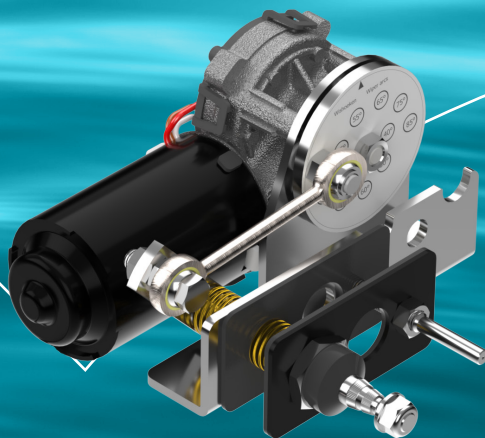


USER MANUAL

Exalto windscreen wiper type 223BDO

**ITEM NO. 12403/12409/12413/12417/12419/13069 (12V)
12421/12435/12439/12443/12446/12449(24V)**



**CLEARLY
THE BEST**



MANUAL WIPER SYSTEMS

Dear Customer,

Thank you for buying our products.

Exalto wiper systems are designed and manufactured to the highest standards for marine applications. We guarantee you a clear view for many years.

Complete range of products

We offer a wide range of wiper systems for all types of vessels, both leisure and commercial. For the leisure market we cover all windows with our LD and MD wipers. For commercial use we have our HD wipers to offer perfect wiping of large window sizes. We also can provide linked or straight line systems. Please see the below table as an overview.

After sales support

We have an excellent after sales support. Our wiper specialists can provide a comprehensive advice to ensure the system works accurately and to your wishes. Should problems occur with the product, it is always our main priority to solve it quickly and accurately, with the help of your local dealer close by you.

Exalto window wiper systems

						
Window height	Up to 1100 mm		Up to 1600 mm		Between 1100-2500 mm	
Nm range	15	23-35	40		55	85-120
Motor series	215	223 232	240		255	285 2120
Arms series	LD (LD)	MD1 (PU)	MD2 (PF)		HD1 (P10)	HD2 (P12)



Safety

1. Introduction

- 1.1 introduction
- 1.2 environmental factors
- 1.3 modified use and warranty conditions

2. Technical data

- 2.1 general
- 2.2 electrical data
- 2.3 mechanical data

3. Installation

- 3.1 preparation
- 3.2 installation of mechanical parts
- 3.3 electrical installation
- 3.4 final installation
- 3.5 washing jet: 2184 & 2110.CPL
- 3.6 wiper cover: 2101 & 2115
- 3.7 external wiper housing: 2197.300

4. Operation and use

- 4.1 preparations for first use
- 4.2 normal operations

5. Maintenance

- 5.1 general maintenance
- 5.2 servicing
- 5.3 changing the wiping arc and park position
- 5.4 disassembly and assembly

6. Troubleshooting

- 6.1 wiper does not work after switching on
- 6.2 wiped area or park position is not correct
- 6.3 motor runs, but arms do not move

7. Drawings and schematics

- 7.1 assembly overview
- 7.2 parts list
- 7.3 connection table
- 7.4 wiring diagrams for switches and control systems

Declaration of conformity



MANUAL WIPER SYSTEMS

Use of the manual

Read the entire manual before installation. In this manual you can find the following expressions and symbols:

Hint!

Gives you advice on how to perform a task more easily.



Attention!

Alerts you to possible problems and safety warnings.

Safety

Exalto windscreen wipers are easy to install, yet a fair amount of technical knowledge (mechanical and electrical) is required of the installer. Please consult the manual or contact your vendor in case of doubt during installation or operation.

Main Precaution

Disconnect all the electric connections of the wiper before making any change to the wiper system.



Safety symbols

An exclamation mark in front of the text warns you, that injury or damage can occur if a procedure is badly performed.



Dangers

The installation and use of Exalto wipers will not inflict any personal dangers or damage, provided that installation is done according to the procedures specified in the manual.

- Never remove covers or other safety provisions, unless maintenance is being performed and all safety requirements are obeyed.
- The installer must provide all necessary covers.
- Always disconnect the electrical power when performing maintenance.

Prevent the installation from being started (accidentally) by others.



Safety provisions

The safety provisions will protect the user against contact with moving, electrical or hot parts. Some of these have to be provided by the installer. There are several safety provisions:

- Cover or panel (obligatory): covers moving parts and electrical connections.
The installer **MUST** provide a self-made cover or place the wiper behind a panel.
- Make sure the wiper has enough ventilation when placing it behind a panel or cover.
- Place a fuse (see specifications) sized to protect the motor.

Safety requirements

Before the Exalto wiper is installed, we strongly recommend the following:

- Read the entire manual before installation.
- Make sure your working environment as well as the wiper parts are clean.
- Check to be sure no parts are missing or damaged.
- Use only high quality tools and have them within reach when installing.
- Handle the parts with care.
- Never install or maintain the wiper with the electrical voltage applied, unless this is specifically mentioned in the manual.
- Clear your tools after installation.

Old and new item numbers

Voltage	Old item number	New item number
12V	XA2165.30	12403
12V	XA2165.32	12409
12V	XA2165.35	12413
12V	XA2165.40	12417
12V	XA2165.45	12419
12V	XA2165.50	13069
24V	XA2166.30	12421
24V	XA2166.32	12435
24V	XA2166.35	12439
24V	XA2166.40	12443
24V	XA2166.45	12446
24V	XA2166.50	12449

Custom bulkhead thickness available.

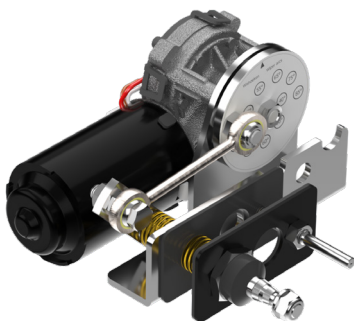




MANUAL WIPER SYSTEMS

1. Introduction

With this user manual we want to guide you in the installation and use of the Exalto windscreen wiper. Please follow all instructions and install all safety provisions.



1.1 Introduction

Exalto windscreen wipers are especially designed to keep working even with the most extreme weather conditions at sea. All external parts are made of corrosion resistant materials. The spindle housings with the self-lubricating bearings are made of naval brass. The wiper is designed to be mounted through the bulkhead or glass, above, through, or below the window. The wipe arc is adjustable from 40° to 90° with steps of 5°. Standard this model is supplied for a bulkhead thickness of either 20, 35, 55, 75, 100 or 125mm. The motor has insulated earth return.

1.2 Environmental factors

Some materials used in the construction of the wiper motor maybe harmful to the environment (e.g. copper). These parts of the wiper may be re-used or recycled. No harmful substances are released when using or disassembling the wiper.

1.3 Modified use and warranty conditions

All modifications or defects in the product are subject to the Orgalime General Conditions of Sale. Please contact your vendor in case of any questions or if you want to use Exalto wipers in a non-maritime environment or other applications.



2. Technical data

2.1 General

- Product **Exalto windscreen wiper**
- Type **223BDO (Bulkhead fitting, Disc adjustable, Open housing)**
- Catalogue numbers: **12403 / 12409 / 12413 / 12417 / 12419 / 13069 (12V)
12421 / 12435 / 12439 / 12443 / 12446 / 12449 (24V)**

2.2 Electrical data 12 Volt

- Torque (max.) **23 Nm**
- Voltage **12 Volt**
- Current **3 A**
- Power consumption (max.) **36 W**
- Number of revolutions **Low speed 40±5 rpm, high speed 60±5 rpm**
- Recommended cable **5 wires, 1½ mm² (16 g) or 2½ mm² (14 g) up to 10 m**
- Recommended fuse **6 A slow blow**
- Grounding **Insulated earth return**

2.2 Electrical data 24 Volt

- Torque (max.) **25 Nm**
- Voltage **24 Volt**
- Current **1,5 A**
- Power consumption (max.) **36 W**
- Number of revolutions **Low speed 40±5 rpm, high speed 60±5 rpm**
- Recommended cable **5 wires, 1½ mm² (16 g) or 2½ mm² (14 g) up to 10 m long**
- Recommended fuse **4 A slow blow**
- Grounding **Insulated earth return**

2.3 Mechanical data

- Dimensions **L x w x h = 118 x 111 x 116 mm**
- Shaft diameters **Drive shaft Ø20mm/support shaft Ø8mm at 50mm ctrs**
- Recommended drill hole size **1x Ø 21 mm & 1x Ø 8.5 mm**
- Mounting **In bulkhead or glass (20, 35, 55, 75, 100 or 125 mm)**
- Bearing **Bronze housing, self-lubricating**
- Wiper arms **Model MD1 (PU) up to 750 mm**
- Wiper blades **Up to 750 mm**
- Wipe arc **40°-90°, adjustable per 5° increments**
- Weight **Approx. 3,20 kg**



3. Installation

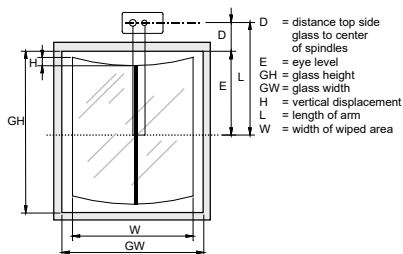
Before starting the installation read the chapter on safety. Check before installation that all parts are present and undamaged. In case of errors, contact your vendor.

3.1 Preparation

The complete wiper, with packaging, can be handled and transported by hand. Leave the wiper in the packing, until you are ready to install it; this will reduce the risk of damage and loss of parts. Make sure all parts, tools and other means are ready.

3.2 Installation of mechanical parts

1. The wipe arc of your wiper is not pre-set unless specified in the order and manufacturing process. Please follow steps described in [paragraphs 5.3 and 5.4](#) to set the wiping arc prior to installation.
2. Rough determination of wiping arc and wiper blade. With this method the wiping arc and the wiper blade length can roughly be determined. Please contact your vendor to calculate your configuration more accurately.



- Determine length of pantograph arm (L):

$$L = E + D$$

- Get the maximum wiped area width (W):

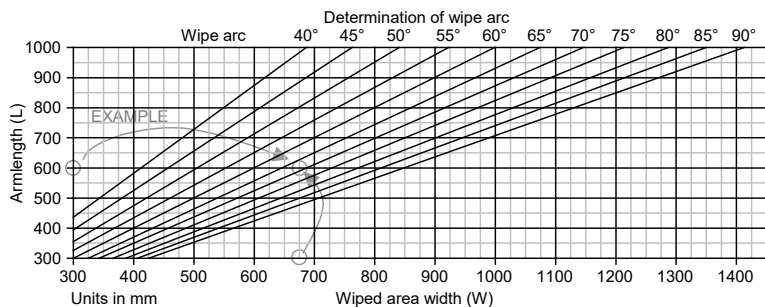
$$W = 0.9 * GW$$



Attention!

Ensure a safety margin of 50 mm between the edge of the window and the wiping area.

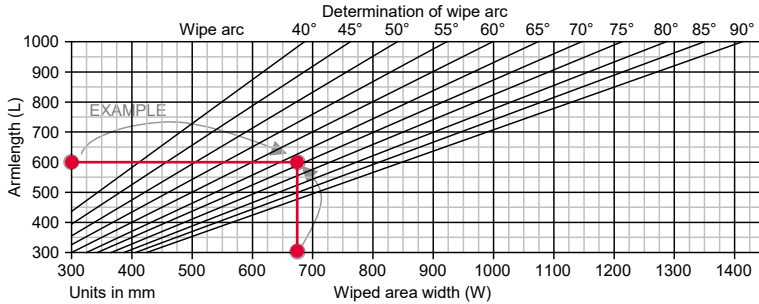
- Find the intersection of L and W in the diagram below:





Example: You have a **600mm** arm and a width wiping area of **675mm**.

- On the vertical axis, find the arm length of 600mm.
- On the horizontal axis, find the width of 690mm.
- Find the intersection to get the corresponding angle. In this case it is **40°**.



- Find in the table below the vertical displacement of the blade (H):

Determining the vertical displacement of the wiper blade

Armlength (L)	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
40°	19	21	25	26	30	34	37	40	43	45	48	51	54	57	60
45°	23	27	30	35	38	42	46	50	53	57	61	65	68	72	76
50°	26	33	36	43	47	52	56	61	66	70	75	80	84	89	94
55°	34	40	45	51	57	62	66	74	79	85	90	96	102	107	113
60°	40	47	54	60	67	74	80	87	94	100	107	114	121	127	134
65°	47	55	63	71	79	86	94	102	110	117	125	133	141	149	157
70°	55	63	73	81	90	100	109	118	127	136	145	154	163	172	181
75°	62	73	83	93	104	114	124	135	145	155	165	176	186	196	207
80°	70	82	94	105	117	129	140	152	164	175	187	199	211	222	234
85°	79	92	105	119	132	145	158	171	184	197	210	223	236	250	263
90°	86	103	117	132	146	161	176	190	205	220	234	249	264	278	293

Units in mm Vertical displacement of the blade (H)

Please contact your vendor to calculate your configuration more accurately.

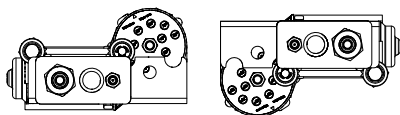
Or visit: <https://exaltowipercalculator.com/>

Now the wiper blade length can be calculated: **Length of wiper blade = 0.9 * 2 * (E-H).**

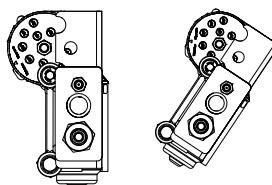
MANUAL WIPER SYSTEMS

- Determine the place where the wiper is to be installed. The wiper can be installed above or below the window. The position of the spindles must be placed horizontally (see below).

Correct



Not correct

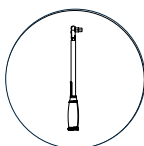


Attention!

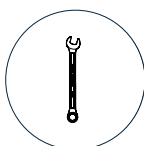
If applicable, attached the cover first (See 3.6). When installing the wiper, reserve space for the housing or cover.

- Place the windscreen wiper in the pre-drilled holes of the bulkhead (see below), with center-to-center distance of 50 mm. A rubber sealing gasket must be placed at both sides of the bulkhead. Use the torque wrench to secure the M20 hex nut to the bulkhead and the spanner for the M8 nut.

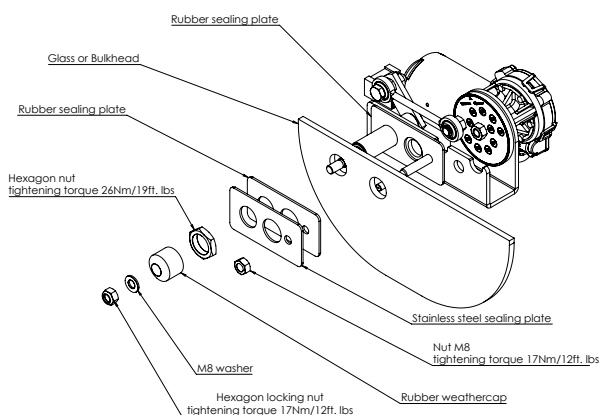
Tools



Torque wrench 27mm



Spanner 13mm



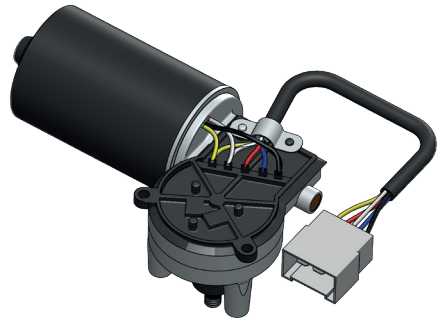


Attention!

Do not fit the wiper arm before finishing the electrical connections.

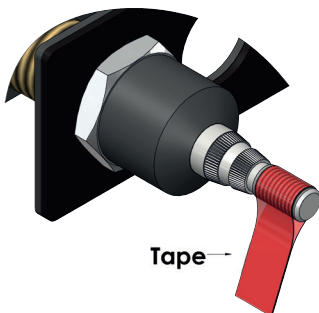
3.3 Electrical installation

1. Install the wiper switch in the dashboard.
2. Connect the wiper to the ship's electrical system. Use a cable with 5 wires with a diameter of at least $1\frac{1}{2}$ mm² (16 g) up to a maximum length of 10 m. Use larger diameters when using longer cable lengths.
3. Fit a slow blow fuse of 8 A (12 Volt) or 6 A (24 Volt) in the main cable (positive).
4. Connect the switch to the wiper (refer to the switch manual for installation).



3.4 Final installation

1. Switch on the power and test the motor briefly. Wait until the motor stops after turning off the switch. The motor will be in park position ([see figure under point 5.3.2](#)).



Hint!

If you have doubts regarding the park position, make a vane with tape to simulate the position of the arms.



MANUAL WIPER SYSTEMS

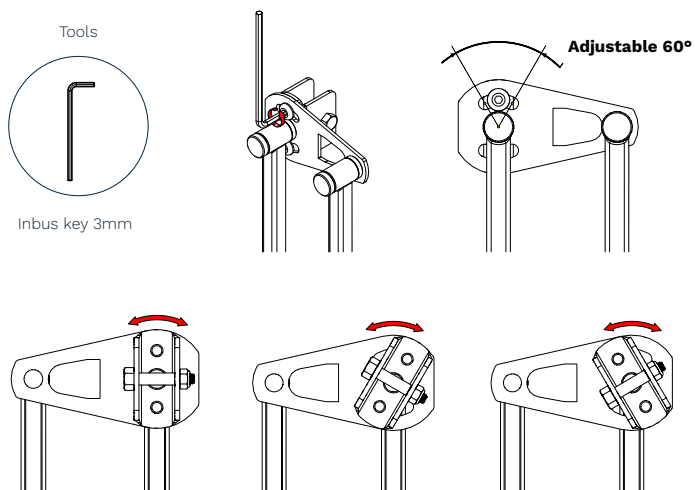


Attention!

Attach wash nozzle first before the wiper blade if it comes separately (see 3.5). This wiper model 223 is suitable for wiper arms model MD1 (PU) up to 750 mm and wiper blades up to 750 mm.

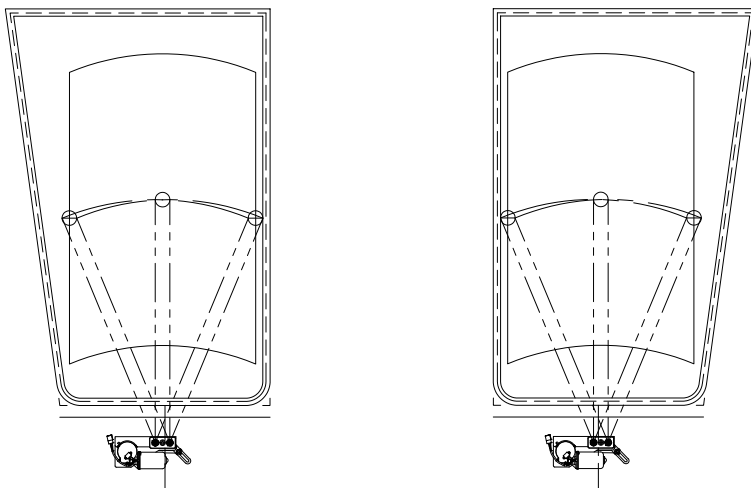
2. If required, it is possible to adjust the blade clip of the wiper arm. For pantograph arms, the angle is adjustable up to 60°.

Pantograph arm

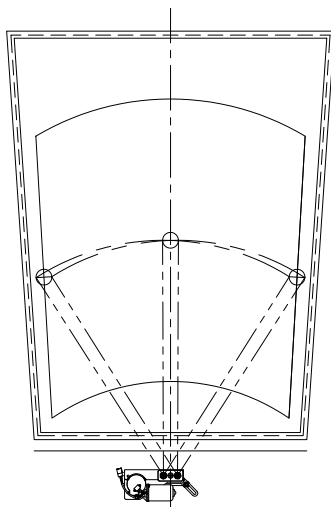




For assymetric windows, it is highly recommended to position the blade clip vertically to provide the maximum wiping area.



For isosceles trapezoid windows, it is highly recommended to position it parallelly to the sides of the window.





MANUAL WIPER SYSTEMS

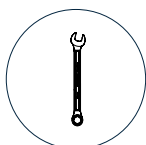
3. Install the wiper blade to the arm. Tighten the nuts to the correct torque (4.2Nm/3.1ft.lbs).



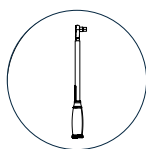
Attention!

Certain blades include an arrow to indicate the proper orientation. Always follow this marking when installing the blade.

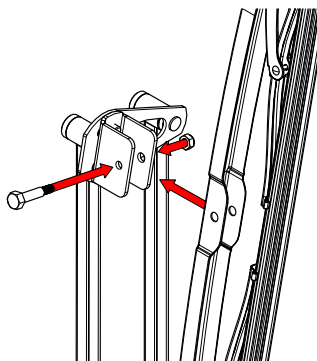
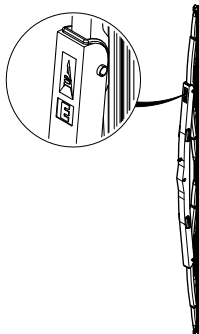
Tools



Spanner 8mm



Torque wrench 7mm

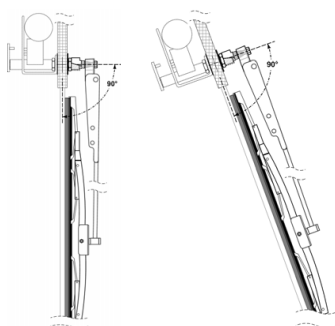


4. Place the wiper arm and blade assembly on the shafts. Fasten the nuts loosely onto the shafts.



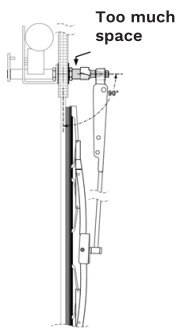
Attention!

To ensure the arm has the right spring pressure, install the wiper arm in such a way that the shaft makes a 90° angle with the window. Please install spacer(s) (if provided) in the inside when there is too much space between the bulkhead and the rubber weather cap.

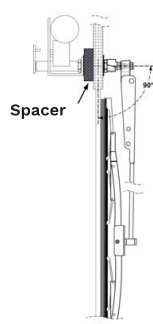


Correct

Correct



Not correct

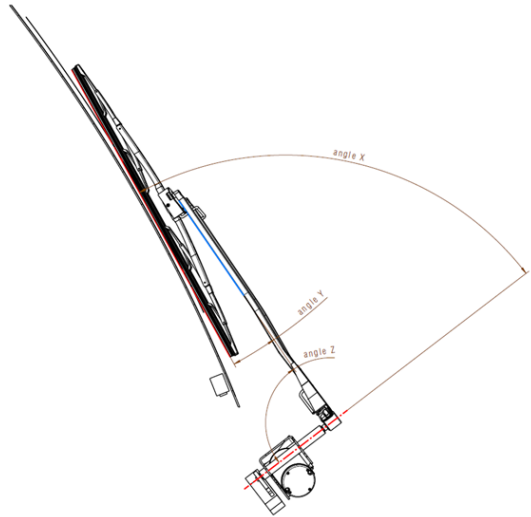


Correct



5. Installation to a curved window are guided by the following: (see below).

- Angle X (angle of the spindles relative to the window):
Minimum 85°, Maximum 105°
- Angle Y (angle of blade relative to the wiper arm): Minimum -5°, Maximum +5°



Attention!

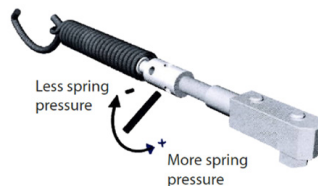
The blade cannot tilt more that 8° in the bladeclip, 5° in both directions is guaranteed.

- Angle Z (angle of arm compared to the spindles): Minimum 80°, Maximum 95° (more angle affects the spring pressure too much).

For heavily curved windows, it is important to use multiple wipers with a limited wiping angle. All of which only go over the top of the curvature. So not a full sweep including the side with one wiper but multiple. One wiper will result negatively on the lifespan due to extra wear.

6. The spring in the pantograph wiper arm are set at a standard pressure for the range of length the arm is supplied as. However, in certain applications, increased or decreased spring pressure is required. This can be obtained by rotating the adjustment mechanism with a pin until the required spring pressure is achieved (see illustration).

As a standard, all MD1 (PU) arms have an adjustable spring pressure.





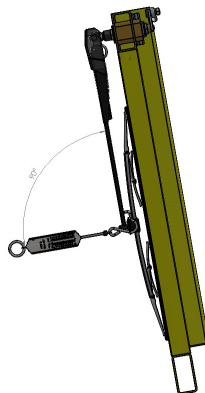
MANUAL WIPER SYSTEMS

Note

It is recommended that this is done in gradual steps, as over tightening the spring pressure is not advised. As a starting point you can also use the following formula:

- Leisure boats: Springpressure (N) = length wiperblade (mm) x 0,01;
- Work boats: Springpressure (N) = length wiperblade (mm) x 0,02;
- Please measure the correct spring pressure with a tensioner gauge (see illustration).

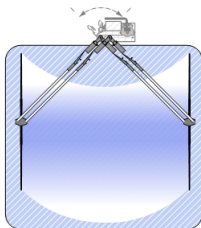
This is a guideline and no rights can be derived from it.



Attention!

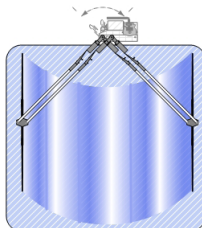
Only wiper arms 2133.01, 2136.01, and 2139.01 have two adjustable springs. They are suitable for high-speed vessels or raked windows.

Too less springpressure



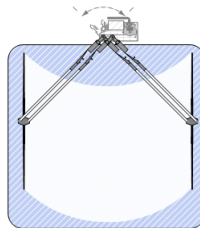
Not all the water is wiped from the window

Too much springpressure



Wiperblade jerks back and forth; no smooth wiper movement

Correct springpressure

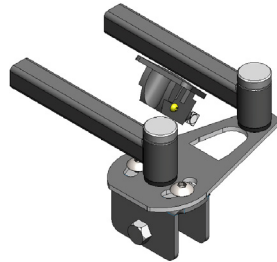


7. Wet the window. Switch on the power and test the motor briefly again to check the wiped area.
8. When the wipe arc is correct, adjust the position and the length of the arm ([see 5.4.1](#)) if necessary. Tighten the nuts of the arm to the correct torque (17Nm/12ft.lbs).

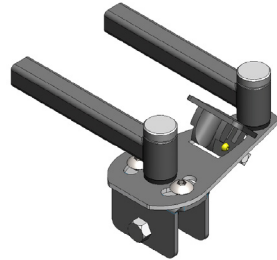


3.5 Washing jet: 2184

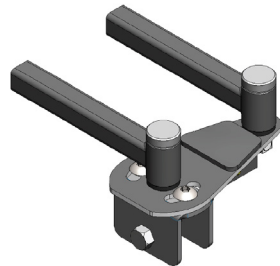
1. Insert the 2184 washing jet into the cut-out on the blade bracket.



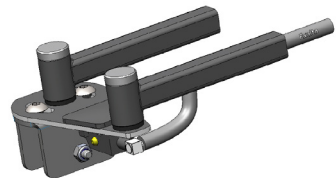
2. Press firmly on top of washing jet.



3. Until the jet snaps into place.



4. Attach the soft (2154) wash tubing to the barbed elbow. Ensure proper service loop on the end of the wiper arm to allow for arm movement.

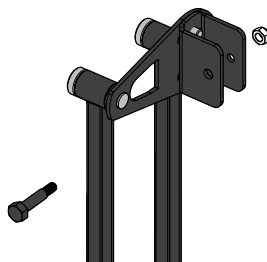




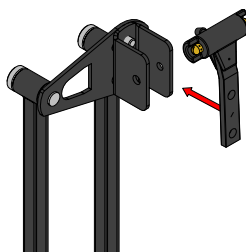
MANUAL WIPER SYSTEMS

3.5 Washing jet: 2110.CPL

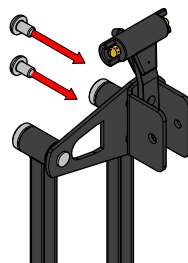
1. Remove the lock nut and shoulder bolt of the wiper arm.



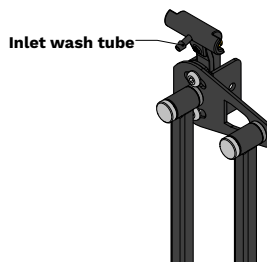
2. Place the washing jet to the blade clip.



3. Secure the washing jet with 2x M5 bolts and nuts (if applicable).



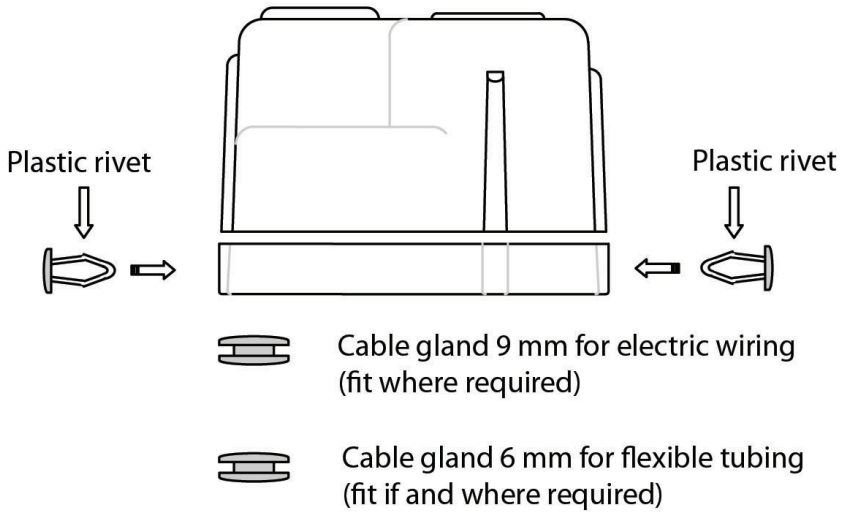
4. Connect the tubing to the inlet of the washing jet. Run the tube through the inside of the wiper arm and out by the spring hook.





3.6 Wiper cover: 2101 (white) & 2115 (black)

The 223BD motor cover kit consists of a two piece cover (base plate and motor cover) and all the necessary parts to install the cover, including: wiring glands, plastic rivets and sealing plates. It can be installed as it is or painted to match a color scheme.





MANUAL WIPER SYSTEMS

Instruction:

1. Place one sealing plate on the motor side of the base plate.
2. Insert the wiper into the sealing gasket and base plate.
3. Apply the second sealing plate to the outside of the base plate. The motor, base plate and gaskets need to make a watertight seal.
4. Install the wiper and base plate assembly to the bulkhead ([see 3.2](#))
5. Before fitting the main cover, determine the location of the two cable glands; one for the electric cable and one for the washing system (if used).
6. Drill a 12 mm (1/2") hole for the cable gland for the electric cable and push the gland into place.
7. Feed the electric cable through the gland.
8. Drill a 9 mm (3/8") hole for the gland for the flexible tubing (only in case a washing nozzle is fitted) and push the gland into place.
9. Feed the flexible tubing through the cable gland and slide the main cover into place.
10. Secure the main cover to the base plate by pressing the three plastic rivets into their respective holes. The sealing gaskets are made of soft rubber and some pressure may be required to make the holes matching.

Note

A 100% water tightness of the cover cannot be guaranteed. It is advised that a small hole be drilled in the lowest point of the cover (determined after installation), allowing any water that may have entered the cover to drain out.



3.7 External wiper housing: 2197.300

The external wiper housing is suitable for installations where internal installation-space is not supported. The system allows for easy adjusting of sweep angles, wiper arm lengths, and spring pressure.

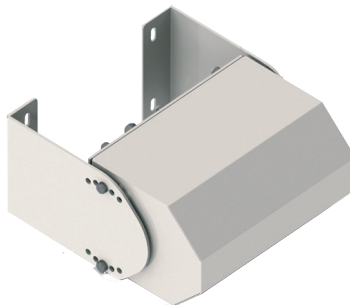


Attention!

A special designed arms 2133.R, 2136.R, or 2139.R must be used for this installation. The 2197.301 Connector Kit is also necessary to make a waterproof connection.

The system consists of:

Content	Quantity
Wiper housing welded (2197.305)	1
Mounting leg (2197.310)	2
Gasket (2197.320)	1
Frontplate (2197.315)	1
Neopreen blind rivet locking nut M6 (2100.084)	4
Washer M6	14
Hexagon bolt M6×25mm	4
Hexagon bolt M5×12mm	2
Hexagon nut M6	10
Drilling template	1





General instructions for use and mounting

Make sure that plastic and rubber parts do not come in contact with solvents or cleaning fluids with solvents. Also no chlorine containing cleaning fluids may be used.

- Gaskets that are used must be clean and also the corresponding faces must be clean.
- Bolts and nuts must be a little lubricated on the thread and on the contact surface under the head and under the nut for correct tension. Standard grease or lubricant is sufficient.
- Use a calibrated torque wrench: 8mm, 10mm, 13mm, and 27mm.

Mounting

Step 1: Prepare the Exalto 223BDO Wiper system for mounting in the external housing:

- Remove the locking nut M8, rubber Weather cap, Nut M20 and the washer plates.
- Check if the Wiper has the correct connector, for waterproof assembly a DEUTSCH connector is necessary.

Step 2: Mount the Front plate (2197.315) on the Wiper:

- Place a washer plate Nitril (2100.491) over the spindles onto the wiper housing face
- Place a the front plate (2197.315) over the spindles in the correct orientation
- Place another washer plate Nitril (2100.491) over the spindles and onto the front plate
- Place the metal washer plate (2100.481) onto the spindles and Nitril gasket
- Mount the nuts M20 and M8 (not the lock nut) with a little lubricant as prescribed before and tighten to the correct torque (M20 = 26Nm/19ft.lbs) (M8 = 17Nm/12ft.lbs).
- Place the Weathercap over the M20 wiper axis.
- Place the M8 lock nut loose on the wiper spindle, do not damage the locking part.
- Mount the Deutsch connector with M5×12mm with the correct torque (3Nm/2.22ft.lbs).

Step 3: Mount the wiper with the front plate in the external housing.

- Place the rubber gasket (2197.320) over the M6 threads of the housing
- Place the wiper with the front plate in the external housing (2197.305) so that the holes in the front plate fit the M6 threads.
- Make sure both faces are clean that the gasket sits on
- Place the washers and tighten the M6 nuts semi loose in the sequence (from inside to outside).
- Next tighten the nuts to half the required torque in the sequence (from inside to outside).
- Then tighten the nuts to the required torque (3Nm/2.22ft.lbs) in the sequence (from inside to outside).



Step 4:

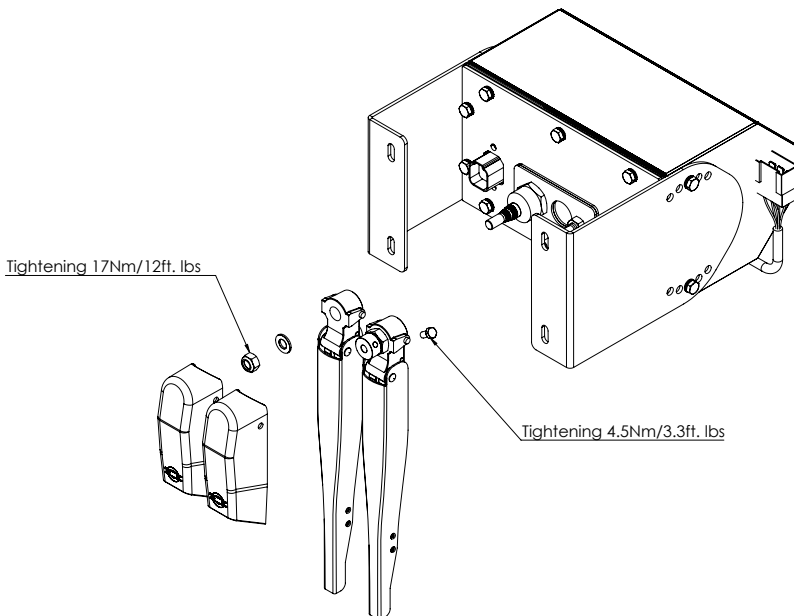
- Determine the place where the wipers need to be on the outside and drill with use of the drilling template the holes for mounting the housing.
- Mount the Mounting legs (2197.310) on the outside wall
- Place the Neopreen blind rivet (2100.084) locking nut M6 in the housing
- Mount the housing with the wiper motor between the Mounting legs using the 4x M6 Bolts with a little lubricating as described and tighten these with the correct torque (9Nm/6.6ft.lbs).

Note

The mounting legs can also be placed with the mounting side pointing outwards, be aware that the drilling template included is not intended for mounting this way.

Arm and blade

For mounting the arm and blade please [refer to 3.4.](#) or see below.





MANUAL WIPER SYSTEMS

Connector kit: 2197.301

For a waterproof housing it is necessary that it is provided with a waterproof connector Brand Deutsch, DT series. Grease the contacts and the rubber gasket with a little Vaseline before use.

Description	Item no.	Quantity
connector female	DT04-6P-CL09	1
connector wig	W6P	1
plug male	DT06-6S-E004	1
plug wig	W6S	1
closing plug	114017	1
pin contact 1.0-2.0 mm ²	046021516141	5
socket contact 1.0-2.0 mm ²	046220916141	5
closing plug with strain relief	1011-268-0605	1

If the existing connector needs to be replaced cut the cable just behind the old connector.



Attention!

When removing the Plug out of the Connector, the sealing rubber often releases. You must remount this correctly to remain a guaranteed waterproof connection. If parts of the housing are opened or loosened then the concerning gasket must be replaced to guarantee waterproof!

Electrical connection

Function	Polarity	Motorcode	Switch code	Cable 12/24V	Code Deutsch
high speed	+	53b	H	white	2
low speed	+	53	L	yellow	1
earth	-	31b		black	3
common leg		53e	P	blue	5
self parking	+	53a	B	red	4



Assembly overview

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Tightening torque 3 Nm [2.22 ft.lbs]

Tightening torque 17 Nm (12ft. lbs)

Tightening torque 26 Nm (19ft. lbs)

Tightening torque 3 Nm [2.22 ft.lbs]

External Wiper-
enclosure complete -
2197.300 (Pos. 1 - 9)

Powdercoated RAL 9010, 2 layers

Picture 1.
Sequence tightening pos 6
M6 nuts

19	2	18	2	Sliding DIN 125		M Ø10x5,3x1
17	1	17	1	connector Deutsch DT04-6P-CL09		
16	1	16	1	Locknut M6 A4	STD 2100.071	
15	1	15	1	Wethercap rubber Ø26	STD 2100.361	
14	2	14	2	Washerplate Nitrid 22385 50mm	STD 2100.491	
13	1	13	1	SS washerplate 22385 50mm	STD 2100.481	
12	2	12	2	Hexagon nut M20x1	STD 2100.350	
11	1	11	1	Hexagon nut M8	STD 2100.460	
10	1	10	1	Wipermotor 22380BH20mm	STD 2166.30	
9	1	9	1	Frontplate	2197.315	
8	2	8	2	Mounting lag External Wiper-enclosure	2197.310	
7	14	7	14	Sliding DIN 125		M Ø12x6,4x1,6
6	4	6	4			
5	10	5	10			
4	4	4	4	Blindlinkmoor Neopreen M6 As Produced	STD 2100.084	
3	1	3	1	Gasket	2197.320	
2	10	2	10	External Wiper-enclosure 22380 welded	2197.305	
Pos.	Qty.	Pos.	Qty.	Description	PartNo/Note	Size



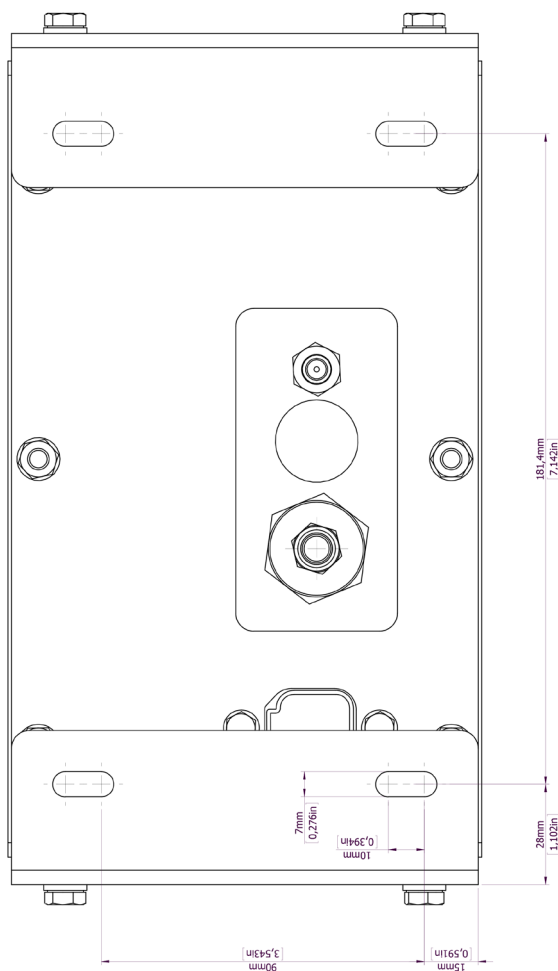
MANUAL WIPER SYSTEMS

Drill template



Attention!

This drill template is NOT in true size.





4. Operation & Use

4.1 Preparation for first use

When the wiper has been installed and adjusted, the system can be prepared for first use. We recommend a thorough inspection of the system to ensure proper operation.

Check:

- there are no leaks where the shafts go through the bulkhead by conducting a hose test.
- the wiping arc cleans the entire window.
- the park position is correct.

If the wiping arc or the park position is wrong, adjust them again. Follow the procedure in [paragraph 5.3](#).

4.2 Normal operation

All Exalto windscreen wipers are provided with the following functions:

- low speed
- high speed
- self parking

Do not use the wiper on a dry window; excessive wear of the blades and the motor will occur in this case. Because of the wide variety of wiper switches, refer to the user manual for the installed switch to learn about the functions of that specific switch. In the back of this manual you will find some general controls and its wiring instructions.



5. Maintenance

5.1 General maintenance

To keep the Exalto wiper in good condition, you are advised to:

- clean wiper arms and blades with fresh water after every journey in salt water (to prevent salt from clogging moving parts).
- never use the wiper on a dry window.

5.2 Servicing

As long as the wiper system functions normally and is kept in good shape (see paragraph 5.1), servicing the motor is not necessary. Check yearly (monthly when used intensively) if the wiper blades are worn. Replace blades when worn or when the blades leave many stripes across the glass. In case of failure or adjustments, have servicing done solely by qualified mechanics. In [chapter 6, Troubleshooting](#), a list is given of possible problems and their solutions.

5.3 Changing the wiping arc and park position

If the wiped area is not optimal, the wipe arc and park position can be changed. Always disconnect the electric before opening the housing.



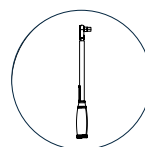
Attention!

Always disconnect the electronics before opening the housing.

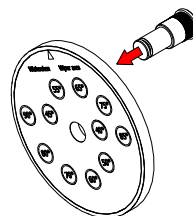
5.3.1 Adjusting the wipe arc

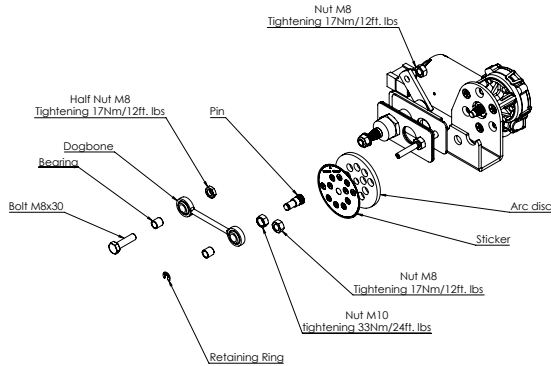
1. Remove the wiper arms from the shafts.
2. Remove the wipe arc disc from the motor shaft.
3. Relocate the pin into the hole of the desired wiper arc:
 - a. Please note the pin will require mechanical press to insert and remove (see right bottom).
 - b. The shoulder of the pin has to be pressed against the disc.
4. Run the motor briefly to park it and move the disc to the desired park position.
5. Tighten the M8 nut (17Nm/12ft.lbs) to secure the disc back to the motor shaft.

Tools



Torque wrench 13mm

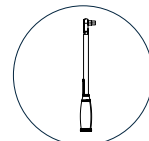




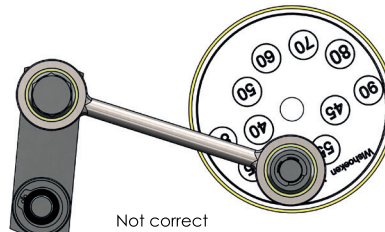
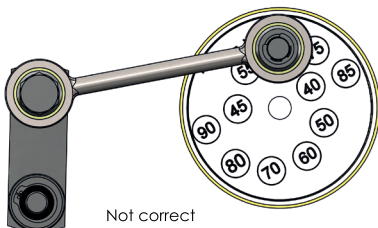
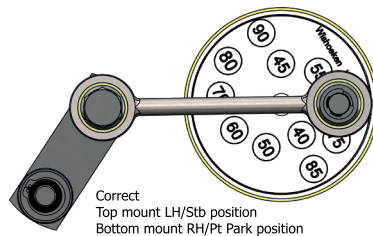
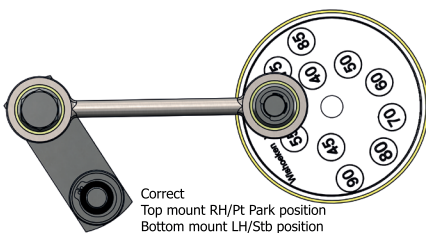
5.3.2 Adjusting the park position

1. Place the disc on the shaft, parking right or left as shown below (please note this is viewed from outside-in).
2. Place the motor lever in such a way that it forms an almost straight line with the dog bone (see below).
3. Tighten the disc well and place the wiper in the bulkhead.
4. Run the motor briefly to check performance.
5. Adjust the wiper arm to the correct length, if necessary ([see 5.4.1](#)).
6. Install the wiper arm in correct parking position.
7. If necessary repeat steps 5 and 6 to position wiper arm in correct parking position.

Tools



Torque wrench
13mm

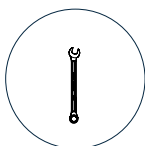




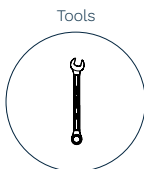
MANUAL WIPER SYSTEMS

5.4 Disassembly and assembly

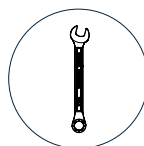
Prevent injuries when disassembling by disconnecting the wiper from the power supply. Keep all necessary tools within reach and remember the chapter on safety. Provide protective packaging, if you're going to store or transport the wiper assembly.



Spanner 8mm to disassemble the wiper arm from the stainless steel bushing

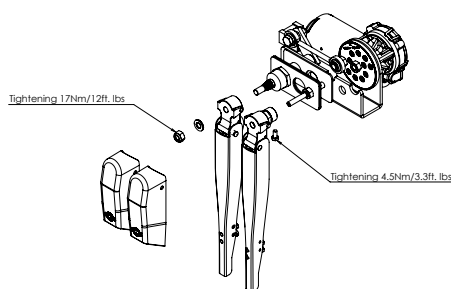


Spanner 13mm to disassemble the wiper arm from the tapered bushing

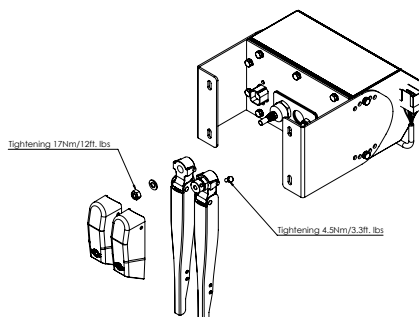


Spanner 27mm to disassemble the wiper unit from bulkhead

Only wiper / with wiper cover



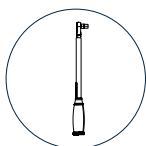
With external housing



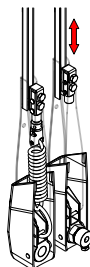
5.4.1 Adjusting wiper arm length

1. Disconnect all the electric connections to the wiper.
2. Remove the wiper arms.
3. Loosen the M5 bolts located at the bottom of the wiper arm (see below).
4. Extend/shorten to the required length.
5. When the length is achieved, secure the M5 bolts (5Nm/3.7ft.lbs).

Tools



Torque wrench 8mm





5.4.2 Removing the wiper assembly from the bulkhead

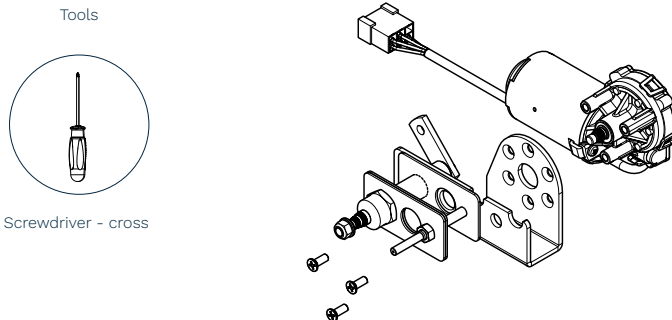
1. Disconnect all the electric connections to the wiper.
2. Remove the wiper arms ([see 5.4](#)).
3. Remove the nuts ([see 7.1](#)) and plates on the outside.
4. Remove the wiper from the holes in the bulkhead or glass.
5. If you want to replace the wiper, follow [chapter 3](#).

5.4.3 Disassembling the motor lever

1. Disconnect all the electric connections to the wiper.
2. Remove the wiper from the bulkhead or glass ([see 5.4](#)).
3. Unscrew the nut ([see 7.1](#)) and bolt on the disc ([see 7.1](#)) and remove the lever.
4. For adjusting the wipe arc, follow [section 5.3](#).

5.4.4 Removing the motor from the wiper assembly

1. Disconnect all the electric connections to the wiper.
2. Remove the wiper arm ([see 5.4](#)).
3. Disassemble the motor lever and wiper disc ([see 7.1](#)) from the motor.
4. Unscrew the three bolts of the motor ([see below](#)) and remove the motor.
5. When replacing, bolt the motor on the housing and follow [section 5.3](#) to install the motor lever and set to the correct park position.





6. Troubleshooting

In this chapter, several malfunctions are mentioned combined with possible causes and solutions. Please leave servicing to qualified mechanics.

6.1 Wiper does not work after switching on

• Possible causes:

1. Wiper switch is not working properly.

Solution: *Test and replace it. Check if the current is (and keeps being) too high.*

2. Burned or incorrectly sized fuse.

Solution: *Test and replace it. Check if the current is (and keeps being) too high.*

3. Electrical connections are wired incorrectly or might be damaged.

Solution: *Measure the voltage across the motor and check all connections are correct.*

4. The wiper motor has failed.

Solution: *Replace the motor and check for excessive drag or high current.*

6.2 Wiped area or park position is not correct

• Possible causes:

1. The wiper arm was placed without parking the motor first.

Solution: *Remove the wiper arm. Run the motor to the park position and re-install the arm.*

2. The wipe arc is set wrong or has changed due to high loads (e.g. spring pressure of arms too high, excessive drag).

Solution: *Determine the wiping arc if needed ([see paragraph 3.2](#)) and set the wiping arc again ([see paragraph 5.3](#)).*

3. The wires are connected incorrectly.

Solution: *Check and reconnect the wiring (see the scheme in [paragraph 7.3](#)).*

6.3 Motor runs, but the wiper arm does not move

• Possible causes:

1. Mechanical joints are loose.

Solution: *Replace worn parts or tighten as required.*

2. Parts are broken.

Solution: *Replace broken parts, re-adjust as required.*

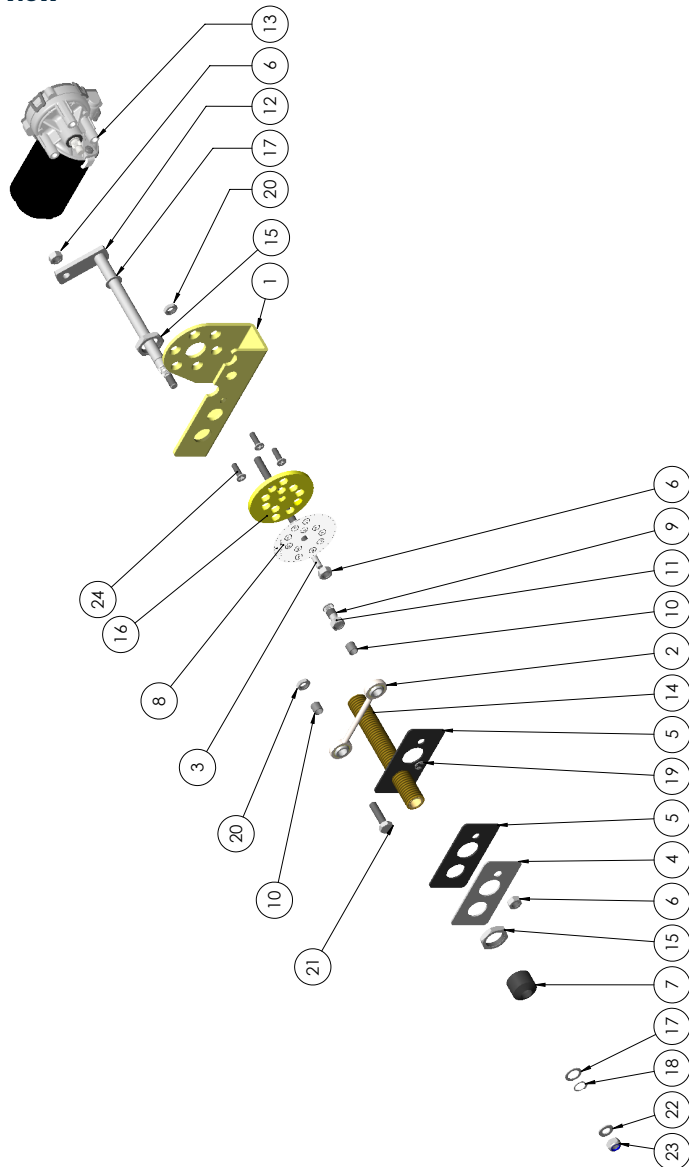
3. Splines of shafts are worn

Solution: *Replace all loose, broken or worn parts and adjust as required.*



7. Drawings & Schematics

7.1 Assembly overview





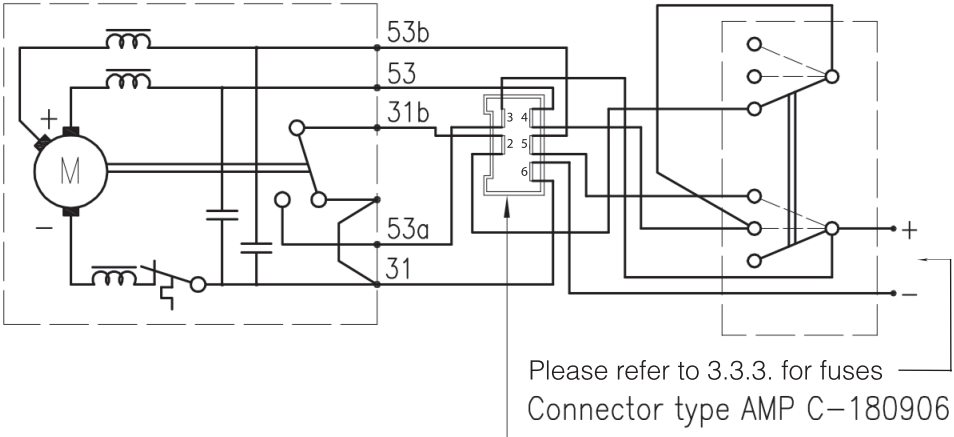
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7.2 Parts list

Pos	QTY.	Description	Old part nr	New part nr
1	1	Wiper housing for 223	2100.104	10563
2	1	Connecting rod Ø10 L=85mm	2100.936	10839
3	1	Idler spindle bh = 20 mm KK/BD/BS	2100.446	10752
	1	Idler spindle bh = 35 mm KK/BD/BS	2100.441	10751
	1	Idler spindle bh = 55 mm KK/BD/BS	2100.447	10754
	1	Idler spindle bh = 75 mm KK/BD/BS	2100.448	10755
	1	Idler spindle bh = 100 mm KK/BD/BS	2100.449	10756
	1	Idler spindle bh = 125 mm KK/BD/BS	2100.451	10757
4	1	Cover plate SS 223BS 50mm	2100.481	10763
5	2	Coverplate Nitril 223BS 50mm	2100.491	10772
6	3	Nut s.s. M8 A4 din934	0934A408	10159
7	1	Weathercap M20	2100.361	10717
8	1	Sticker arc disc 235KK/KD/KG/KJ/BD	2100.931	10838
9	1	Linking pin M8 235KK/KD/KG/KJ/B	2100.920	10828
10	2	PA6.6 bearingØ8×10×10	2100.926	10833
11	1	Nut M10 SW 13	2100.354	10712
12	1	Driven spindle + lever bh = 20	2100.364_A	10722
	1	Driven spindle + lever bh = 35	2100.360_A	10716
	1	Driven spindle + lever bh = 55	2100.366_A	10725
	1	Driven spindle + lever bh = 75	2100.368_A	10725
	1	Driven spindle + lever bh = 100	2100.370_A	10730
	1	Driven spindle + lever bh = 125	2100.372_A	10734
13	1	Motor 12Volt 23Nm	2100.023012	10512
	1	Motor 24Volt 25Nm	2100.025024	10514
14	1	Liner M20x1mm bh=20	2100.326	10695
	1	Liner M20x1mm bh=35	2100.321	10693
	1	Liner M20x1mm bh=55	2100.327	10697
	1	Liner M20x1mm bh=75	2100.328	10698
	1	Liner M20x1mm bh=100	2100.329	10699
	1	Liner M20x1mm bh=125	2100.331	10701
15	2	Nut M20x1	2100.350	10709
16	1	Arc disc for wiper235KK/KD/KG/KGV/KJB/BD	2100.930	10836
17	2	Plain washer s.s. M12x1,0	2100.400	10745
18	1	circlip 12mm	0471A2012	10118
19	1	circlip 6mm	6799A4006	12046
20	2	Nut M8 flat	0439A408	10112
21	1	Hexagon bolt, Din933-A4-M8x30	0933A408030	10148
22	1	Ring-DIN125A-A4-M8	0125A408	10033
23	1	Self-locking nut A4 M8	0985A408	10174
24	3	SS Flathead bolt M6×16	0965HA406016	10162

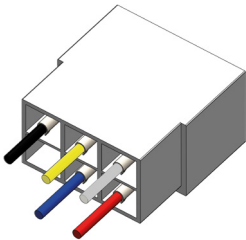


7.3 Motor Wiring Schematic - Connection data



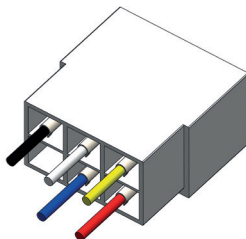
7.4 Wiring diagrams for switches and control systems

Exalto wiper motors can be connected through a wide variety of simple switches to complex controllers. Below you will find some connection wiring diagram examples of Exalto switches and controllers. Please refer for detailed instructions to the specific switch or controller manual.



≤ 2025 old configuration

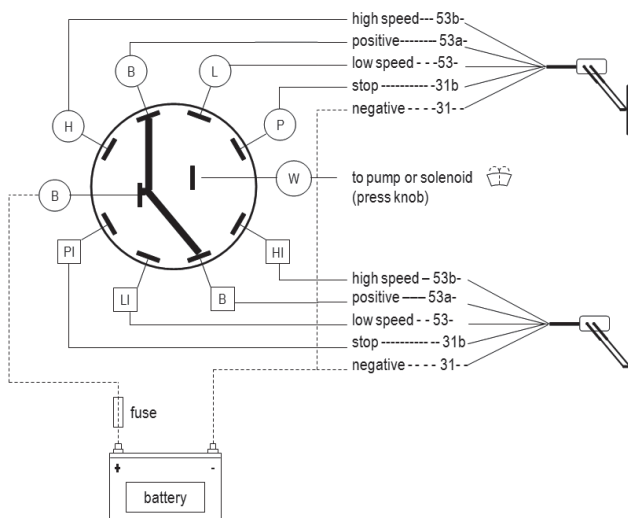
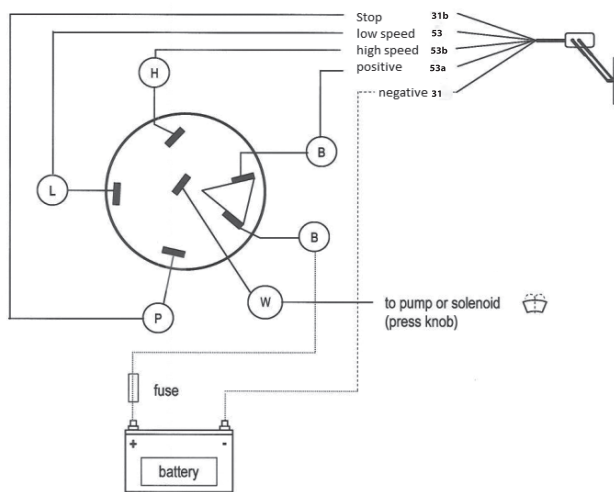
Function	Polarity	Switch code	Cable
High speed	+	H	White
Low speed	+	L	Yellow
Negative	-		Black
Stop - self park		P	Blue
Positive	+	B	Red



≥ 2026: updated specification

Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red

Switch 11302/2134 - 11303/2135:

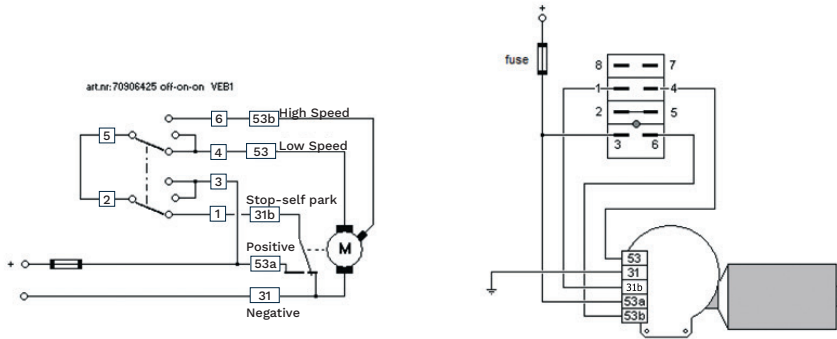


Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red

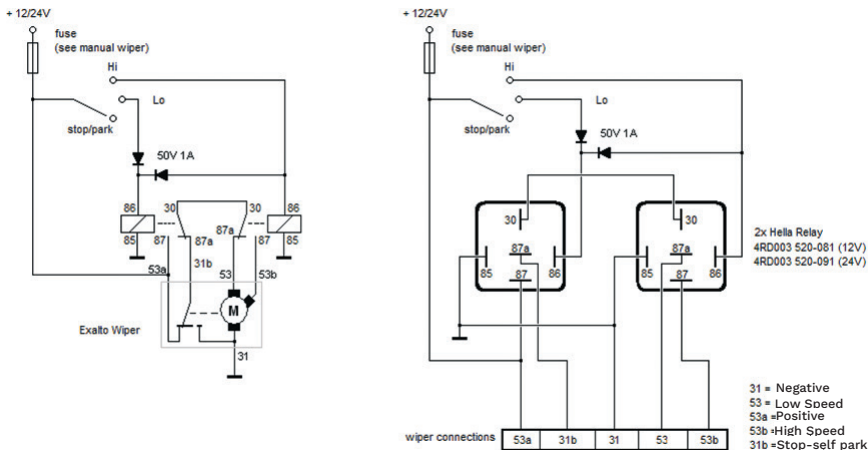


Carling switching VEB1:

(Exalto number 70906425.SET) as per following details which is wiper switch specific.



For a standard 3 stage switch of Carling or alternative this scheme below has to be used. This scheme can also be used for the case of digital switching modules with only simple output channels.



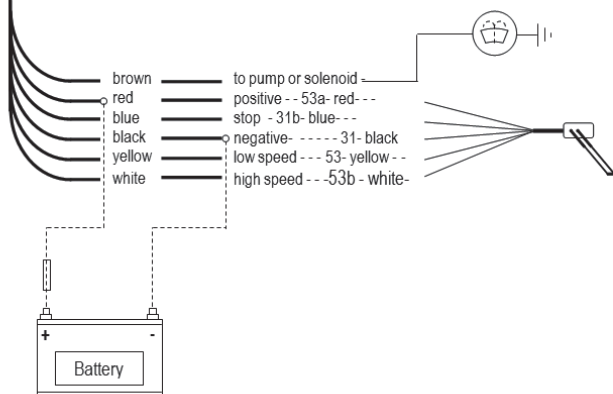
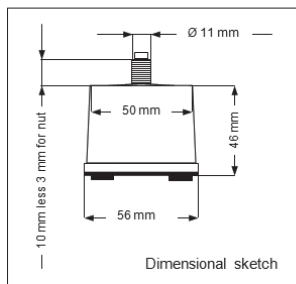
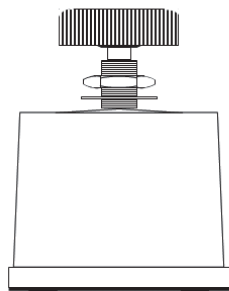
Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red



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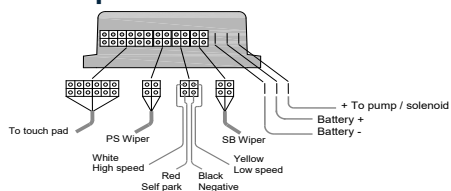
Switch 11459/2158 - 11505/2159:

 Press to activate pump or solenoid



Please refer to the instruction manuals as supplied with the units for motor wiring.

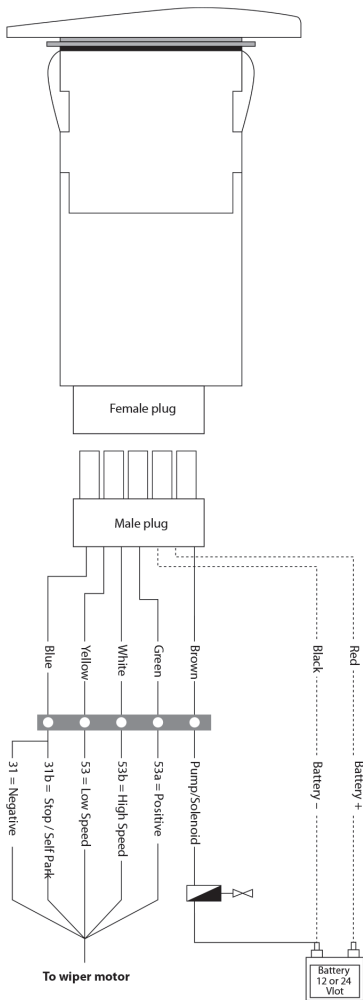
Switch panel CT3EX:



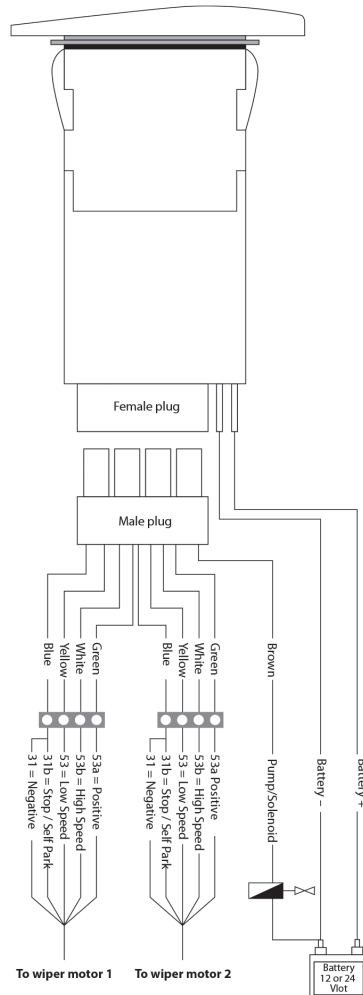
Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red



Switch 11065/210341:



Switch 11079/210342:

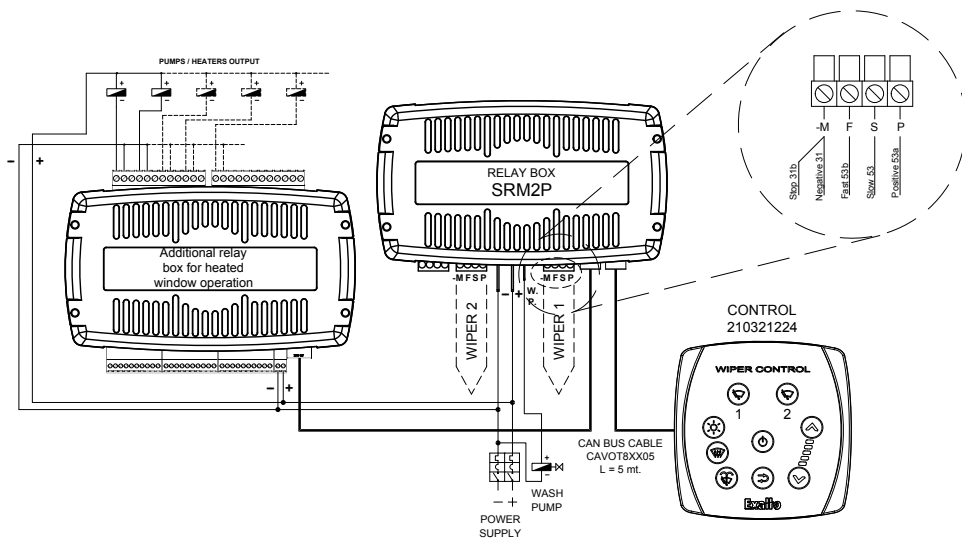


Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red



MANUAL WIPER SYSTEMS

Switch panel 11051/210321224 - 11092/210351224:

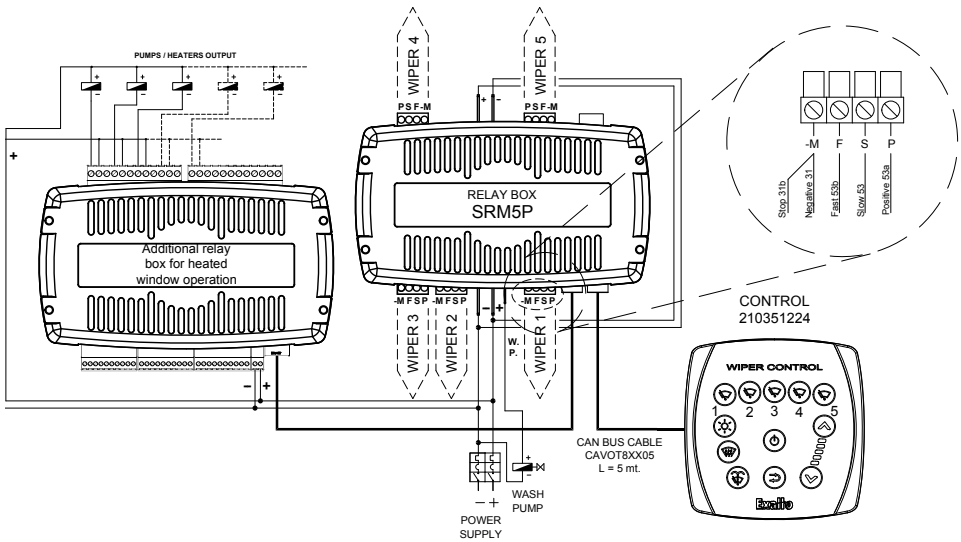


Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red

MANUAL WIPER SYSTEMS



Additional relay box for pumps/heaters is not supplied in standard equipment.

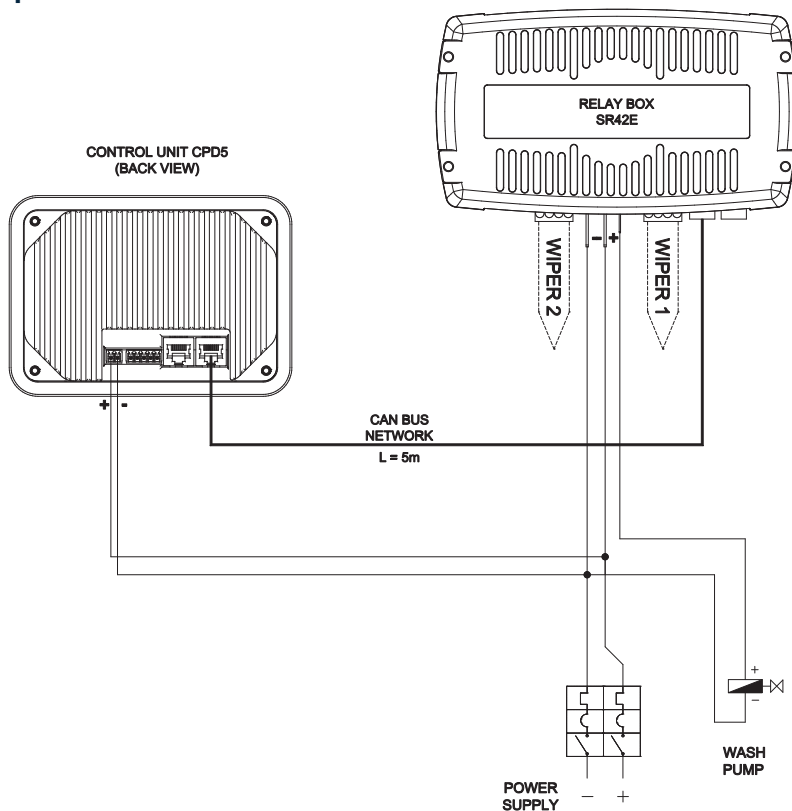


Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red

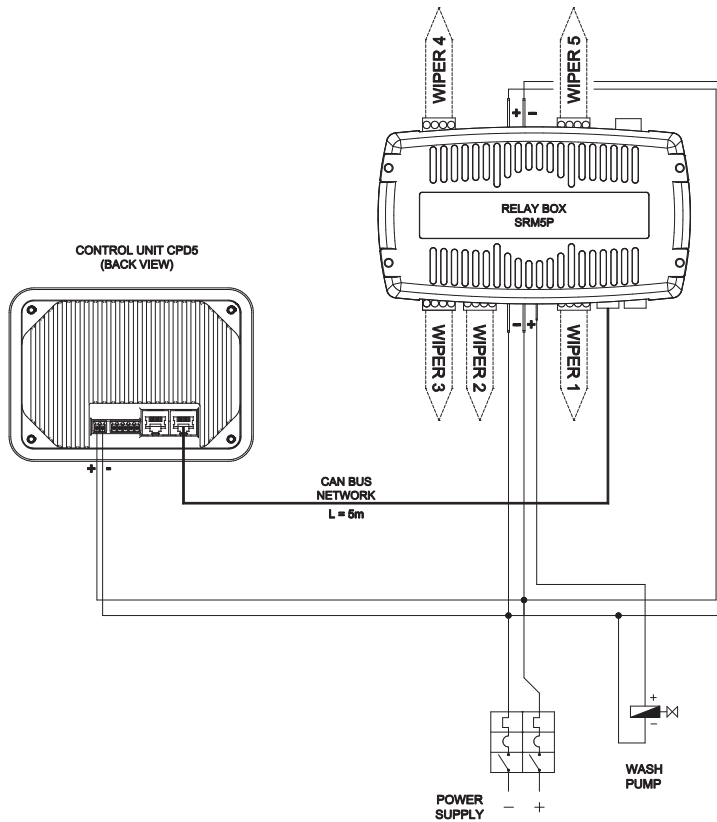


MANUAL WIPER SYSTEMS

Control panel CPD5:



Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red



Function	Polarity	Motorcode	Switch code	Cable
High speed	+	53b	H	White
Low speed	+	53	L	Yellow
Negative	-	31		Black
Stop - self park		31b	P	Blue
Positive	+	53a	B	Red



CLEARLY THE BEST

Hereby declares that Exalto windscreen wiper type 223BDO complies to the following harmonised standards:

Pleasure yachts electric systems

- NEN-EN-ISO 10133:2017 Extra-low voltage D.C. installations (regarding color codes)

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