



**HPH spol.s r.o.**  
Čáslavská 234  
Kutná Hora, Česká republika

**Procedure of  
Starter Power Cable Harness Modification  
to Meet SB HPH 304TS-03a)**

Glider type	<b>HpH 304 TS</b>	Mfg No.	<b>See SB</b>	Registry	various
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The purpose of this document is to provide supplementary material for procedures described in service bulletin (SB) HPH 304TS-03 a), depending on tools availability and possibility of their use within the luggage compartment. The SB describes procedures used to modify the 304TS-82-98 starter cables - installation of 80A fuse boxes as Action 1 and installation of cable inserts as Action 2.

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NOTE: All maintenance work must be carried out and certified by qualified and authorized personnel.

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This document provides the following options of procedures for completing the SB:

**A) Modification of the starter battery cable in its original position (as described in SB )**

see page 2

**B) Modification of the starter battery cable after its removal from the plane**

see page 3

**C) Replacement of the starter battery cable with new product**

see page 9



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**A) Modification of the starter battery cable in its original position (as described in SB )**

Material:

As described in SB Action 1, i.e.

- MTA 0300360 fuse holders, 2pcs
- MTA-1708250 terminals or equivalent (crimped, on cable, for M5 screw mounting) – 4pcs
- 80A fuses – MTA MIDIVAL-80A or equivalent (blade type, 32V DC, 80A rating, fuse size 40mm, mounting by M5 screws with 30mm mounting hole spacing) – 2pcs
- Heat shrink tubing, red color, size 8/4
- AWG7 cable (10mm<sup>2</sup>), red insulation
- Drawing 304TS-82-98
- 304S-82-90 connector inserts variant A - 4pcs + cable ties 4 pcs OR 304S-82-90 connector inserts variant B - 4pcs + Heat shrink tubing, red color, size 9.5/4.75 – 100 mm

Tools:

- Set of metric sized tools (wrenches and/or sockets, hex keys)
- Cutting pliers
- Crimping pliers (suitable for MTA-1708250 terminals)
- Heat gun

Procedure:

As described in SB Action 1 and Action 2.



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**B) Modification of the starter battery cable after its removal from the plane**

Material:

- MTA 0300360 fuse holders, 2pcs
- MTA-1708250 terminals or equivalent (crimped, on cable, for M5 screw mounting) – 4pcs
- 80A fuses – MTA MIDIVAL-80A or equivalent (blade type, 32V DC, 80A rating, fuse size 40mm, mounting by M5 screws with 30mm mounting hole spacing) – 2pcs
- Heat shrink tubing, red color, size 8/4
- AWG7 cable (10mm<sup>2</sup>), red insulation
- Cable ties
- Drawing 304TS-82-98
- 304S-82-90 connector inserts variant A - 4pcs + cable ties 4 pcs OR 304S-82-90 connector inserts variant B - 4pcs + Heat shrink tubing, red color, size 9.5/4.75 – 100 mm

Tools:

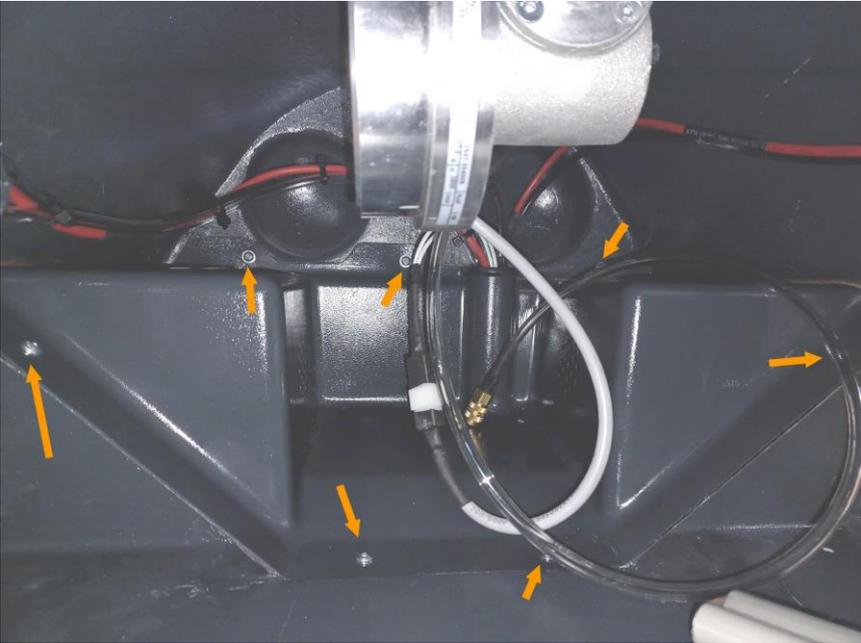
- Set of metric sized tools (wrenches and/or sockets, hex keys)
- Cutting pliers
- Crimping pliers (suitable for MTA-1708250 terminals)
- Heat gun

Procedure:

Step	Action
B-1	<b><u>Initial condition</u></b> The procedure is performed on a sailplane fuselage with wings removed. The fuselage is secured in a cradle (e.g. from a Cobra trailer) or similar holder, positioned so that the lower avionics compartment (hatch located on the fuselage underside aft of the landing gear) is accessible for work.
B-2	<b><u>Preparation</u></b> Remove starter batteries from the holders. Store them securely.
B-3	Disconnect avionic power sources.
B-4	Check that both the main switch and engine main switch are OFF.
B-5	<b><u>Cable removal</u></b> Remove all free items from the luggage compartment Remove the rear luggage compartment floor. It is attached with seven screws – four in the front, three in the back (see Fig. B1)

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Glider type	<b>HpH 304 TS</b>	Mfg No.	<b>See SB</b>	Registry	various
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Step	Action
	 <p><i>Fig. B1 – Luggage compartment floor (behind the rear headrest), screws indicated with orange arrows</i></p>
B-6	<p>Remove the cover of the engine avionics compartment (located on the fuselage underside, aft of the landing gear).</p> <p>Disconnect the battery cables from the starter relay located on the compartment's rear wall.</p> <p>Positive (red) cables are fastened to a threaded terminal on the top of the relay, the negative (black) cables are fastened to the relay mounting plate (see Fig. B2 and B3)</p>

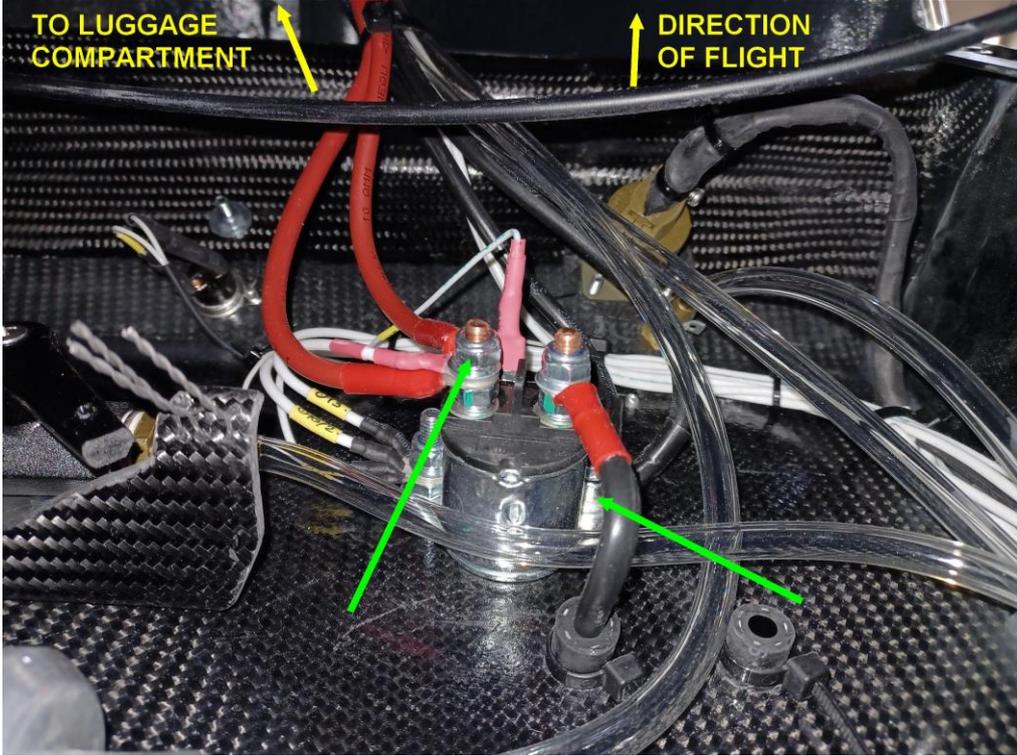
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Step	Action
B-6 (cont.)	 <p><i>Fig. B2 – Engine avionic compartment viewed through the bottom hatch, starter relay indicated with green circle and arrow</i></p>

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 Starter Power Cable Harness Modification  
 to Meet SB HPH 304TS-03a)**

Glider type	<b>HpH 304 TS</b>	Mfg No.	<b>See SB</b>	Registry	various
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Step	Action
	 <p><i>Fig. B3 – Starter relay, closeup. Cable attachment points indicated by green arrows.</i></p>
B-7	Remove all cable ties connecting the starter cables to the rest of the bundle going into the luggage compartment
B-8	Remove the battery connectors on the other side of the cables from the battery holders
B-9	Carefully pull the cables out
B-10	<b><u>Cable modification</u></b> Cut the red cable leading to the „+“ connector terminal 35-55mm from the connector
B-11	Check the terminal dimensions to determine the extent of insulation to be stripped and the length of the heat shrink tube needed
B-12	Strip the insulation and put the heat shrink tube on the cable end. Move the shrink tube so that it doesn't interfere during terminal attachment.
B-13	Attach the crimp-on terminal. Terminal blade should be parallel to the flat side of the battery connector. Secure the crimped end with heat shrink tube.
B-14	Test-fit the terminal into the fuse cover to determine the length to be cut from the other end of the red cable.
B-15	Cut the free end of the red cable in position determined in previous step.
B-16	Strip insulation from the free end of the cable (extent should be identical to step B-11)

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Step	Action
B-17	Attach a ~25mm length of shrink tube to the free end of the cable
B-18	Attach a crimp-on terminal (blade should be parallel to the blade on the connector side), secure the crimped end with heat shrink tube
B-19	<p>Install both terminals and the 80A fuse into the fuse box according to Fig. B4. Align the fuse box base with the plane of the flat side of the connector, then attach first the terminals, then the fuse on the M5 studs and secure with M5 locking nuts provided with the fuse cover. Close the fuse box cover.</p>  <p align="center"><i>Fig. B4 – Fuse box detail</i></p>
B-20	<p><b><u>Installation of modified cables</u></b>          Replicate the routing of the original cables with the new cables, attach them on the relay end</p> <p><b>NOTE:</b>          Different cable lengths are used for left and right side battery holders – ensure that the cables are reinstalled on the same side from which they were removed previously.          Early production planes have both battery holders on the same side of the fuselage – disregard this note in such case.</p>
B-21	Attach the battery connectors back in their original positions. The fuse covers should have their bases aligned to the battery holder, but are not otherwise secured (see Fig. B5)

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Step	Action
	 <p align="center"><i>Fig. B5 – Battery connector with fuse box (indicated by green arrow).            Current production 304TS with two single holders on opposite sides of the luggage compartment, early planes have a double holder on one side.</i></p>
B-22	Tie the starter cables to the rest of the original cable bundle
B-23	Install the luggage compartment floor back in its original place. Make sure the cable bundle goes through the tunnel in the floor and isn't impeded or squeezed in any way.
B-24	Reattach the batteries. Check system function.
B-25	As described in SB Action 1 and Action 2.

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**C) Replacement of the starter battery cable**

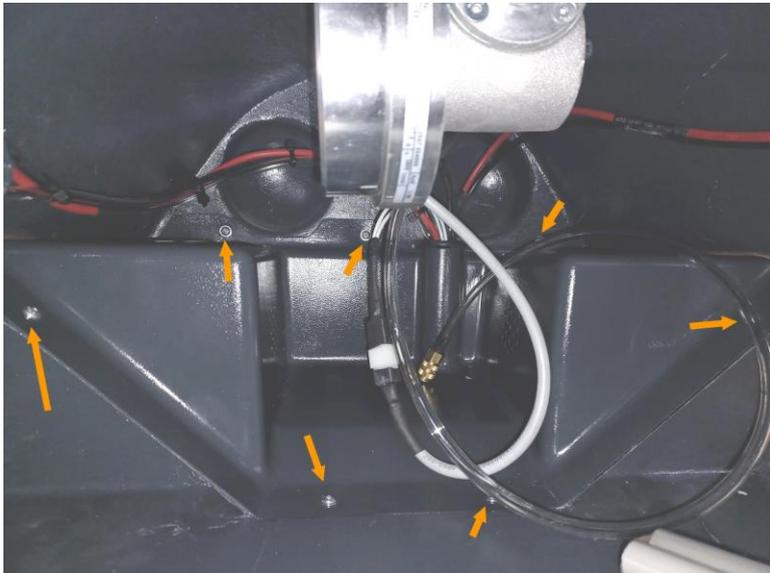
Material:

- 304TS-82-98 cable, 2pcs
- Cable ties

Tools:

- Set of metric sized tools (wrenches and/or sockets, hex keys)
- Cutting pliers

Procedure:

Step	Action
C-1	<p><b><u>Initial condition</u></b>            The procedure is performed on a sailplane fuselage with wings removed.            The fuselage is secured in a cradle (e.g. from a Cobra trailer) or similar holder, positioned so that the lower avionics compartment (hatch located on the fuselage underside aft of the landing gear) is accessible for work.</p>
C-2	<p><b><u>Preparation</u></b>            Remove starter batteries from the holders. Store them securely.</p>
C-3	Disconnect avionic power sources.
C-4	Check that both the main switch and engine main switch are OFF.
C-5	<p><b><u>Cable removal</u></b>            Remove all free items from the luggage compartment            Remove the rear luggage compartment floor. It is attached with seven screws – four in the front, three in the back (see Fig. C1)</p> 

*Fig. C1 – Luggage compartment floor (behind the rear headrest), screws indicated with*

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Step	Action
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*orange arrows*

Remove the cover of the engine avionics compartment (located on the fuselage underside, aft of the landing gear).  
 Disconnect the battery cables from the starter relay located on the compartment's rear wall.  
 Positive (red) cables are fastened to a threaded terminal on the top of the relay, the negative (black) cables are fastened to the relay mounting plate (see Fig. C2 and C3).

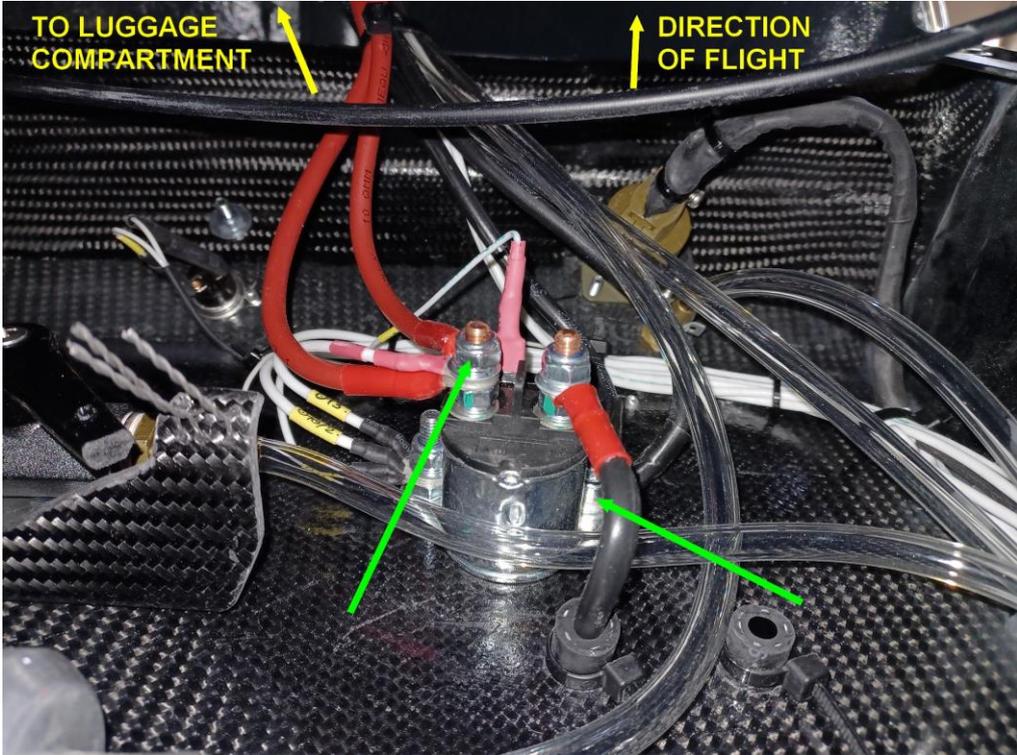
C-6



*Fig. C2 – Engine avionic compartment, viewed through the opening on the fuselage underside. Starter relay indicated with green circle and arrow*

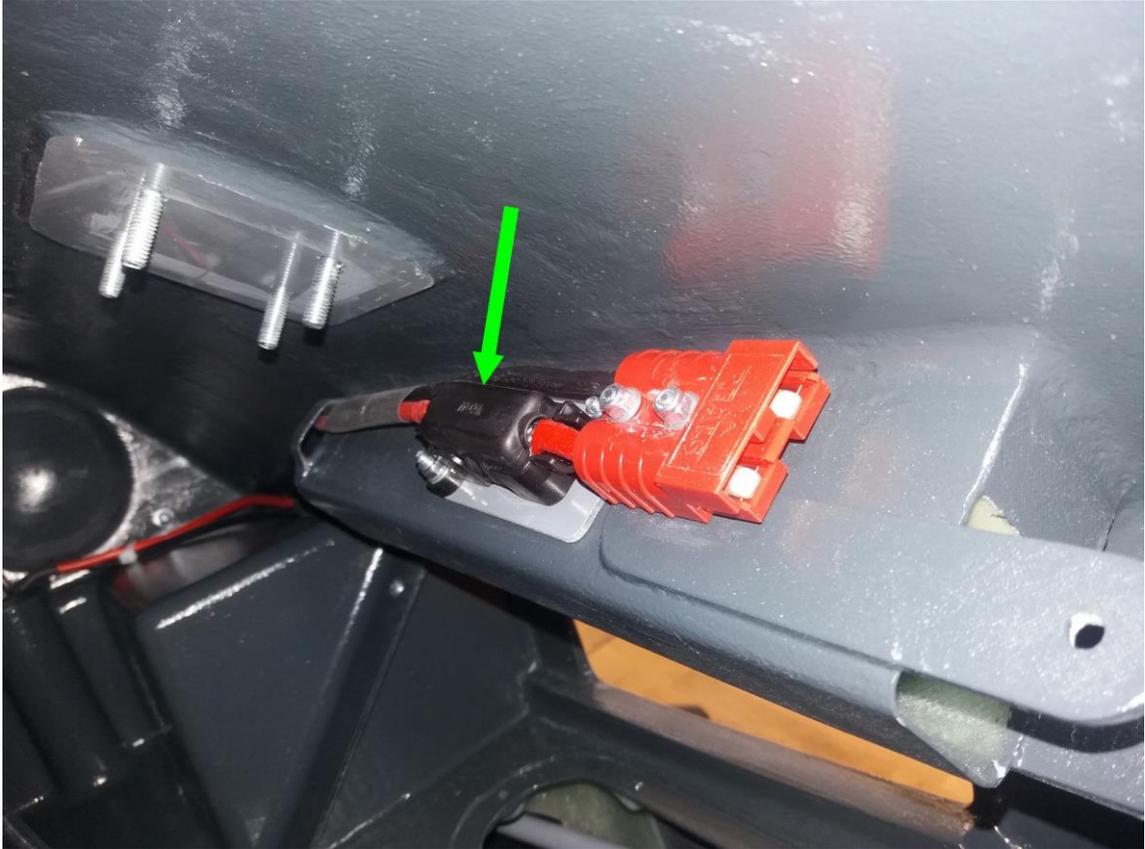
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Step	Action
C-6 (cont.)	 <p><i>Fig. C3 – Starter relay, closeup. Cable attachment points indicated by green arrows.</i></p>
C-7	Remove all cable ties connecting the starter cables to the rest of the bundle going into the luggage compartment
C-8	Remove the battery connectors on the other side of the cables from the battery holders
C-9	Carefully pull the cables out
C-10	<p><b><u>Installation of new cables</u></b>            Replicate the routing of the original cables with the new cables, attach them on the relay end</p> <p><b>NOTE:</b>            The cables provided by HpH have different lengths for left and right side battery. The longer cable should be used for right side battery (right side relative to flight direction – on the left when looking into the luggage area from the cockpit).            Early production planes have both batteries on one side. In that case the longer cable should be used for the top battery. Any kink or bend used to equalize cable lengths should be located in the lower avionics compartment and fixed in place.</p>
C-11	Attach the battery connectors back in their original positions. The fuse covers should have their bases aligned to the battery holder, but are not otherwise secured (see Fig. C4)

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Step	Action
	 <p align="center"><i>Fig. C4 – Battery connector with fuse box (indicated by green arrow).        Current production 304TS with two single holders on opposite sides of the luggage compartment, early planes have a double holder on one side.</i></p>
C-12	Tie the starter cables to the rest of the original cable bundle
C-13	Install the luggage compartment floor back in its original place. Make sure the cable bundle goes through the tunnel in the floor and isn't impeded or squeezed in any way.
C-14	Reattach the batteries. Check system function.