

ADDRESSEES	: ABC Customer Care and Parts Source
VEHICLE MODEL	: CX45 vehicles equipped with Iteris lane departure warning system (LDW)
MANUAL CHAPTER	: 11.04 Control systems – Driver assistance systems
DOCUMENT TYPE	: Informative
DATE	: November 14 th , 2019
SUBJECT	: To retrofit from Iteris to Wabco LDW2 lane departure warning system

INTRODUCTION

Van Hool has released a work procedure to assist ABC Companies in successfully retrofitting a CX45 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 LDW 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!

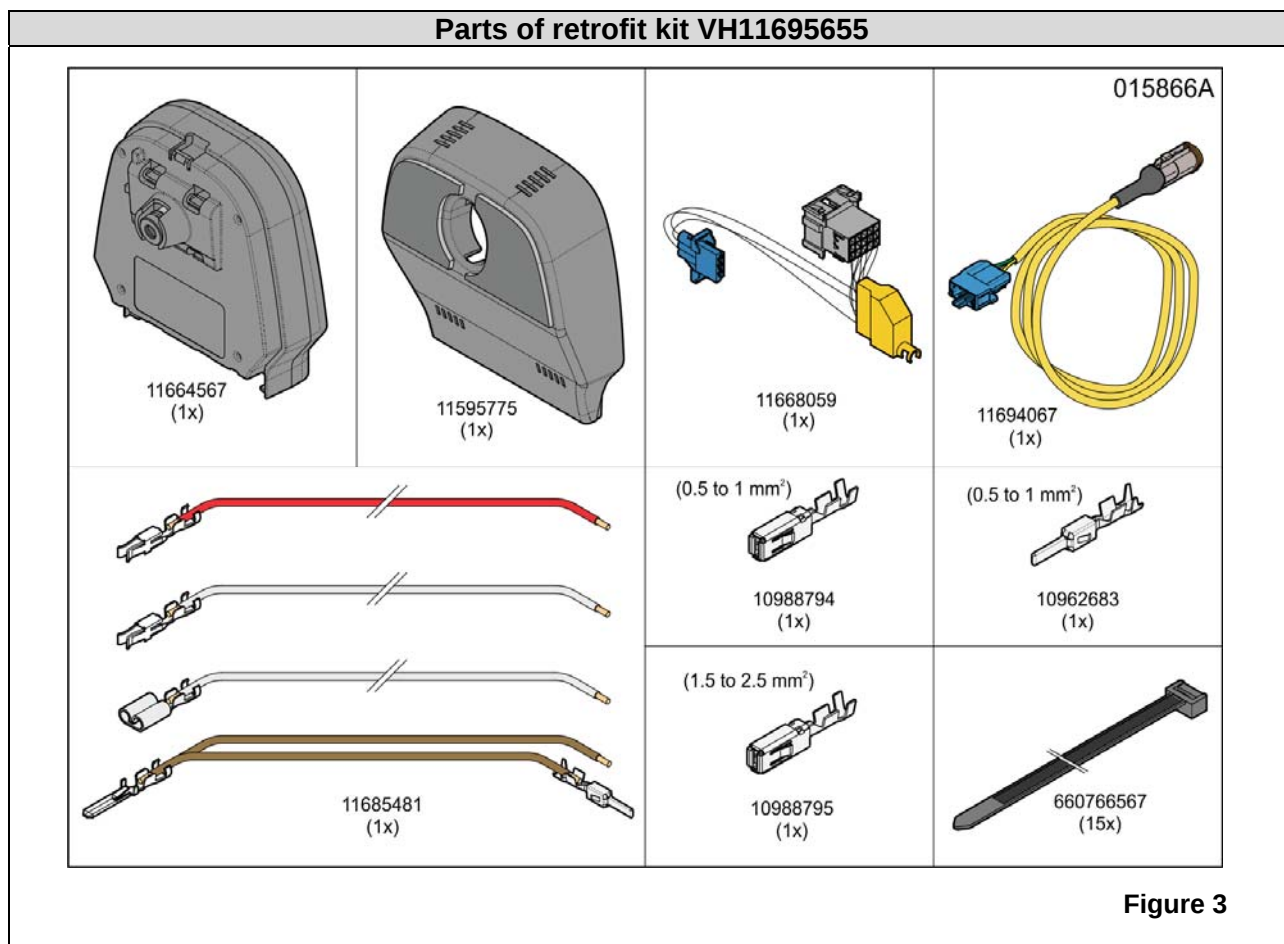
Observe safe shop practices at all times.

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SPECIAL TOOLS, EQUIPMENT OR SERVICES:

- LDW2 camera positioning tool: Van Hool caliper 11655152 (figure 18) or self-fabricated cardboard template (figure 17)
- Removal tool for MCP 2.8 connector terminal: VH10541368 (Tyco 1-1579007-6)

COMPONENTS AND PRODUCTS:



VH reference	Description	Qty
11664567	Wabco LDW2 Camera (VH11626943) with parameters (VH11663172)	1
11595775	Camera support	1
11668059	Adapter cable	1
11694067	Supplementary adapter cable (only for early vehicles equipped with Deutsch Y-splitter connectors instead of a CAN bus splitter module)	1
11695481	Electric wire kit (red, 2x grey, brown)	1
10988794	Connector terminal, female (for wire sections from 0.5 to 1 mm ²)	1
10988795	Connector terminal, female (for wire sections from 1.5 to 2.5 mm ²)	1
10962683	Connector terminal, male	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 "WP1107 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	At the right of the dashboard: 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	In the step well: remove the trim panel to get access to the front junction box (EKF). 

Figure 4

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3.3	At the connector socket disconnected from the Iteris camera: - Remove the connector terminal of contact number 15 by using removal tool VH10541368. - Cut off the connector terminal and isolate the wire end with a heat shrink tubing. - Introduce the female connector terminal of the red wire from the kit into contact number 7 of the connector socket. - Take the grey wire with the female MCP 2.8 connector terminal from the kit and introduce the terminal into contact number 15 of the connector socket. - Route the end of both previous installed wires to the diagnostic panel (refer to figure 5) located in the front junction box EKF. - Secure the wires on the way to other wiring with some cable ties from the kit. Figure 5
3.4	At the dash panel that holds the audio/video selector unit: - Locate LDW dashboard switch S807. - Disconnect the connector socket from dashboard switch S807. Remove at the back of the connector socket the connector terminal of contact number 5. Cut off the cable terminal and isolate the wire end with a heat shrink tubing. Secure this red wire away with cable ties from the kit because it will not be reconnected. - Take the other grey wire from the kit and introduce the female connector terminal into contact number 5 of switch S807 connector socket. - Route the end of this grey wire also to the diagnostic panel located in the front junction box EKF. - Secure the wire on the way with some cable ties from the kit.

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3.5

Connect adapter cable 11668059 from the kit as follows:

- a. Connect the 15-pin connector plug of the adapter cable to the connector socket disconnected in step 1.
- b. Route the blue 3-pin connector socket of the adapter cable to the front junction box EKF.
 - **For early vehicles using Deutsch Y-splitter connectors in the CAN bus:** remove the existing cable tail connecting the LDW camera to the CAN bus. Connect the blue 3-pin connector socket by using supplementary adapter cable 11694067 from the kit to the Deutsch Y-splitter CAN bus connector.
 - **For newer vehicles already equipped with a CAN splitter module:** connect the 3-pin connector socket of the adapter cable to a free blue connector plug.
- c. Route the remaining 16-pin connector socket of the adapter cable to the new camera location.
- d. Secure the wires on the way with some cable ties from the kit.

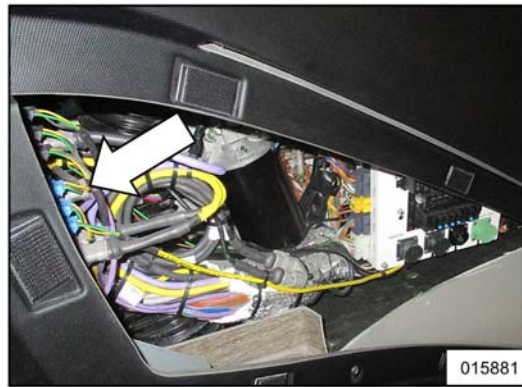


Figure 6: Location of CAN bus splitter module (later CX vehicles only)

3.6

In the front junction box (EKF):

- a. Locate the grey 18-pin connector P104 and disconnect it.
- b. Remove the connector terminal of contact number 5 from the connector socket by using removal tool VH10541368 and cut the connector terminal off.
- c. Strip back this violet electric wire as well as both grey electric wires earlier installed over a distance of 7,5 mm (0.29 inch).
- d. Crimp female connector terminal 10988795 from the kit to the wires and reintroduce it into contact number 5 of connector socket P104.
- e. Reconnect connector P104.
- f. Secure the wire on the way with some cable ties from the kit.



Figure 7: Connector P104 in front junction box EKF

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3.7

In the front junction box (EKF):

- Locate the grey 9-pin connector P102 and disconnect it.
- Remove the connector terminal of contact number 3 from the connector socket by using removal tool VH10541368 and cut the terminal off.
- Strip back the white electric wire from the previous step and the red wire earlier installed over a distance of 7,5 mm (0.29 inch).
- Crimp female connector terminal 10988794 from the kit to the wires and reintroduce it into contact number 3 of connector plug P102.
- Reconnect connector P102.
- Secure the wires on the way to other wiring with some cable ties from the kit.



Figure 8: Connector P102 in front junction box (EKF)

3.8

In the main junction box (EKV):

- Locate the white 12-pin connector P107.
- Unlock and disconnect the connector.
- At the connector plug:** unlock the secondary locking device. Remove the connector terminals of contact numbers 3, 4, 5, 6, 7 and 8. Cut off the terminal of contact number 3. Isolate the red wire end of contact number 3 with a heat shrink tubing. Discard the cable bridge connecting contact numbers 3, 4, 5, 6, 7 and 8.
- At the connector plug:** remove the connector terminal of contact number 9. Cut off the terminal of contact 9. Strip back the brown wire over a distance of 7,5 mm (0.29 inch). Take the preassembled brown wire from the kit and strip back the wire end without connector terminal over a distance of 7,5 mm (0.29 inch). Crimp both brown wires together with connector terminal 10962683 from the kit. Introduce the terminal into contact number 9. Introduce the two other connector terminals of the preassembled brown wire into contact number 5 and 6. Relock the secondary locking device of the connector plug.
- Reconnect connector P107.
- Secure the wires on the way to other wiring with some cable ties from the kit.

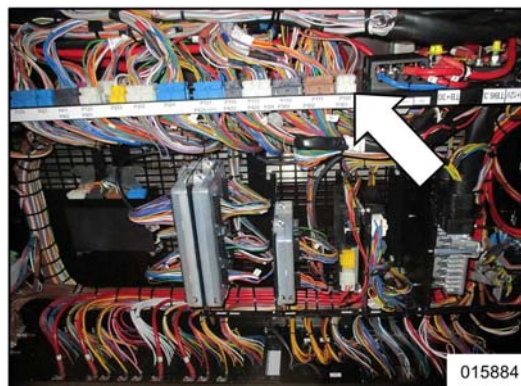


Figure 9: Connector P107 in main junction box (EKV)

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STEP 5 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 17 for the dimensions) or caliper VH11655152 (refer to figure 18).

NOTE: The support of 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 (see figures 10 and 11). Never install a support of which the expiry date has elapsed.



Figure 10: Location of adhesive label with expiry date on support



Figure 11: Mounting expiry date of support of lane-departure warning system (typical: February 2018)

Step	Action
5.1	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.
5.2	Manufacture a template from a strong piece of cardboard to position the lane-departure warning system camera. Use the dimensions from figure 18 to manufacture the template.
5.3	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.
5.4	Remove the protective film from the adhesive layer and glue the support onto the windshield as indicated in figure 13.



Figure 12: To remove protective film from adhesive layer

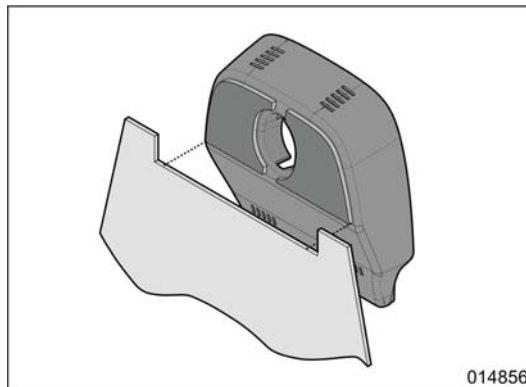


Figure 13: To glue support onto windshield

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5.5	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.
5.6	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.
5.7	<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 6 IN DETAIL: To secure lane-departure warning camera into support

Step	Action
6.1	Connect the new camera to the vehicle wiring.
6.2	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.
6.3	Starting at the bottom, install the camera in the support (refer to figure 14). Then press the top in the support until you hear a click (refer to figure 15). The camera is now secured in the support.  014833 Figure 14  014834 Figure 15
6.4	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.  014835 Figure 16

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TEMPLATE/CALIPER TO POSITION LDW2 CAMERA ON WINDSHIELD

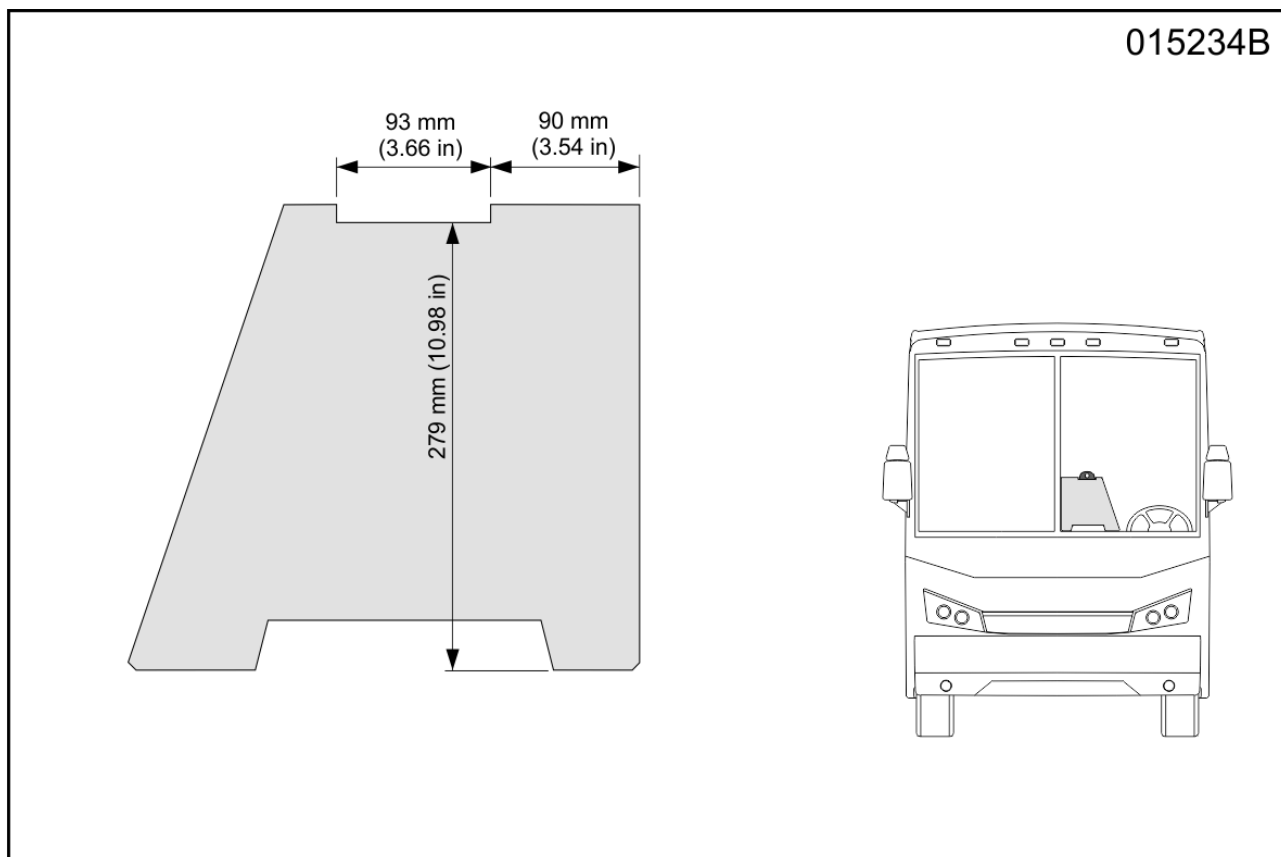


Figure 17: Dimensions of self-fabricated cardboard template to position the LDW2 camera at the inside of the windshield

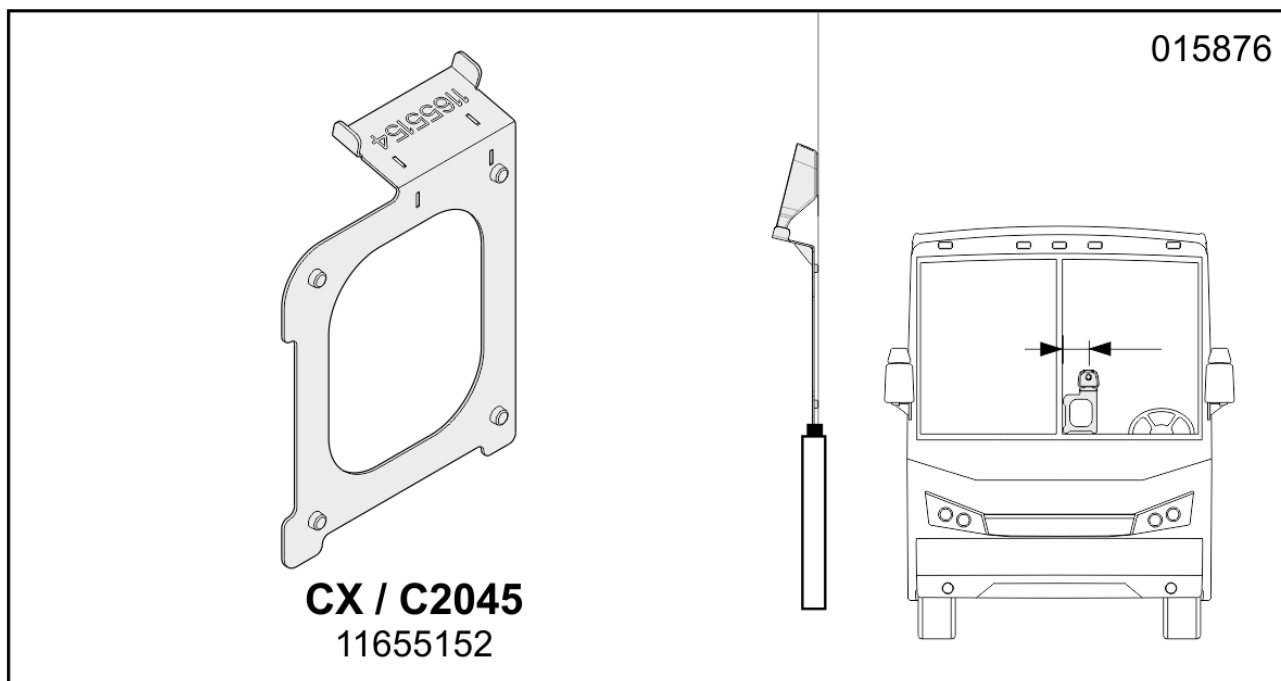


Figure 18: Caliper VH11655152 to position LDW2 camera at the inside of the windshield

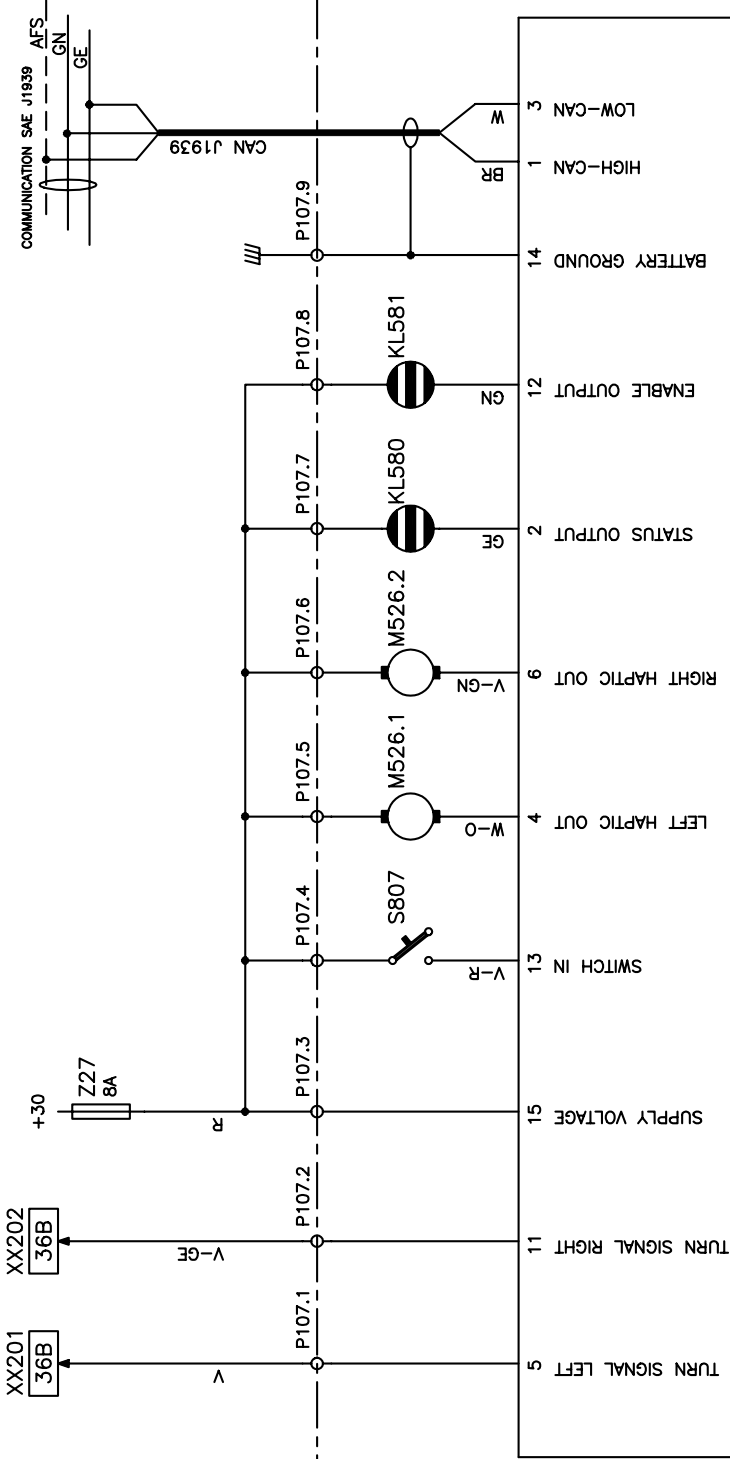
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DISCLAIMER:

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, 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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