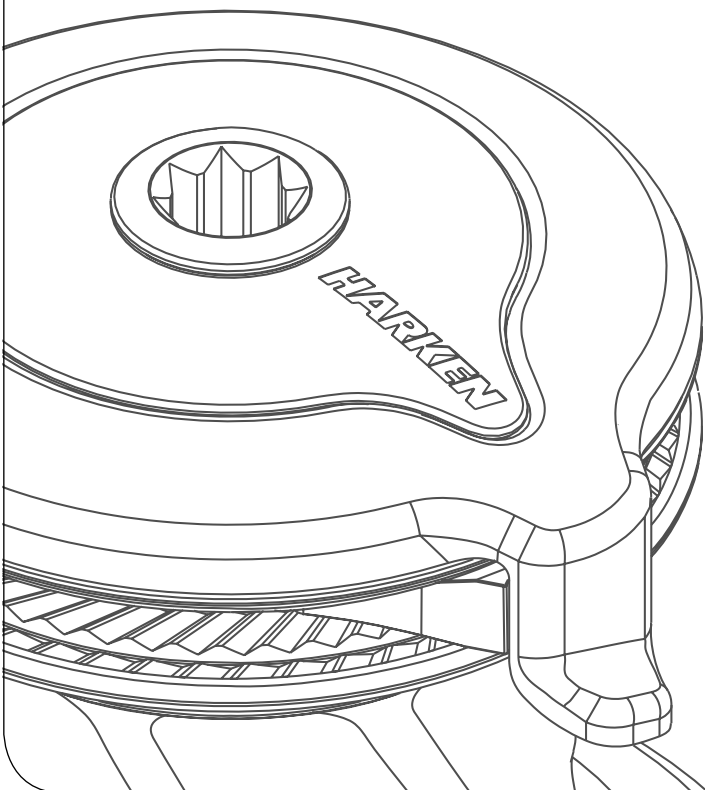


Installation and Maintenance Manual

MRW-02

Powered Radial Winch 40.2 ST E/HY



HARKEN[®]

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Introduction

This manual gives technical information on winch installation and maintenance, including disassembling and reassembling.

This information is DESTINED EXCLUSIVELY for specialised personnel or expert users.

Installation, disassembling and reassembling of the winch by personnel who are not experts may cause serious damage to users and those in the vicinity of the winch.

Harken® accepts no responsibility for defective installation or reassembly of its winches.

In case of doubt the Harken® Tech Service is at your disposal at techservice@harken.it

This Manual is available only in English. If you do not fully understand the English language, do not carry out the operations described in this Manual.

Technical characteristics

	Power ratio	Gear ratio
1st speed	13,50 : 1	2,13 : 1
2nd speed	39,90 : 1	6,28 : 1

The theoretical power ratio does not take friction into account.

Performance data

Winch 40.2 ST E (electric)

	horizontal motor			
	12 V (700 W)		24 V (900 W)	
	1st speed	2nd speed	1st speed	2nd speed
line speed (m/min)**	23,2	7,9	28,7	9,8
max load (Kg)	290	850	290	867

***Line speed is measured with no load*

		motor nominal power (W)		current absorption at winch MWL (A)	
		12 V	24 V	12 V	24 V
winch 40.2 ST E	horizontal	700	900	170	90

Weight

	ST A EH	ST C EH
weight (Kg)	13,5	15,1

Versions:

A = drum in anodised aluminium

C = drum in chromed bronze

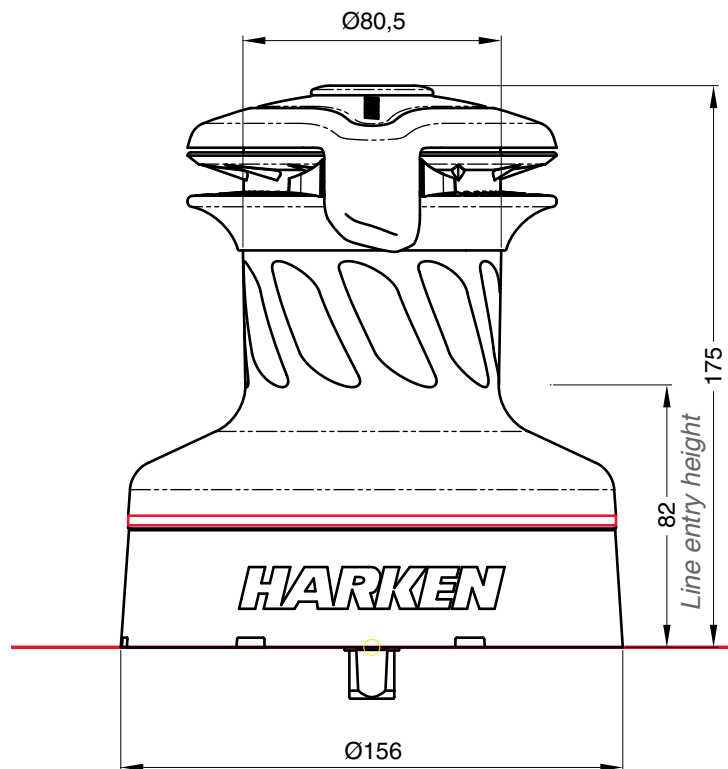
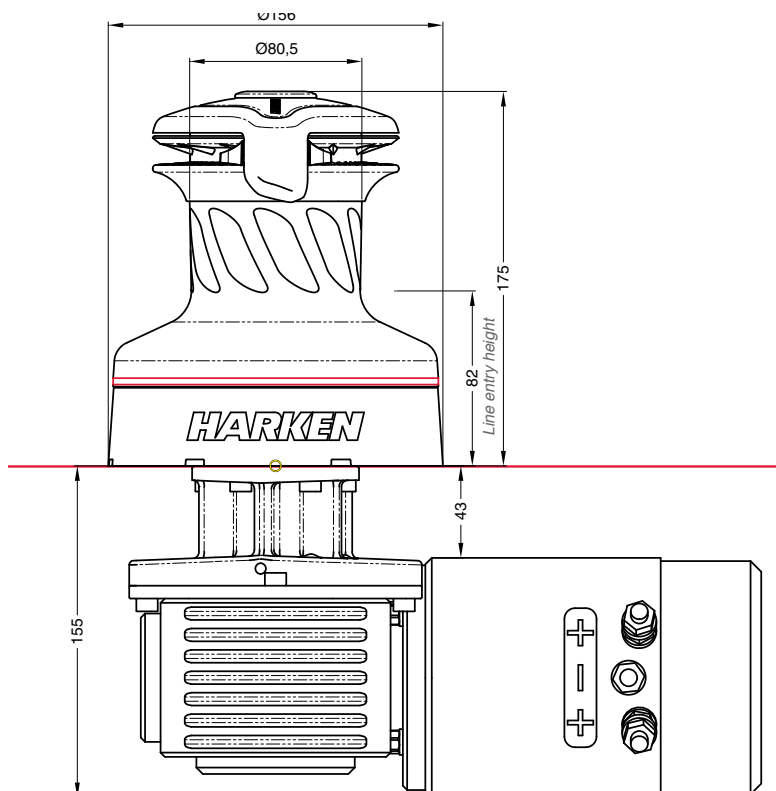
EH = horizontal electric winch

Maximum working load



WARNING!

The maximum working load (MWL) for the 40.2 ST Radial Winch is 850 Kg (1874 lb). Subjecting the winch to loads above the maximum working load can cause the winch to fail or pull off the deck suddenly and unexpectedly during high loads causing severe injury or death.

Outline*Winch 40.2 ST E/HY**Horizontal electric motor (12 V / 24 V)*

Installation

The winch must be installed on a flat area of the deck, reinforced if necessary to bear a load equal to at least twice the maximum working load of the winch.

It is the installer's responsibility to carry out all structural tests needed to ensure that the deck can bear the load.

Harken® does not supply the screws needed to install the winch since these may vary depending on the deck on which it is to be installed.

It is the installer's responsibility to choose the correct screws taking account of the loads they will have to bear.

Harken® assumes no responsibility for incorrect installation of its winches or for an incorrect choice of mounting screws.



DANGER!

Incorrect installation of the winch may cause severe injury or death. Consult the yard that built the boat in the case of doubt over the correct positioning of the winch.



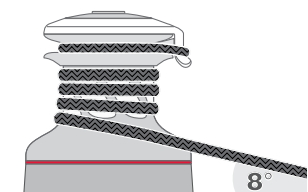
WARNING!

Failure to use the correct number and type of mounting fasteners or failure to ensure the correct deck strength can result in the winch pulling off the deck suddenly and unexpectedly during high loads causing severe injury or death.



WARNING!

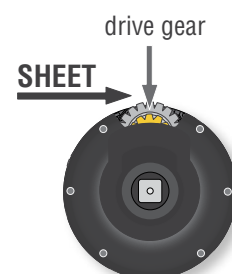
Verify the entry angle of the sheet. This must be 8° with tolerance of $\pm 2^\circ$, to avoid sheet overrides and damaging the winch or making the winch inoperable leading to loss of control of the boat which can lead to severe injury or death.



WARNING!

Mount the winch on the deck so that the drive gear is positioned where the sheet enters the winch drum.

Incorrect position of drive gear can weaken winch leading to failure which can cause an accident leading to severe injury or death.



NOTICE

You can find the icon ▲ on the skirt to identify the drive gear position.




After correctly positioning the final drive gear with respect to the load, check that the motor, gearing, electrical wiring and/or hydraulic pipes can be housed below decks. To help find the optimal compromise, remember that, to make the installation of the motor easier, it can be coupled to the winch in any one of four different positions that differ by 40° from each other.

Once you have decided the correct mounting position for the winch on the deck and checked the space available below deck, proceed with the installation.


The winch can be installed following one of the two procedures below (Procedure 1 or Procedure 2):

Procedure 1

To install the winch you must remove the drum and use Socket Head (SH) bolts.

Tools needed:  One medium flat-bladed screwdriver

To identify the various parts, refer to the exploded view at the end of this Manual.

 Torque to apply when assembling



1. Pull out the disconnect rod n°30



2. Unscrew the central screw ($\approx 2\text{Nm}/18\text{ in-lb}$)



3. Slide off the assy socket n°28 and the cover n°29.

Pay attention to the o-ring in the socket.



4. Unscrew the three screws n°27 ($\approx 4\text{Nm}/35\text{ in-lb}$)



5. Remove the self-tailing arm n°26 by rotating and lifting it.



6. Lift off the drum n°22

Install the winch on the deck in the position you have chosen, keeping in mind the limits described on page 6 and using socket head (SH) bolts.


Procedure 2

To install, you must remove the winch skirt and use hexagonal headed bolts.


Tools needed:  One medium flat-bladed screwdriver

To identify the various parts, refer to the exploded view at the end of this Manual.

See (paragraph on installation) the limits described on page 6 and using socket head (SH) bolts.

 Torque to apply when assembling



1. Remove the skirt n°2 with the help of the screwdriver placed as shown by the symbol 



2. Take off the base n°2



3. Position the 5 M6 hexagonal headed bolts in their holes



4. Reposition the skirt n°2 in its housing



5. Press down the skirt to position it correctly

NOTICE

Make sure the skirt is correctly clipped on to the base of the winch.

Install the winch on the deck in the position you have chosen, keeping in mind the limits described on page 6 and using hexagonal headed bolts.
(See paragraph on winch installation)

Winch installation procedure

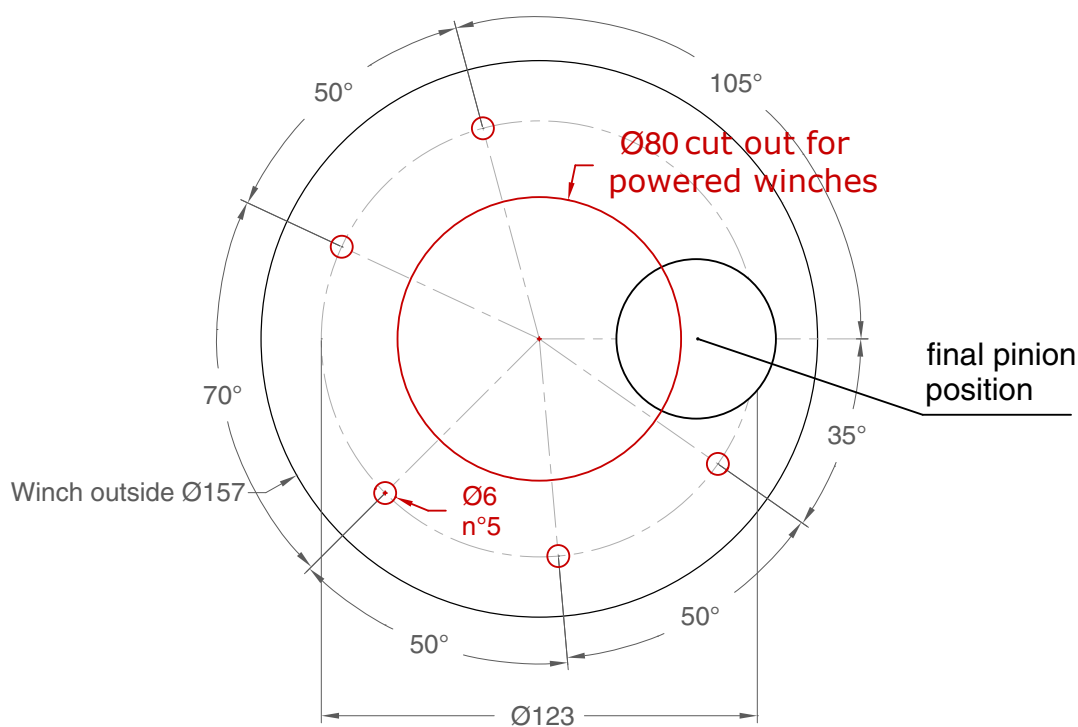
Carry out Procedure 1 or Procedure 2, then install the winch on the deck in the chosen position.

NOTICE

Before drilling the deck, check the space available below deck for the flange and the motor

A. Position the base of the winch on the deck and mark the position of the holes or use the drilling cut-out template at the point where you have decided to place the winch.

Below is a reduced scale diagram.



The drilling cut out template is available on the Harken® website, www.harken.com

B. Remove the winch and drill the five 6.2 mm and a 80 mm diameter holes.

C. Bolt the base of the winch to the deck using five M6 Socket Head (SH) bolts for **Procedure 1** or five hexagonal headed M6 bolts for **Procedure 2** (neither is supplied by Harken®), correctly chosen for the thickness and type of the boat deck. Consult the yard that built the boat in case of doubt.



WARNING!

To install the winch on the deck, use only bolts in A4 stainless steel (DIN 267 part 11).

Bolts made of other materials may not have sufficient strength or may corrode which can result in winch pulling off deck suddenly and unexpectedly during high loads causing severe injury or death.

NOTICE

To mount winches on the deck, do not use countersunk bolts.

D. Fill the mounting holes with a suitable marine sealant.

E. Remove the excess adhesive/sealant from the holes and base drainage channels

F. Reassemble the winch following the steps in **Procedure 1** or **Procedure 2** in the reverse order, and apply the products indicated in the section on maintenance.

NOTICE

Before closing the winch, make sure the holes and drainage channels in the base of the winch are not obstructed.





Positioning the self-tailing arm

Position the self-tailing arm so that the line leaving the winch is led into the cockpit.

Motor installation procedure

Once you have installed the winch on the deck, proceed with motor installation. The motor can be coupled to the winch in different positions. Check the space available below deck and choose the suitable position.

Tools needed

-  A number five hex key
-  A number six hex key (only for vertical electric motor)
-  A number ten hex key (only for hydraulic motor)
-  Two number thirteen wrenches



1. Position the flange (see Page 12)



2. Tighten the six screws (8 Nm/ 71 in-lb)



3. Position the reduction gear and motor



4. Tighten the two screws (8 Nm/ 71 in-lb).
Be sure to align the flange.

NOTICE

Before positioning the flange, check to make sure that seals (the first one is above the flange and the second one is under the flange) are seated correctly.



After winch is assembled and before sailing, test the powered winch functioning: insert the lock-in winch handle in the handle socket and check that the disconnect rod must disconnect gearbox.

Electric wiring diagrams

To guarantee greater efficiency in terms of safety and long life, for certain winch models it is obligatory to install the WLC200R Load Controller.



WARNING!

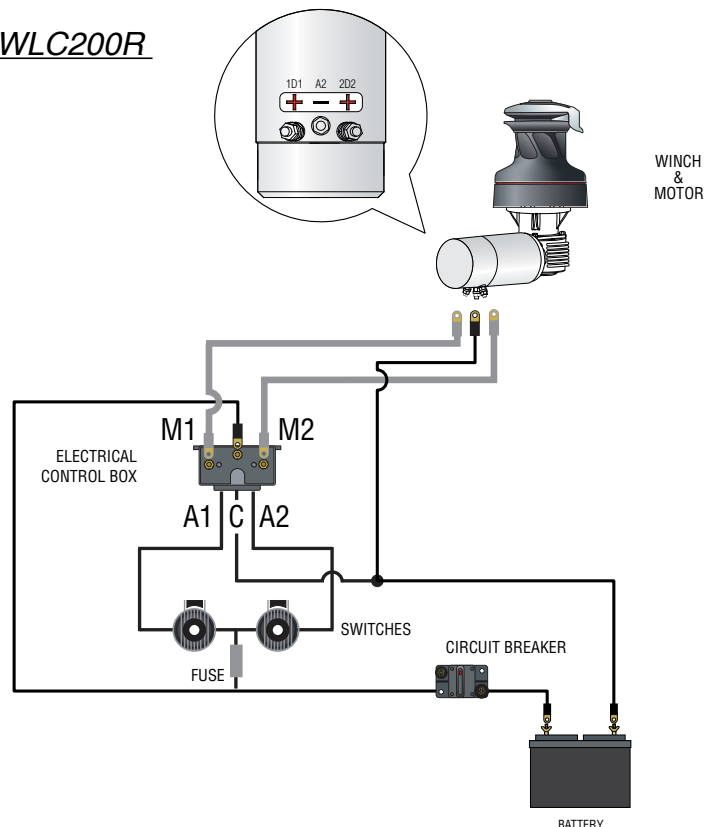
Consult the table below to check for which winch models it is obligatory to install the WLC200R and for which it is recommended.

WINCH RADIAL	Horizontal motor	
	12 V	24 V
40.2	recommended	recommended

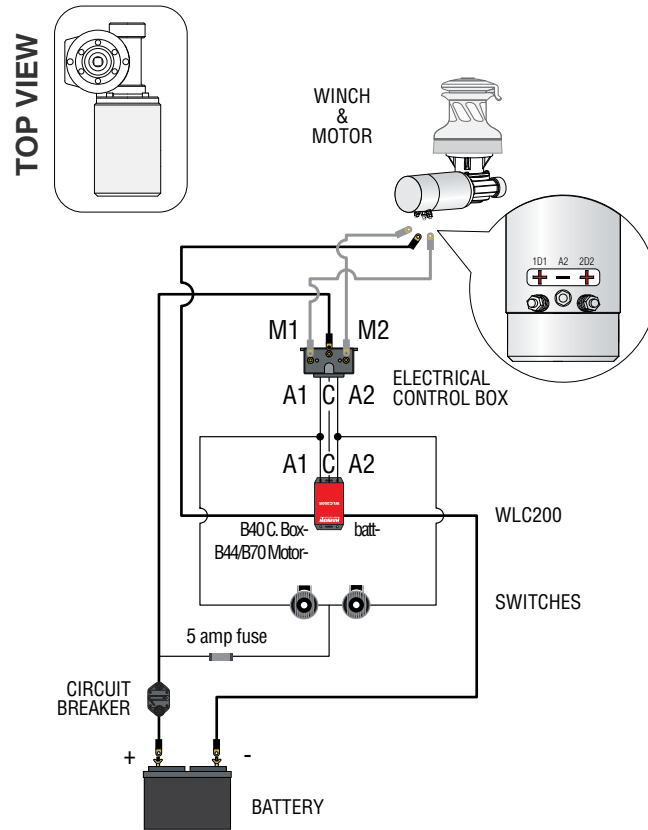
For more information, refer to the WLC200R Manual.

Refer to the following diagrams for the electric wiring:

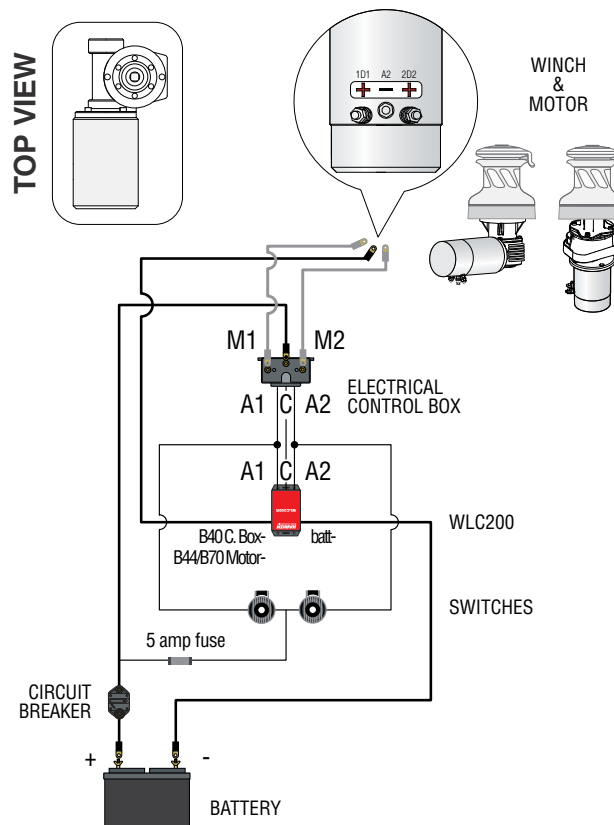
Horizontal 12 V / 24 V motor installed without WLC200R



Horizontal 12 V / 24 V motor in right-hand configuration installed with WLC200R



Horizontal 12 / 24V motor in left-hand configuration with WLC200R



Fasten electric control box containing solenoids to bulkhead or wall. Install remote circuit breaker between power supply and electric control box. Locate push-buttons on deck in a convenient spot for easy winch operation.

Refer to the following chart for wire size:

Total distance between winch and battery

Winch size	Current voltage	Under 16.4 ft AWG	Under 5 m mm ²	16.4 - 32.8 ft AWG	5 m - 10 m mm ²	32.8 - 49.2 ft AWG	10 m - 15 m mm ²	49.2 - 65.6 ft AGW	15m - 20 m mm ²
40.2	12 V	2	32	0	50	00	70	000	95
40.2	24 V	5	16	3	25	2	35	0	50

NOTICE

To connect motor, attach cable terminals to clamps between nut and lock nut. Hold nut in contact with motor using a spanner and tighten other nut with second spanner. Take special care not to turn the central spindles. Be careful not to turn central spindles. These instructions apply when assembling and disassembling. We recommend using a torque wrench so as to obtain a torque equal to and no greater than 10 Nm (88 in-lb).



NOTICE

Note that correct electrical contact sequence is: Nut – Cable Terminal – Self-Locking Washer – Lock Nut



Maintenance

Washing

Winches must be washed frequently with fresh water, and in any case after each use.

Do not allow teak cleaning products or other cleaners containing caustic solutions to come into contact with winches and especially anodised, chrome plated or plastic parts.

Do not use solvents, polishes or abrasive pastes on the logos or stickers on the winches. Do not use polishes or abrasive pastes on anodised, chromed plated or plastics surfaces.

Make sure that the holes and drainage channels in the base of the winch are not obstructed so that water does not collect.

Maintenance table

Winches must be visually inspected at the beginning and end of every season of sailing or racing. In addition they must be completely overhauled, cleaned and lubricated at least every 12 months. After an inspection, replace worn or damaged components. Do not replace or modify any part of the winch with a part that is not original.



WARNING!

Periodic maintenance must be carried out regularly. Lack of adequate maintenance shortens the life of the winch, can cause serious injury and also invalidate the winch warranty. Installation and maintenance of winches must be carried out exclusively by specialized personnel.







WARNING!

Make sure that the power is switched off before installing or carrying out maintenance on the winch.

In the case of doubt contact Harken® Tech Service at techservice@harken.it

Disassembly procedure

Tools needed:

-  One medium flat-bladed screwdriver
-  A number five hex key
-  Brush
-  Rags

To identify the various parts refer to the exploded view at the end of this Manual.

 Torque to be applied in assembly phase

Carry out **Procedure 1** as shown in the paragraph on winch installation and then do the following:



6. Completely unscrew the three screws n° 27 and remove the stripper arm support n°21



7. Slide out the central shaft n°19



8. Unscrew the 5 hex screws n°16
($\approx 20\text{Nm}/177\text{ in-lb}$)



9. Remove the assy housing n°15
Important: washer n°13 may remain inside the drum support!



10. Remove the washer n°13



11. Remove the gear n°7



12. Remove the pawls carrier n°4



13. Remove the gear n°3



14. Remove the gear n°14



15. Remove the gear n°10



16. Remove the pawls carrier n°11



18. Remove the washer n°9



I. Unscrew the 4 screws n°25
($\approx 4\text{Nm}/35\text{ in-lb}$)



II. Remove the jaws n°24

If it is necessary to replace any jaws of the winch, proceed as follows:
Inspect balls inside the drum and carefully check the correct position; if it is necessary to put back



any balls, push balls in the race (as shown below):

Once the winch is completely disassembled, clean the parts: use a basin of diesel oil to soak metal components and rinse plastic parts in fresh water. Once you have done this, dry the parts with cloths that do not leave residue.

Inspect gears, bearings, pins and pawls for any signs of wear or corrosion.

Carefully check the teeth of gears and ring gears to make sure there are no traces of wear.

Check the roller bearings and check there are no breaks in the bearing cages.

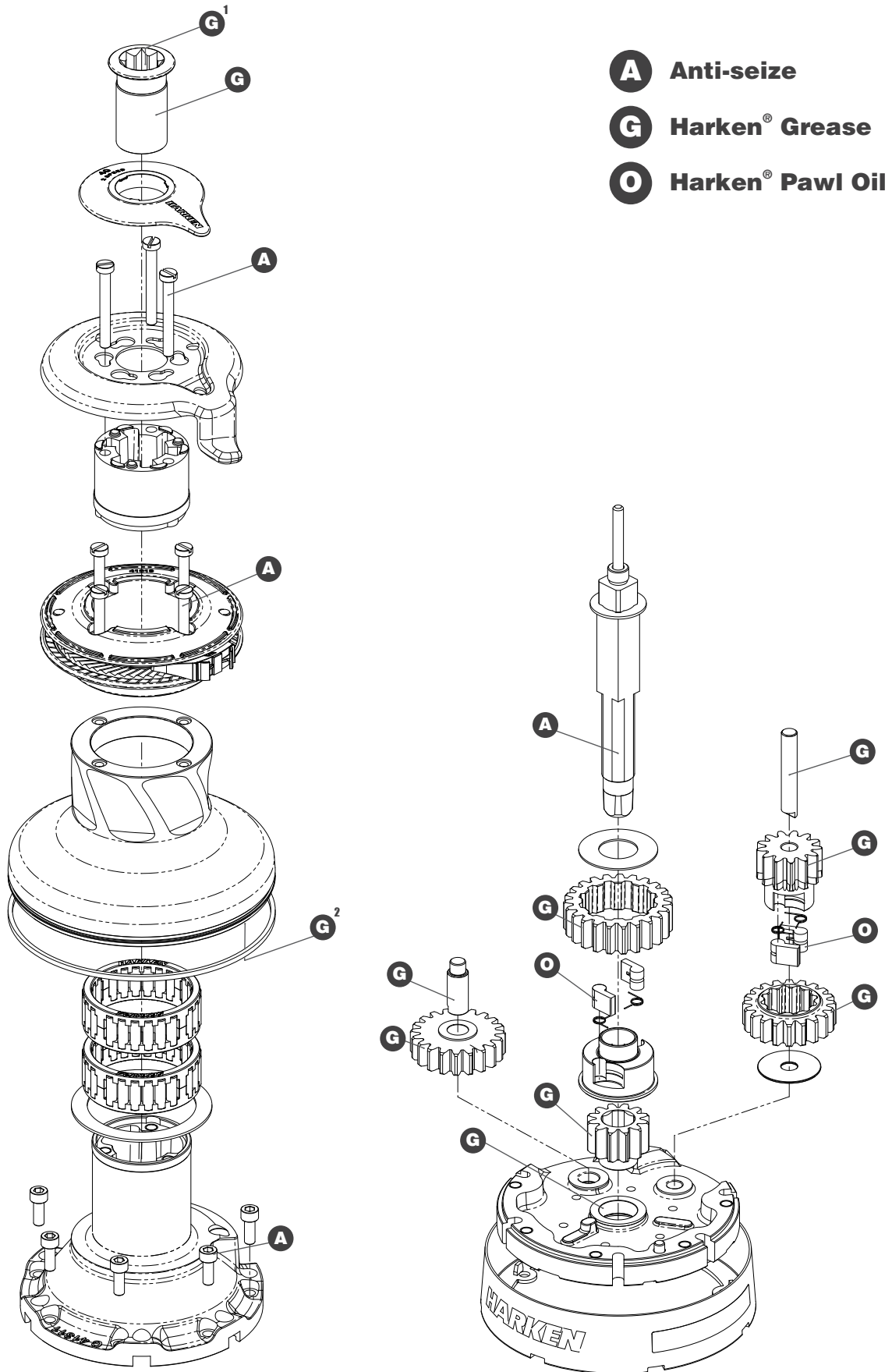
Replace worn or damaged components.

Carry out maintenance on components using the products listed below.

For more information on which products to use where, refer to the exploded diagram below.

Use a brush to lightly lubricate all gears, gear pins, teeth and all moving parts with grease.

Lightly lubricate the pawls and springs with oil. Do not use grease on the pawls!



1. Apply Harken® grease on assy socket screw - 2. Apply Harken® grease on drum gear

Exploded view with maintenance products

Assembly

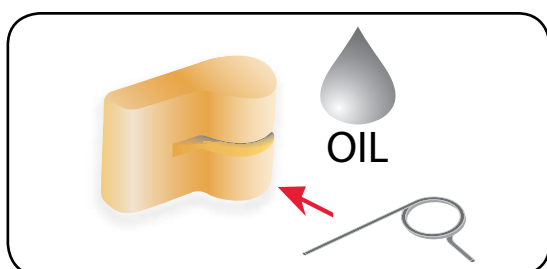
Make sure that the holes and drainage channels in the base of the winch are not obstructed. Assemble the winch in the reverse order of the sequence in the section on disassembly.



When positioning the stripper arm, align the peeler with it.

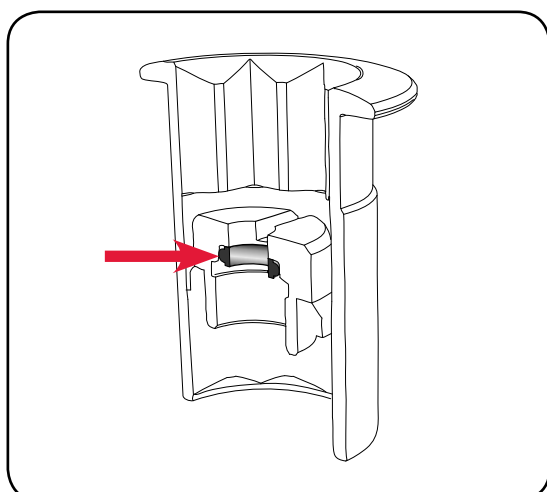


If the jaws have been disassembled, insert peeler between the two jaws, taking care that the letters TOP on the peeler are facing upwards.



To assemble the pawls

Correctly position the spring in its housing as shown at left. Hold the spring closed and slide the pawl into its housing. Once in position, check that the pawls can be easily opened and closed with a finger.



NOTICE

Before screw the central screw, check the correct position of the o-ring in the assy socket.

To tighten bolts, use the torque indicated in the disassembly procedure.

*In case of doubt concerning the assembly procedure contact Harken® Tech Service:
techservice@harken.it*

Harken® limited worldwide warranty

Refer to the Harken® Limited Worldwide Warranty in the Harken® Catalogue and on the website www.harken.com

Ordering spare parts

Spare parts can be requested from Harken® as described in the Harken® Limited Worldwide Warranty, indicating the part number in the Parts List and including the serial number of the winch for which the parts are required.

The serial number of the winch is printed on a plate on the drum support of the winch.



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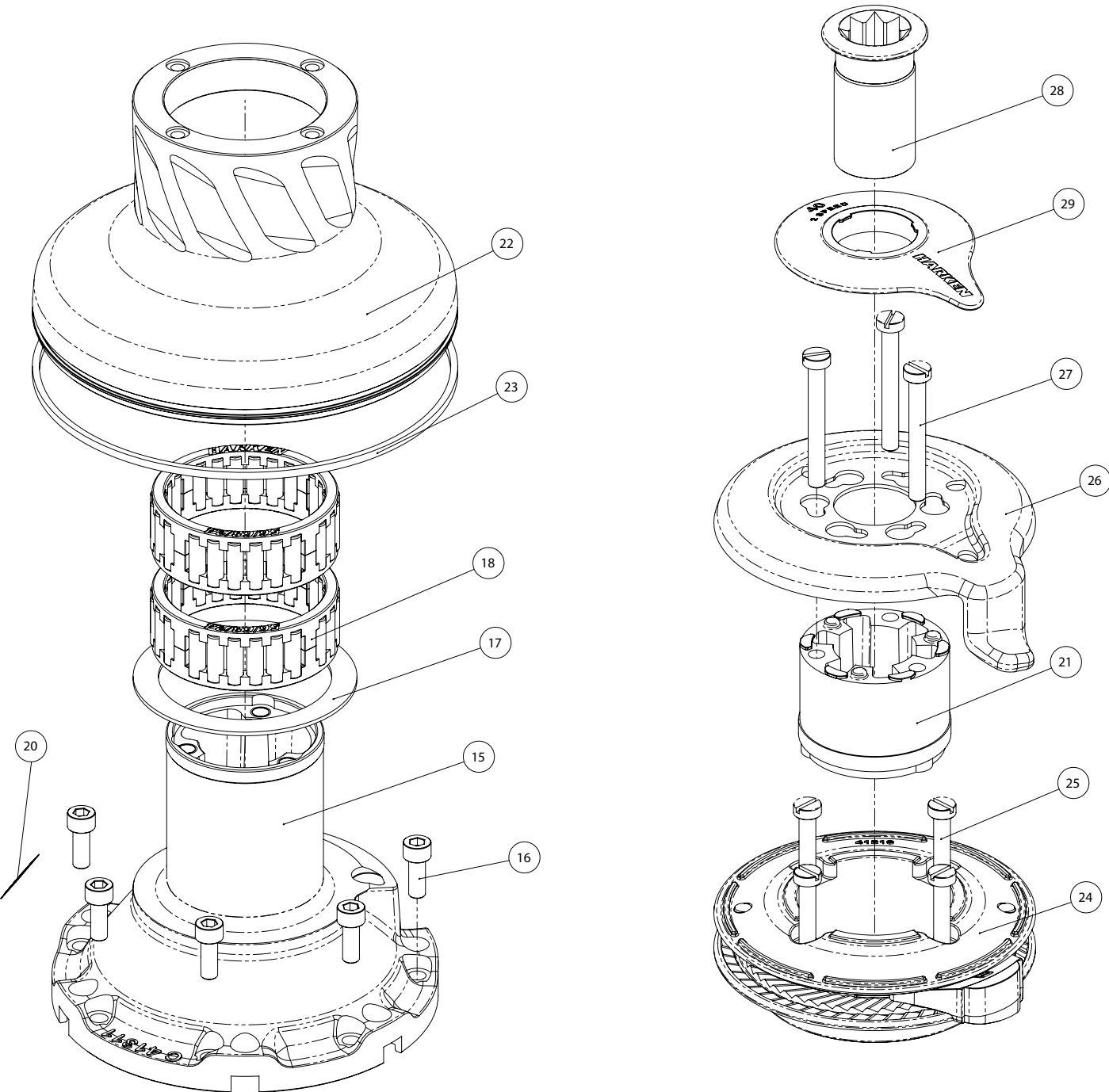
Harken®, Inc.

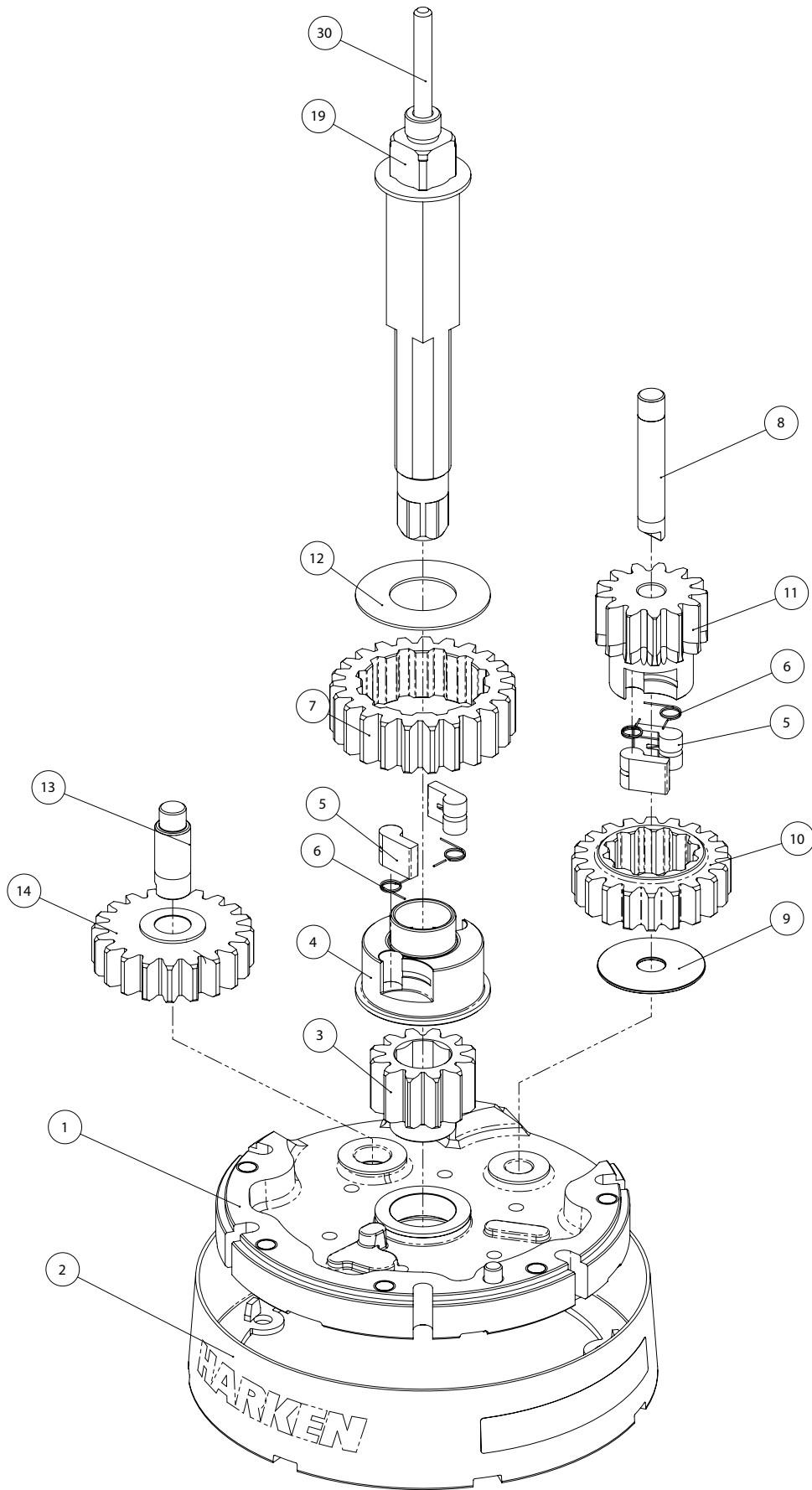
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Exploded view





Parts List

Radial Winch 40.2 STA

A= drum in anodised aluminium

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A 941896 00	Assy Base Winch 40 EL/HY Base W40 Heli-coil M6x9 Roller Ø6x19 Bushing Ø22xØ25x8.5 Bushing Ø9xØ11x12* Bushing Ø12xØ14x11*	16	6	M0635103	Socket head screw M6x16 UNI 5931*
				17	1	S 41315 00 82	Washer Ø62xØ80x1.5*
				18	2	A74136000	Bearing Ø56xØ68x24*
				19	1	A94149800	Assy Central Shaft W40 EL/HY Central Shaft Pred. W40 Washer Ø17.2xØ32x1.5
2	1	A94141400	Assembly Skirt Winch 40 Skirt W40 Winch Product Sticker**	20	1	S 41876 00 63	Winch Serial Number Sticker
				21	1	S 41294 00 A0	Stripper arm support
3	1	S 41302 00 04	Gear Z12	22	1	S414170053	Drum A W40
4	1	S 41303 00 04	Pawls Carrier Ø8xN2	23	1	S281680097	Red line*
5	4	S 00008 00 03	Pawl Ø8	24	1	A94131800	Assy Winch 40 Jaws Lower Jaw W40 Upper Jaw W40 Peeler W40 Spring
6	4	S 00038 00 01	Pawl Spring Ø8				
7	1	S 41283 00 41	Gear Z23	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35 - A4*
8	1	S 41300 00 04	Pin Ø9x55	26	1	S 41420 00 19	Stripper Arm W35/40
9	1	S279090002	Washer 36x9,5x1*	27	3	M6007103	Screw M6x50 UNI6107*
10	1	S 41297 00 04	Gear Z20	28	1	A 941493 00	Assy Socket W40 EL/HY Socket Handle W40 Washer ø25xø15x4 Nut Screw for Disconnect Rod O ring RC 2025 series*
11	1	S 41285 00 41	Pinion Z13	29	1	S 41419 00 A5	Cover 2 speed W40
12	1	S 41312 00 02	Washer Ø22.5xØ45x1*	30	1	S 41506 00 02	Disconnect Rod W40
13	1	S 41307 00 04	Pin Ø9-Ø12x32.5				
14	1	A94130500	Assy Gear Z20 Gear Z20 Bushing Ø12xØ14x8*				
15	1	A94141500	Assy Housing W40 Support W40 Bushing Ø9xØ11x7* Heli-coil M6x9 Bushing Ø22xØ25x8.5				

*Service kit available; see winch kit section on the website www.harken.com

**Winch product sticker



Radial Winch 40.2 STC

C=drum in chromed bronze

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A 941896 00	Assy Base Winch 40 EL/HY <i>Base W40 Heli-coil M6x9 Roller Ø6x19 Bushing Ø22xØ25x8.5 Bushing Ø9xØ11x12* Bushing Ø12xØ14x11*</i>	16	6	M0635103	Socket head screw M6x16 UNI 5931*
2	1	A94141400	Assembly Skirt Winch 40 <i>Skirt W40 Winch Product Sticker**</i>	17	1	S 41315 00 82	Washer Ø62xØ80x1.5*
3	1	S 41302 00 04	Gear Z12	18	2	A74136000	Bearing Ø56xØ68x24*
4	1	S 41303 00 04	Pawls Carrier Ø8xN2	19	1	A94149800	Assy Central Shaft W40 EL/HY <i>Central Shaft Pred. W40 Washer Ø17.2xØ32x1.5</i>
5	4	S 00008 00 03	Pawl Ø8	20	1	S 41876 00 63	Winch Serial Number Sticker
6	4	S 00038 00 01	Pawl Spring Ø8	21	1	S 41294 00 A0	Stripper arm support
7	1	S 41283 00 41	Gear Z23	22	1	S414180043	Drum C W40
8	1	S 41300 00 04	Pin Ø9x55	23	1	S281680097	Red line*
9	1	S279090002	Washer 36x9,5x1*	24	1	A94131800	Assy Winch 40 Jaws <i>Lower Jaw W40 Upper Jaw W40 Peeler W40 Spring</i>
10	1	S 41297 00 04	Gear Z20	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35 - A4*
11	1	S 41285 00 41	Pinion Z13	26	1	S 41420 00 19	Stripper Arm W35/40
12	1	S 41312 00 02	Washer Ø22.5xØ45x1*	27	3	M6007103	Screw M6x50 UNI6107*
13	1	S 41307 00 04	Pin Ø9-Ø12x32.5	28	1	A 941493 00	Assy Socket W40 EL/HY <i>Socket Handle W40 Washer ø25xø15x4 Nut Screw for Disconnect Rod O ring RC 2025 series*</i>
14	1	A94130500	Assy Gear Z20 <i>Gear Z20 Bushing Ø12xØ14x8*</i>	29	1	S 41419 00 A5	Cover 2 speed W40
15	1	A94141500	Assy Housing W40 <i>Support W40 Bushing Ø9xØ11x7* Heli-coil M6x9 Bushing Ø22xØ25x8.5*</i>	30	1	S 41506 00 02	Disconnect Rod W40

*Service kit available; see winch kit section on the website www.harken.com

**Winch product sticker



Radial Winch 40.2 STCW

C=drum in chromed bronze W=components RAL 9003

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A 941896 00	Assy Base Winch 40 EL/HY Base W40 Heli-coil M6x9 Roller Ø6x19 Bushing Ø22xØ25x8.5 Bushing Ø9xØ11x12* Bushing Ø12xØ14x11*	16	6	M0635103	Socket head screw M6x16 UNI 5931*
2	1	A 941414 00 W	Assembly Skirt Winch 40 RAL 9003 Skirt W40 RAL 9003 Winch Product Sticker**	17	1	S 41315 00 82	Washer Ø62xØ80x1.5*
3	1	S 41302 00 04	Gear Z12	18	2	A74136000	Bearing Ø56xØ68x24*
4	1	S 41303 00 04	Pawls Carrier Ø8xN2	19	1	A94149800	Assy Central Shaft W40 EL/HY Central Shaft Pred. W40 Washer Ø17.2xØ32x1.5
5	4	S 00008 00 03	Pawl Ø8	20	1	S 41876 00 63	Winch Serial Number Sticker
6	4	S 00038 00 01	Pawl Spring Ø8	21	1	S 41294 00 A0	Stripper arm support
7	1	S 41283 00 41	Gear Z23	22	1	S414180043	Drum C W40
8	1	S 41300 00 04	Pin Ø9x55	23	1	S281680097	Red line*
9	1	S279090002	Washer 36x9,5x1*	24	1	A 941318 00 W	Assy Winch 40 Jaws RAL 9003 Lower Jaw W40 RAL 9003 Upper Jaw W40 RAL 9003 Peeler W40 RAL 9003 Spring
10	1	S 41297 00 04	Gear Z20	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35 - A4*
11	1	S 41285 00 41	Pinion Z13	26	1	S 41420 00 19	Stripper Arm W35/40
12	1	S 41312 00 02	Washer Ø22.5xØ45x1*	27	3	M6007103	Screw M6x50 UNI6107*
13	1	S 41307 00 04	Pin Ø9-Ø12x32.5	28	1	A 941493 00	Assy Socket W40 EL/HY Socket Handle W40 Washer ø25xø15x4 Nut Screw for Disconnect Rod O ring RC 2025 series*
14	1	A94130500	Assy Gear Z20 Gear Z20 Bushing Ø12xØ14x8*	29	1	S 41419 00 A5 W	Cover 2 speed W40 RAL 9003
15	1	A94141500	Assy Housing W40 Support W40 Bushing Ø9xØ11x7* Heli-coil M6x9 Bushing Ø22xØ25x8.5*	30	1	S 41506 00 02	Disconnect Rod W40

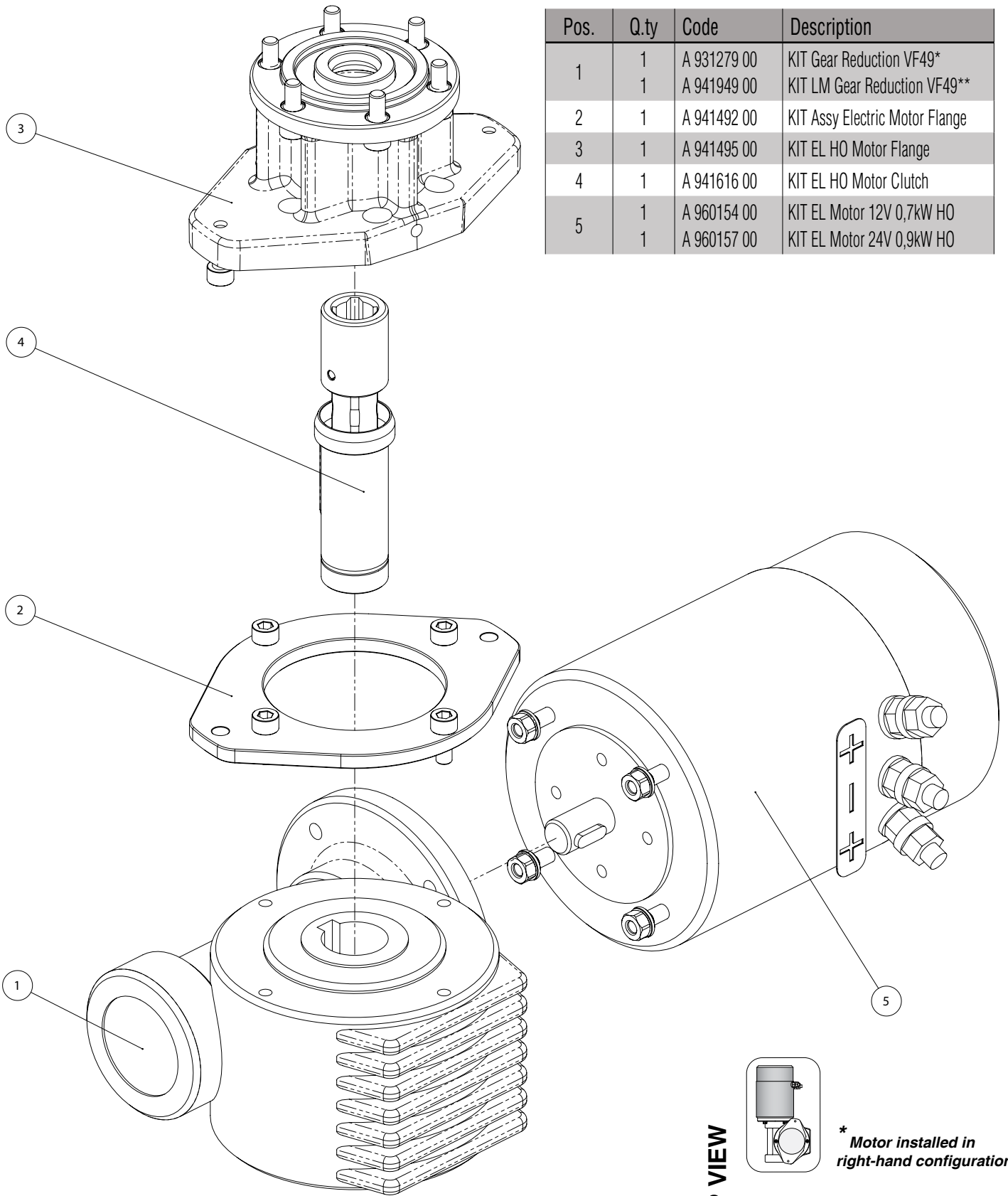
*Service kit available; see winch kit section on the website www.harken.com

**Winch product sticker

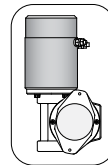


Horizontal electric motor 12V/24V

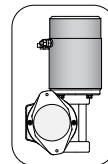
Pos.	Q.ty	Code	Description
1	1	A 931279 00	KIT Gear Reduction VF49*
	1	A 941949 00	KIT LM Gear Reduction VF49**
2	1	A 941492 00	KIT Assy Electric Motor Flange
3	1	A 941495 00	KIT EL HO Motor Flange
4	1	A 941616 00	KIT EL HO Motor Clutch
5	1	A 960154 00	KIT EL Motor 12V 0,7kW HO
	1	A 960157 00	KIT EL Motor 24V 0,9kW HO



TOP VIEW



* Motor installed in right-hand configuration.



** Motor installed in left-hand configuration.