

<b>ADDRESSEES</b>	: ABC Customer Care and Parts Source
<b>VEHICLE MODEL</b>	: TX.. coaches equipped with Iteris lane departure warning system (LDW)
<b>MANUAL CHAPTER</b>	: 11.04 Control systems – Driver assistance systems
<b>DOCUMENT TYPE</b>	: <b>Informative</b>
<b>DATE</b>	: November 13 <sup>th</sup> , 2019
<b>SUBJECT</b>	: <b>To retrofit from Iteris to Wabco LDW2 lane departure warning system</b>

## INTRODUCTION

Van Hool has released a work procedure to assist ABC Companies in successfully retrofitting a TX.. coach factory equipped with an Iteris LDW system to a Wabco LDW2 system. The reason for this work procedure is the spare parts production stop for the Iteris LDW system.



**Figure 1: Iteris lane-departure warning system camera**



**Figure 2: Wabco LDW2 lane-departure warning system camera**

## PREPARATIONS

- Park the vehicle on a level floor.
- Apply the parking brake.
- Stop the engine.
- Switch off all systems and turn off the battery isolation switch on the dashboard.
- Put chocks in front of and behind the front-axle wheels.
- **Read the entire procedure before starting to work.**



### **WARNING!**

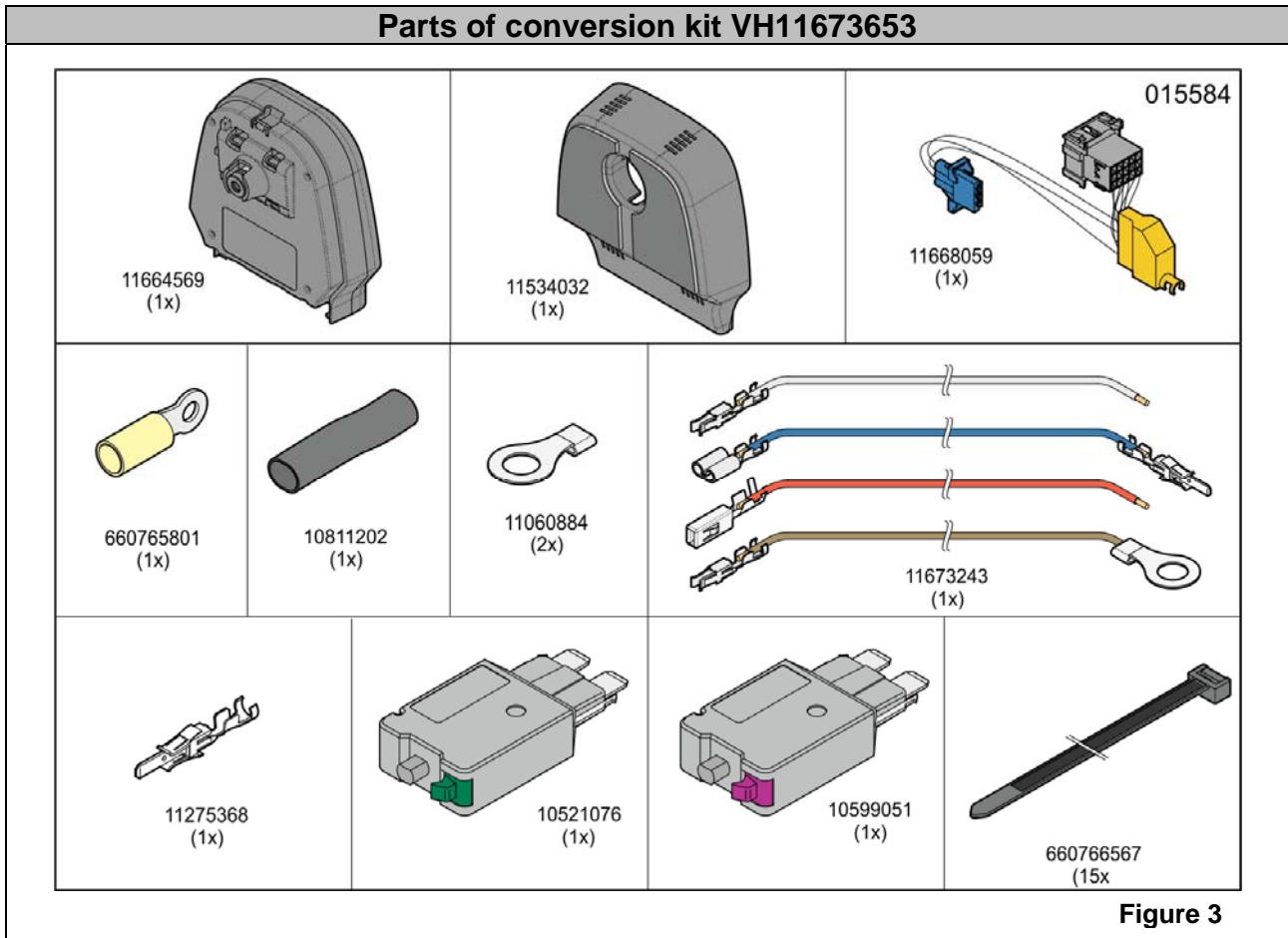
**Observe safe shop practices at all times.**

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## **SPECIAL TOOLS**

- LDW2 camera positioning tool: Van Hool caliper 91400409 (figure 16) or self-fabricated cardboard template (figure 15)
- Removal tool for MCP 2.8 connector terminal: VH10541368
- Removal tool for MCP 1.5K connector terminal: VH11063197

## **COMPONENTS AND PRODUCTS:**



<b>VH reference</b>	<b>Description</b>	<b>Qty</b>
11664569	Wabco LDW2 Camera (VH11626943) with parameters (VH11664549)	1
11534032	Camera support	1
11668059	Adapter cable	1
660765801	Cable terminal	1
10811202	Heat shrink tubing	1
11060884	Cable terminal	2
11673243	Electric wire kit (blue, grey, red, brown)	1
11275368	Cable terminal	1
10521076	Circuit breaker 6A	1
10599051	Circuit breaker 3A	1
660766567	Cable tie	15

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**PROCEDURE:**

Step	Action
1	Disconnect the connector socket from the Iteris camera.
2	Remove the Iteris camera from the windshield as described under "STEP 2 IN DETAIL".
3	Modify the vehicle wiring as described under "STEP 3 IN DETAIL".
4	Install the support of the Wabco LDW2 camera on the windshield as described under "STEP 4 IN DETAIL".
5	Secure the Wabco LDW2 camera into the support as described under "STEP 5 IN DETAIL".
6	Calibrate the Wabco LDW2 camera as described in work procedure WP984 "To calibrate LDW2 lane-departure warning system camera".
7	Register the works through the registration button located behind the work procedure on the Van Hool customer portal. Write the text "WP1048 completed on VIN..." in the "Remark" field.

*End of procedure.*

**STEP 2 IN DETAIL: To remove Iteris camera from windshield**

*NOTE: Use a spatula to remove the support. Any other tool, e.g. a screwdriver, might damage the windshield.*

Step	Action
2.1	Introduce a spatula between the glass and a corner of the support in order to detach the adhesive layer.
2.2	Starting in a corner, slowly detach the support from the glass by pulling.
2.3	Remove the remainders of glue on the windshield. This can be done easily by pulling the remainders of glue somewhat loose and rolling them with a finger.

**STEP 3 IN DETAIL: To modify vehicle wiring**

Step	Action
3.1	<b>At the right dashboard:</b> undo and remove the Torx screws securing the dash panel that holds the audio/video selector unit. Tilt the panel forwards so that the wiring behind can be reached.
3.2	<b>At the left side of the steering column:</b> remove the trim panel.  

**Figure 4**

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<p><b>3.3</b></p>	<p><b>At the connector socket disconnected from the Iteris camera:</b></p> <ol style="list-style-type: none"> <li>Remove the cable terminals of contact numbers 7, 8, 9 and 10 by using removal tool VH10541368.</li> <li>Cut off the cable terminals and isolate the wire ends with a heat shrink tubing.</li> <li>Introduce the female cable terminal of the red wire from the kit into contact number 7 of the connector socket.</li> <li>Route the other end of the red wire to the in-line junction point DVB11 located at the left side of the steering column (refer to figure 4). The in-line junction point DVB11 can be identified by the bundle of five grey wires.</li> <li>Secure the red wire on the way to other wiring with some cable ties from the kit.</li> </ol>
<p><b>3.4</b></p>	<p>Connect adapter cable 11668059 from the kit as follows:</p> <ol style="list-style-type: none"> <li>Connect the 15-pin connector plug of the adapter cable to the connector socket disconnected in step 1.</li> <li>Route the blue 3-pin connector socket of the adapter cable to the CAN splitter located behind the dashboard panel tilted in step 3.1, and connect it to a free blue CAN splitter connector plug (refer to figure 5).</li> <li>Route the remaining 16-pin connector socket of the adapter cable to the new camera location.</li> </ol> <div data-bbox="614 851 1141 1232" data-label="Image"> </div> <p><b>Figure 5</b></p>

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### 3.5

#### At the left side of the steering column:

- a. Strip back the in step 3.3 installed red wire over a distance of 15 mm (0.58 inch).
- b. Cut off the cable terminal of the in-line junction point DVB11 (identifiable by the bundle of five grey wires).
- c. Strip back the five grey wires over a distance of 15 mm (0.58 inch).
- d. Separate the five grey wires of junction point DVB11 into two bundles: one bundle containing the grey wires with printing "P51" and "S807"; the second bundle containing the three other grey wires.
- e. Crimp the red wire together with the grey wires with printing "P51" and "S807" to cable terminal 660765801 from the kit (refer to figure 6A). Cut off the eye of the cable terminal (refer to figure 6B) and insulate the remaining part of the cable terminal with heat shrink tubing 10811202 from the kit (refer to figure 6C).
- f. Crimp the grey wires with printing "M526.1" and "M526.2" each to a cable terminal 11060884 from the kit.
- g. Locate a ground stud and secure the grey wires with printing "M526.1" and "M526.2" to the ground stud.
- h. Locate the brown 36-pin connector P51.
- i. Unlock and disconnect the connector. Unlock the secondary locking device of the connector plug by pushing the big yellow button at the plug side.
- j. Remove the grey wire from contact number 3 by using removal tool VH11063197. Cut off the cable terminal and strip back the grey wire over a distance of 7,5 mm (0.29 inch).
- k. Crimp this grey wire together with the grey wire from the kit to cable terminal 11275368 from the kit.
- l. Introduce the cable terminal with the two grey wires into contact number 6 of the connector plug.
- m. Relock the secondary locking device of the connector plug by pushing in the two small yellow buttons at the plug side. Reconnect and lock connector P51.
- n. Locate dashboard switch S807 (LDW). Route the other end of the grey wire installed in step "3.5k" to dashboard switch S807.
- o. Disconnect the socket from dashboard switch S807. Remove at the back of the socket the grey wire from contact number 7 by using removal tool VH10541368. Secure this grey wire away with cable ties from the kit because it will not be reconnected.
- p. Introduce the female cable terminal of the grey wire installed in step "3.5k" into contact number 7 of the socket of switch S807.
- q. Secure the wires on the way with some cable ties from the kit.

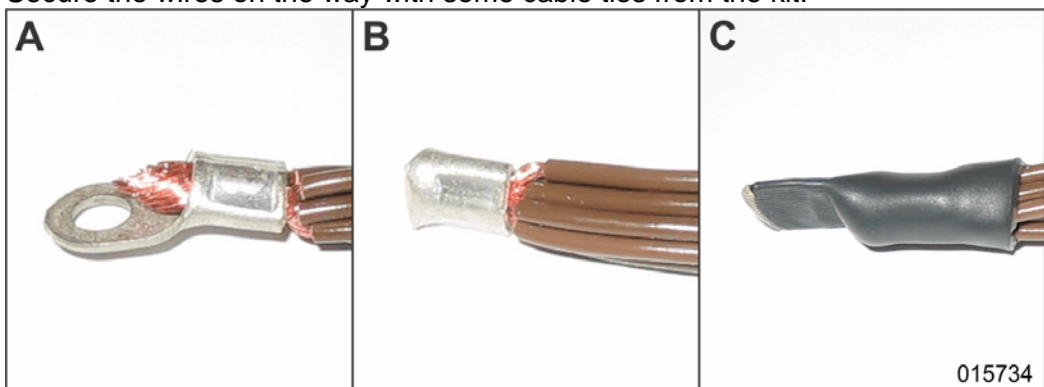


Figure 6: Making of a junction point

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### 3.6

#### In the main junction box (EK1):

- a. Locate the brown 36-pin connector P151.
- b. Unlock and disconnect the connector. Remove the secondary locking device from the connector plug.
- c. Introduce the male cable terminal of the blue wire from the kit into contact number 6 of connector plug P151. Route the other end of the blue wire to fuse holder ZB08.
- d. Reinstall the secondary locking device into the connector plug. Connect and lock connector P151.
- e. Introduce the female cable terminal of the blue wire into connection “8” of socket “7-8-G-H” of fuse holder ZB08 (refer to figure 7).
- f. Install 6A circuit breaker 10521076 from the kit into location 8 of fuse holder ZB08.
- g. Replace the 8A circuit breaker Z15.3 by 3A circuit breaker 10599051 from the kit.
- h. Locate node 2 of the multiplex system. Disconnect 22-pin connector socket “A” from the node by first depressing the locking tab and then carefully separating it from the node. The connector reference (A, B, C ...) has been stamped into the node housing.
- i. Fold the connector socket side covers open.
- j. Install the brown wire from the kit into contact number 3 of the connector socket.
- k. Close the connector socket sides and connect it again to the node.
- l. Secure the ring terminal of the brown electrical wire to a ground stud in the junction box. Secure the brown wire on the way to wiring making the same routing with cable ties from the kit.

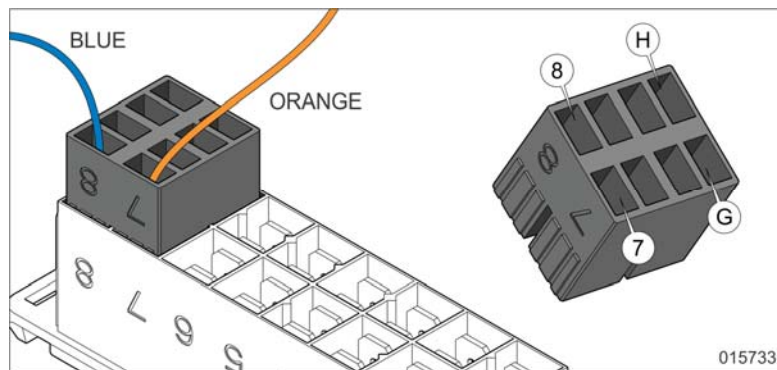


Figure 7: Fuse holder socket “7-8-G-H”

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**STEP 4 IN DETAIL:** To install new support of lane-departure warning system camera on windshield

*NOTE: Never reuse a removed support! The support has inevitably been deformed at removal. Discard the used support according to the locally applicable guidelines regarding protection of the environment.*

*NOTE: To position the lane-departure warning system camera properly on the windshield, you have to use a self-fabricated template (refer to figure 15 for the dimensions) or caliper VH91400409 (refer to figure 16).*

*NOTE: The support for the lane-departure warning camera is provided with a special adhesive layer with limited storage life. The mounting expiry date is mentioned on an adhesive label on the support (refer to figures 8 and 9). Never install a support of which the expiry date has elapsed.*



**Figure 8:** Location of adhesive label with expiry date on support

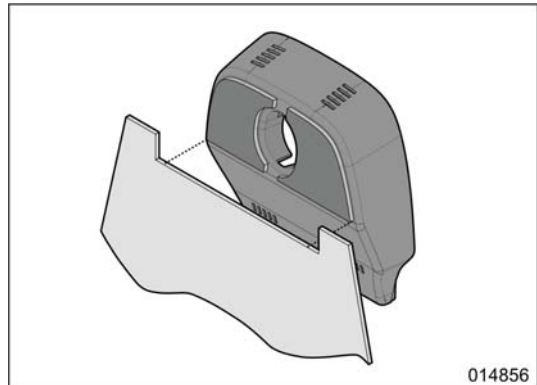


**Figure 9:** Mounting expiry date of support of lane-departure warning system (typical: February 2018)

Step	Action
4.1	Thoroughly clean the mounting area of the camera on the windshield. To this end, use a mix of 50% demineralized water and 50% isopropyl alcohol.
4.2	Position the lane-departure warning system camera by using the self-fabricated template or the Van Hool caliper. Make sure that the tool fits tightly against the windshield rubbers. Tape the tool onto the windshield.
4.3	On the interior side of the windshield, tape the template onto the windshield. Make sure that the bottom and the non-chamfered side of the template fit tightly against the windshield rubbers.
4.4	Remove the protective film from the adhesive layer and glue camera support 11534032 from the kit onto the windshield as indicated in figure 11.



**Figure 10:** To remove protective film from adhesive layer






**Figure 11:** To glue support onto windscreen (cardboard template shown)

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4.5	By hand, press the support against the windshield for at least 5 seconds. This activates the adhesive layer. Repeat this at different places over the area with adhesive layer.
4.6	Check from the outside whether the adhesive layer is adequately glued to the windshield all over. A single bubble is no problem, but the adhesive layer should be glued to the windshield for at least 3/4 of its surface. Press the support some more from inside if necessary.
4.7	<i>NOTE: After 20 minutes, the adhesive layer reaches 50% of its adhesive force. Full adhesive force is only obtained after a couple of hours.</i>  Let the adhesive layer rest for approximately 20 minutes before continuing the installation procedure of the lane-departure warning system camera.

**STEP 5 IN DETAIL: To secure lane-departure warning camera into support**

Step	Action
5.1	Connect the yellow 16-pin connector socket from the adapter cable to the new camera.
5.2	Remove, if present, the protective cap from the lens. Do not touch the camera lens with your fingers! The slightest finger print or dust on the lens can cause incorrect warnings of the lane-departure warning system.
5.3	Starting at the bottom, install the camera in the in step 4 installed support (refer to figure 12). Then press the top in the support until you hear a click (refer to figure 13). The camera is now secured in the support.  <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>Figure 12</b></p>  <p>014833</p> </div> <div style="text-align: center;"> <p><b>Figure 13</b></p>  <p>014834</p> </div> </div>
5.4	Check whether the camera is introduced equally far into the support all round. The camera is properly installed if the seam is equal all round.  <div style="text-align: center;">  <p>014835</p> </div> <p><b>Figure 14</b></p>

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## TEMPLATE/CALIPER TO POSITION LDW2 CAMERA ON WINDSHIELD

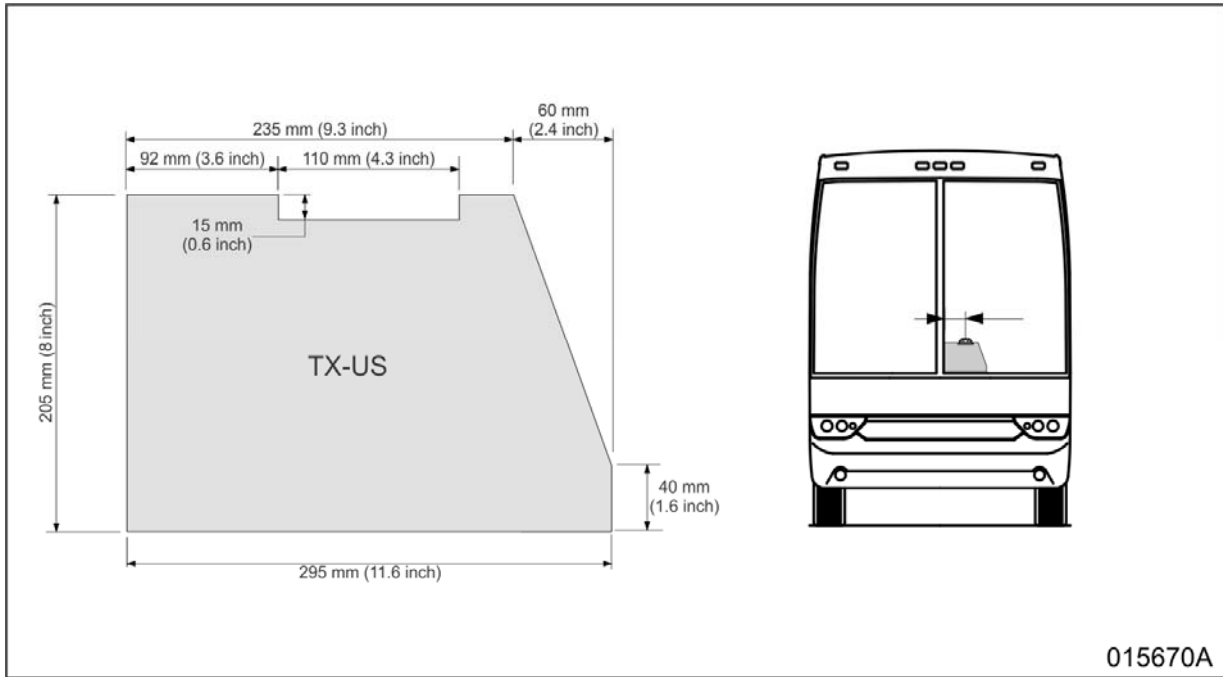


Figure 15: Dimensions of self-fabricated cardboard template to position the LDW2 camera at the inside of the windshield

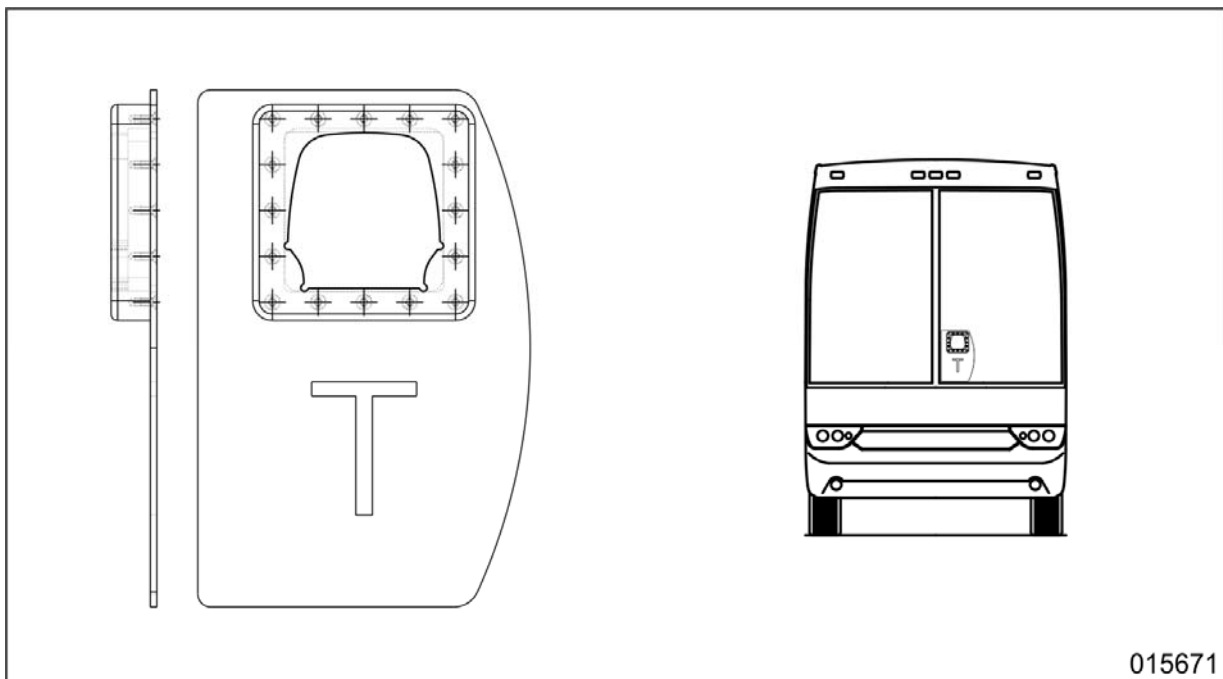


Figure 16: Caliper VH91400409 to position LDW2 camera at the inside of the windshield

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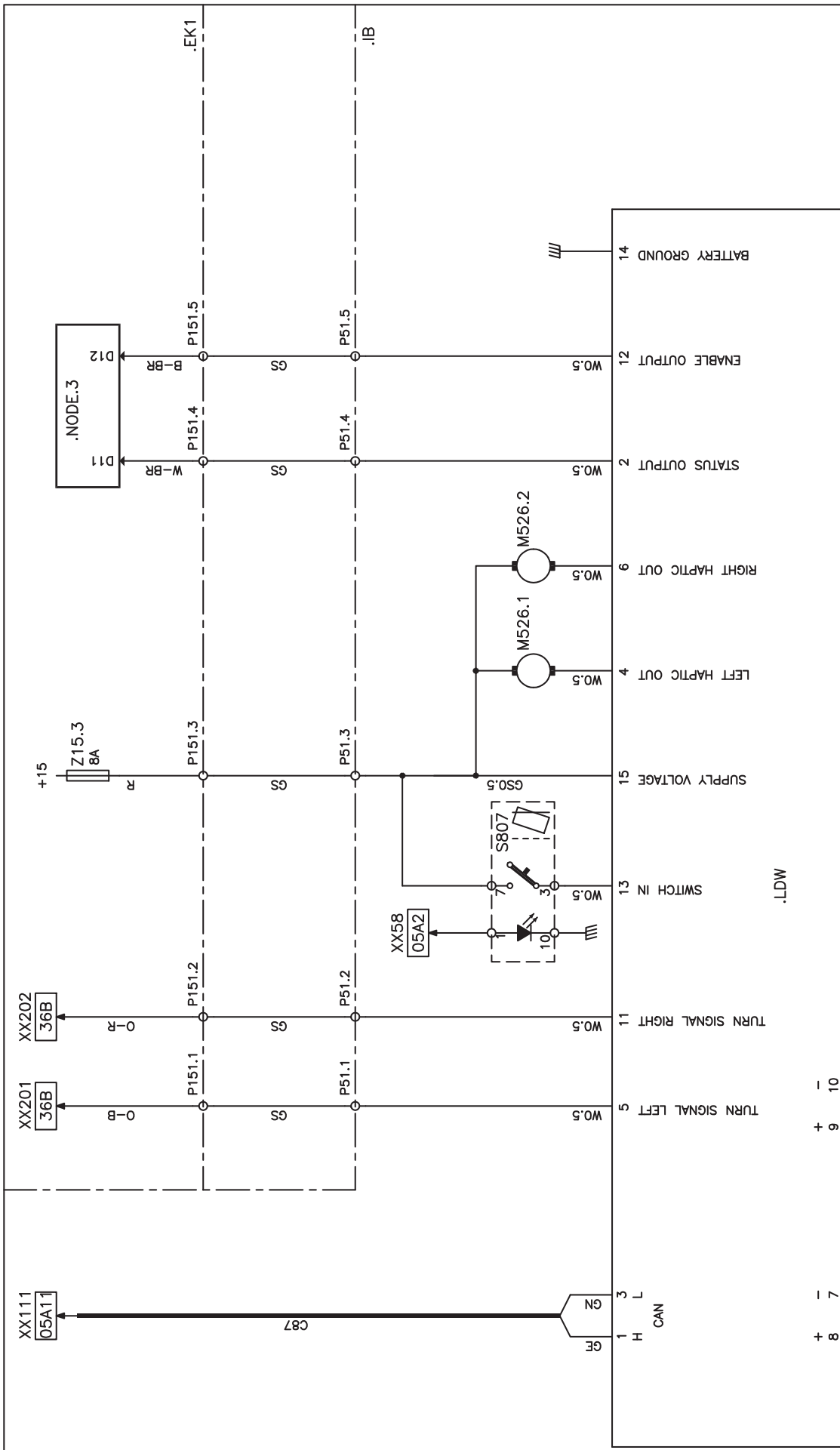
## **DISCLAIMER:**

The procedures contained herein are not exclusive. Van Hool cannot possibly know, evaluate, or advise the transportation industry of all conceivable ways in which a procedure may be undertaken or of the possible consequences of each such procedure. Other procedures may be as good, or better, depending upon the particular circumstances involved.

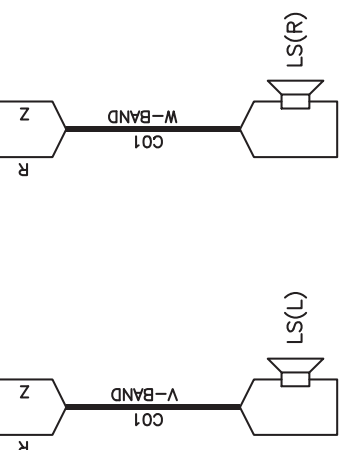
Each carrier who uses the procedures herein must first satisfy himself thoroughly that neither the safety of his employees or agents, nor the safety or usefulness of any products, will be jeopardized by any procedure selected.

## **VAN HOOL CUSTOMER PORTAL:**

Consult the customer portal regularly for the latest service documentation. In addition to the maintenance manual, you will also find the operating manual and the spare parts catalogue of your vehicle on the customer portal. The customer portal is accessible through [www.vanhool.be](http://www.vanhool.be), and only with a code (password) from Van Hool. If you do not have a password yet, request it by using the link on the Van Hool website.



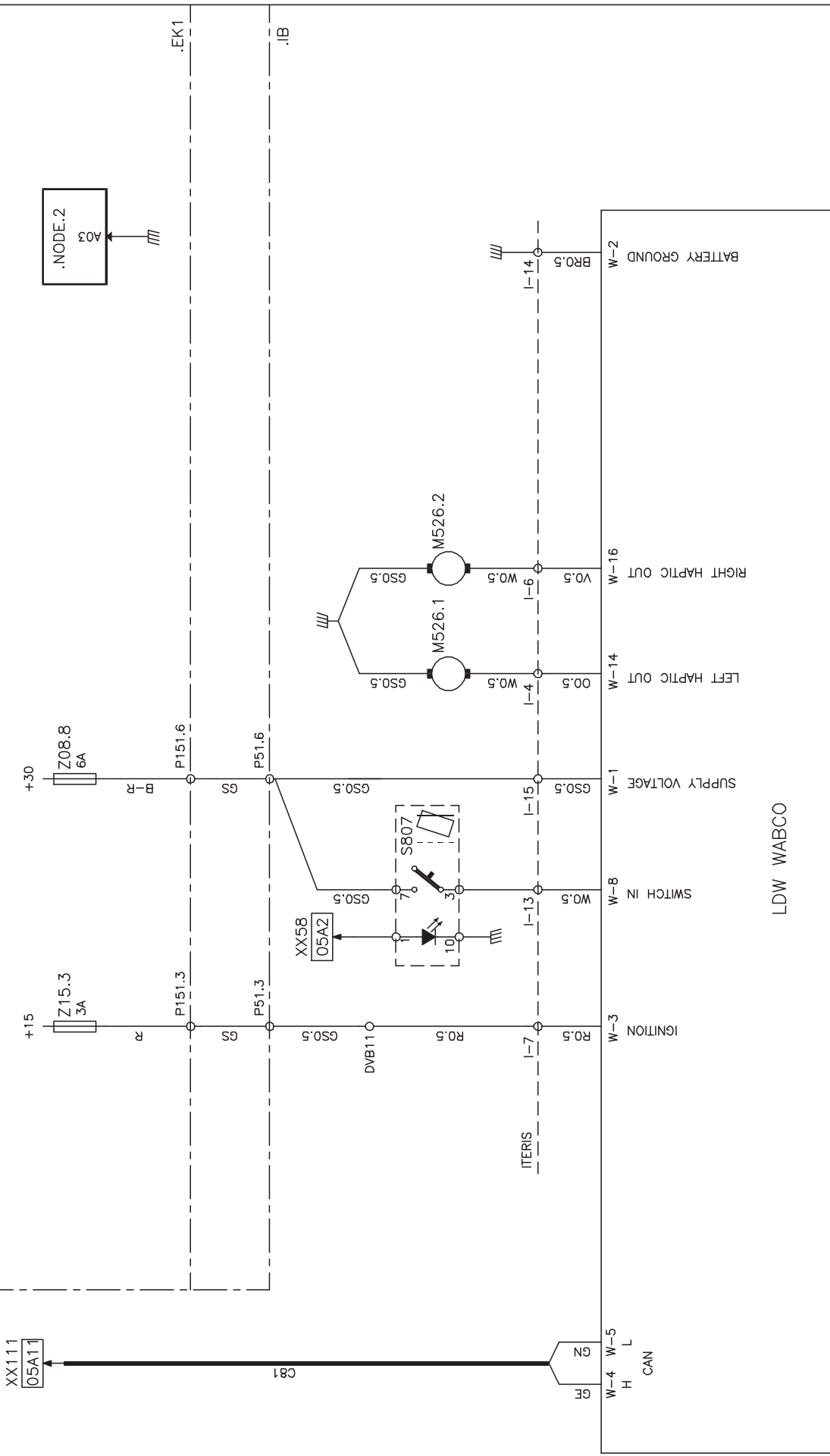
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C	PK 61156, AFGESCHERMDE CAN-KABEL	K.V.D.	DN	18-01-2016
B	PK 61156, CAN-KABEL C39 WORDT C30	K.V.D.	DN	04-09-2014
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