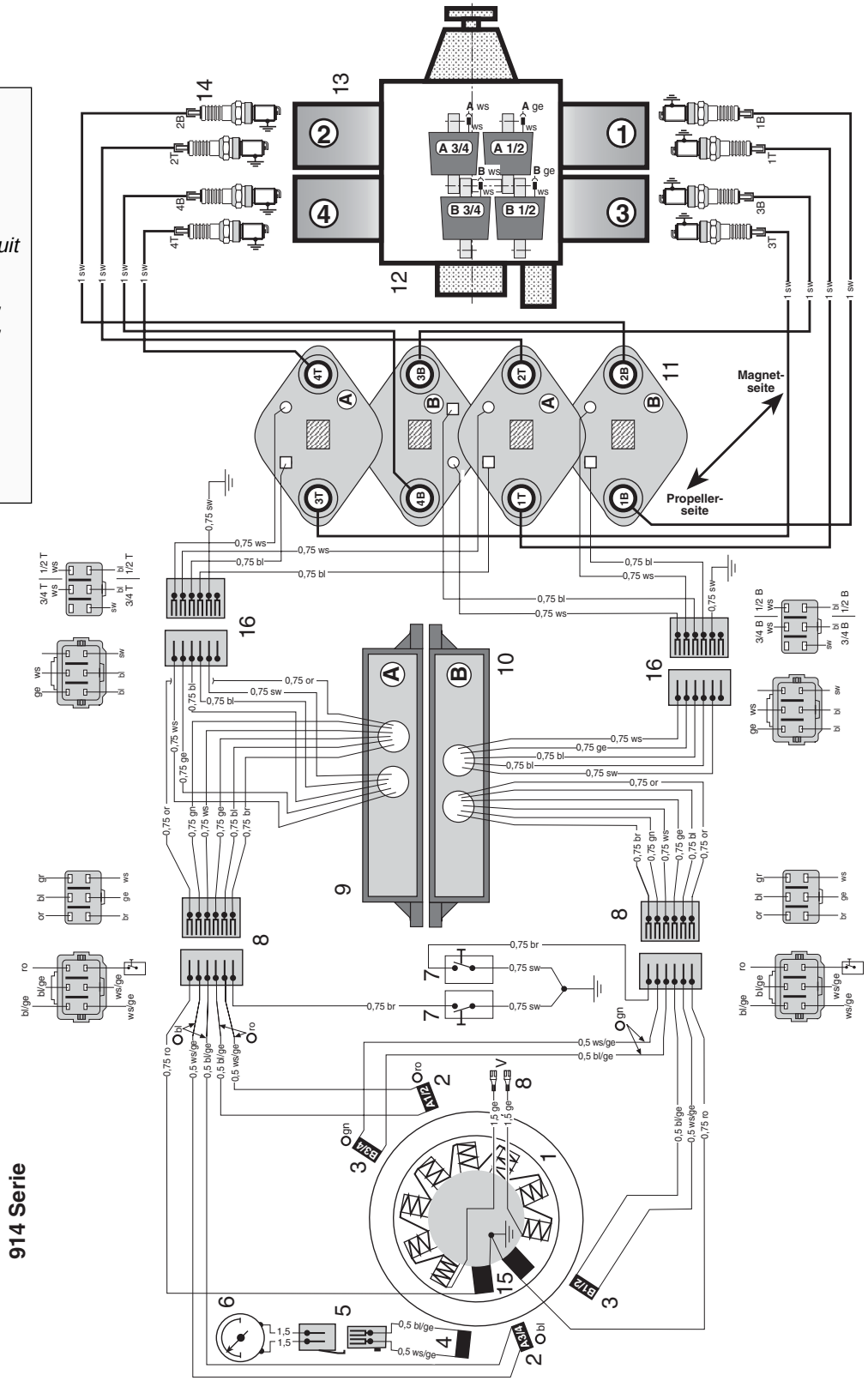
05809

T = top = oben
B = bottom = unten

1. ignition magneto-generator
2. pick-up for ignition circuit A"
3. pick-up for ignition circuit B"
4. pick-up for rev-counter
5. plug receptacle 2-pole
6. electronic tachometer
7. shorting switch for ignition circuit "A" and "B"
8. plug receptacle 6-pole
9. electronic module for circuit "A"
10. electronic module for circuit "B"
11. double ignition coil
12. engine
13. cylinder 1-4
14. spark plugs
15. charging coils
16. plug receptacle 6-pole

V consumer connection
o colour code

ignition circuit A: 1 - 4 TOP
ignition circuit B: 1 - 4 BOT



bl	blue
br	brown
ge	yellow
gn	green
ro	red
rs	pink
sw	black
ws	white
or	orange

05809