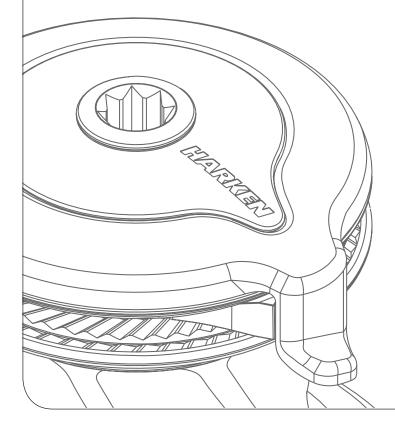
# **Installation and Maintenance Manual**

MRW-03

# **Radial Winch 40.2 ST**





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## **Introduction - Technical characteristics - Outline**

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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<sup>®</sup> accepts no responsibility for defective installation or reassembly of its winches. In case of doubt the Harken<sup>®</sup> 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.

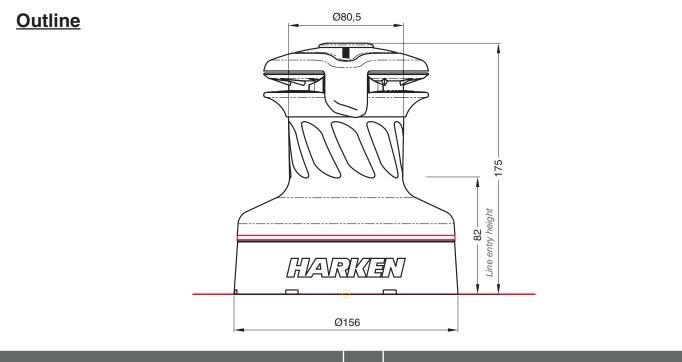
#### <u>Weights</u>

	ST A version	ST C/CW versions	ST BBB/CCC versions					
Weight (Kg)	3,8	5,4	6,2					
Versions: A = drum in anodised aluminium; C = drum in chrome bronze; CW = chrome/white;								
BBB = all bronze; CCC = All-Chrome bronze								

#### 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.



## Installation

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#### **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<sup>®</sup> 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<sup>®</sup> 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.



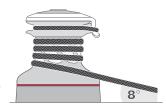
#### WARNING!

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  $8^{\circ}$  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.



drive gear

SHEET

## $\wedge$

#### 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

For winch STA, STC and STCW versions only you can find the icon  $\blacktriangle$  on the skirt to identify the drive gear position.



Once you have chosen the correct mounting position for the winch on the deck proceed with installation.

The winch can be installed following one of the two procedures below (Procedure1 or Procedure 2):

#### Procedure 1

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

Tools needed Common One medium flat-bladed screwdriver

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

 $\sim$  Torque to apply when assembling



1. Unscrew the central screw (22Nm/18 in-lb)



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



3. Unscrew the three screws n°27 (~4Nm/35 in-lb)



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



5. 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 4 and using socket head (SH) bolts.

#### Procedure 2 (not pertinent for ST BBB/CCC versions)

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.

<sup>3</sup> √ Torque to apply when assembling

See (paragraph on installation) the limits described on page 4 and using socket head (SH) bolts.



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



2. Take off the skirt 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 4 and using hexagonal headed bolts (HH). (See paragraph on installation)

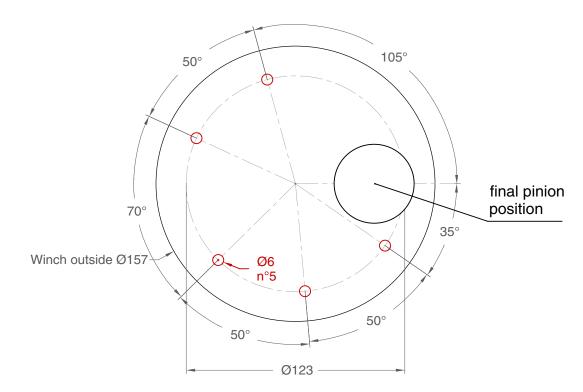
#### Installation procedure

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

**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<sup>®</sup> website, www.harken.com



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

**C.** Bolt the base of the winch to the deck using five M6 bolts (not supplied by Harken<sup>®</sup>) as described at Procedure 1 or Procedure 2, 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 part11). 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.

## Maintenance

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#### 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.

.....

#### <u>Maintenance</u>

#### 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.

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 Rags

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

 $^{\sim}$  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



7. Remove the self-tailing arm support n°21 and slide out the bushing



8. Slide out the central shaft n°19



9. Unscrew the 6 hex screws n°16 (~8Nm/71 in-lb)



10. Remove the drum support n°15Important: washer n°12 may remain inside the drum support!



11. Remove the washer  $n^\circ 12$ 



12. Remove the gearing n°7 and remove the pawls n°5. To facilitate the operation press the spring against the pawl with a blade.



14. Slide off gear n°14



13. Slide off gear n°3



15. Slide off gear n°10



16. Remove the pawls n°5. To facilitate the operation press the spring against the pawl with a blade.



17. Remove washer n°9

If it is necessary to replace any jaws of the winch, proceed as follows:



I. Unscrew the 4 screws n°25 (~4Nm/35 in-lb)



II. Remove the jaws n°24

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.

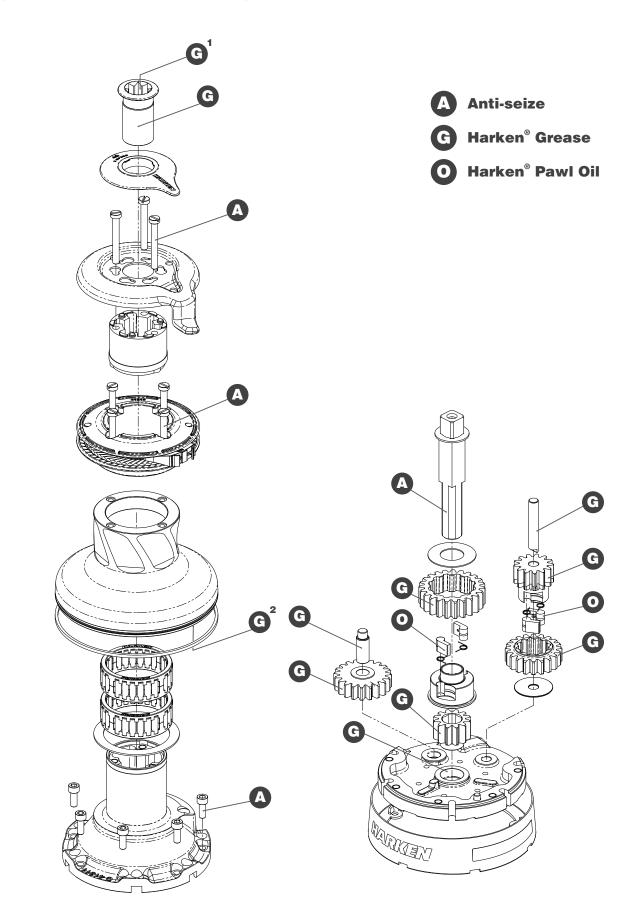
Carefully check the teeth of gears and ring gears to make sure there are no traces of wear.

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!

Exploded view with maintenance products



1. Apply Harken<sup>®</sup> grease on assy socket screw - 2. Apply Harken<sup>®</sup> grease on drum gear



#### <u>Assembly</u>

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.

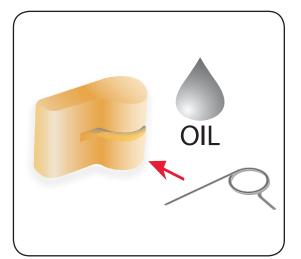
To tighten bolts, use the torque indicated in the disassembly procedure.



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.

In case of doubt concerning the assembly procedure contact Harken<sup>®</sup> Tech Service: techservice@harken.it

## Harken® limited worldwide warranty

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

#### **Ordering spare parts**

Spare parts can be requested from Harken<sup>®</sup> as described in the Harken<sup>®</sup> 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.



#### Manufacturer

Harken<sup>°</sup> Italy S.p.A. Via Marco Biagi, 14 23570 Limido Comasco (CO) Italy Tel: (+39) 031.3523511 Fax: (+39) 031.3535031 Email: info@harken.it Web: www.harken.com

- Tech Service Email: techservice@harken.it
- Customer Service Tel: (+39) 031.3523511 Email: info@harken.it

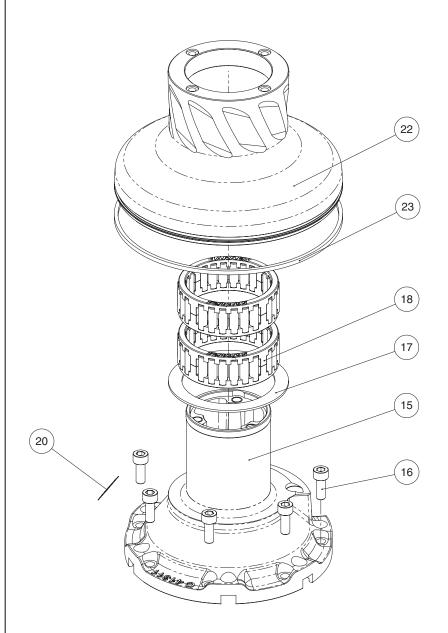
#### Headquarters

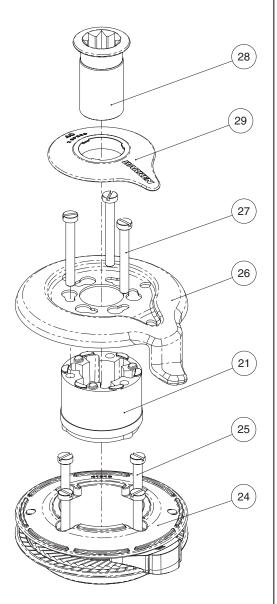
Harken<sup>°</sup>, Inc. 1251 East Wisconsin Avenue Pewaukee, Wisconsin 53072-3755 USA Tel: (262) 691.3335 Fax: (262) 691.3008 Email: harken@harken.com Web: www.harken.com

- Tech Service Email: technicalservice@harken.com
- Customer Service
  Tel: (262) 691-3335
  Email: customerservice@harken.com

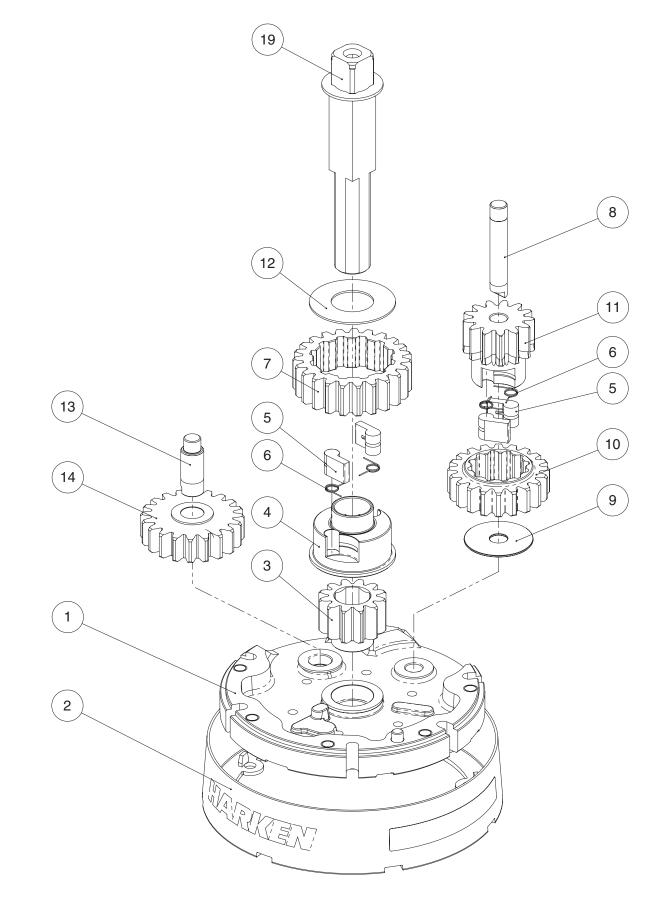
## **Exploded view**

Radial Winch 40.2 STA, STC, STCW

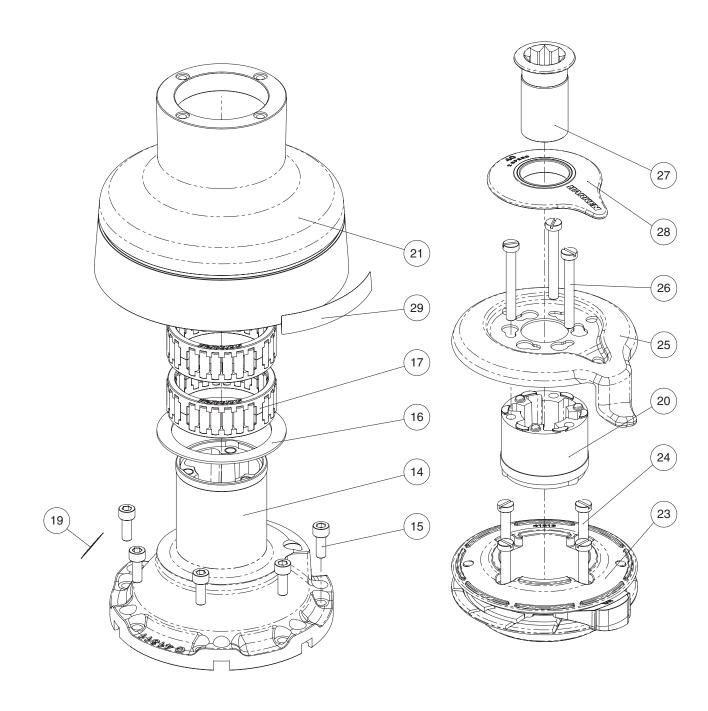




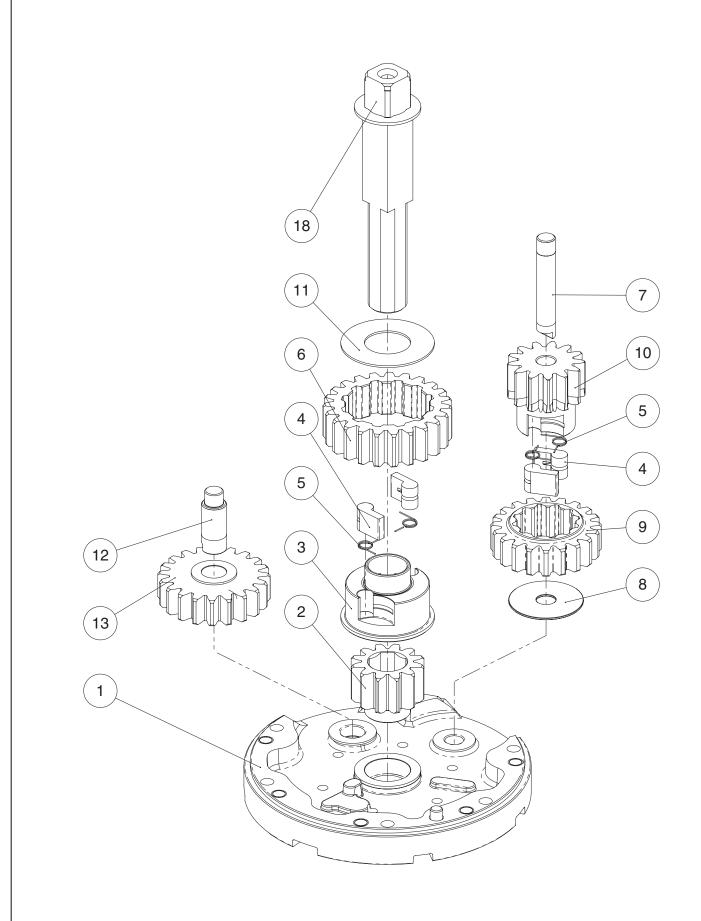
## Radial Winch 40.2 STA, STC, STCW



## Radial Winch 40.2 STBBB, STCCC



## Radial Winch 40.2 STBBB, STCCC



## Parts List

Radial Winch 40.2 STA

A= drum in anodised aluminium

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A94141300	Winch 40 Base Assy	16	6	M0635103	Socket head screw M6x16 UNI 5931
			Base W40 Heli-coil M6x9	17	1	S413150082	Washer Ø62xØ80x1.5
	1	S413350080	Roller Ø6x19	18	2	A74136000	Bearing Ø56xØ68x24
	1	S4152300A7 S413960085	Bushing Ø22xØ25x9.5 Bushing Ø9xØ11x12	19	1	A94139000	Assy Central Shaft W35/40 Central shaft W35/40 ST
	1	S413300005	Bushing Ø12xØ14x11		1	S413880002	Washer Ø17.2xØ32x1.5
2	1	A94141400	Assembly Skirt Winch 40	20			Winch Serial Number Sticker
			Skirt W40 Winch Product Sticker**	21	1	S4129400A0	Stripper arm Housing
3	4	S413020004	Gear Z12	22	1	S414170053	Drum A W40
4	-		Pawls Carrier Ø8xN2	23	1	S281680097	Red line
5		S413030004	Pawl Ø8*	24	1	A94131800	Assy Winch 40 Jaws
6	4	S000080003	Pawl Spring Ø8*				Lower Jaw W35/40 Upper Jaw W35/40
7	4	S000380001	Gear Z23		1	S413610080	Peeler W20 - 40
8	-	S412830041	Pin Ø9x55		4	S385970001	SPRING
9	-	S413000004	Washer Ø36xØ9,5x1	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35
10	1	S279090002	Gear Z20				- A4
-		S412970004		26	1	S414200019	Stripper Arm W35/40
11	1	S412850041	Pinion Z13	27	3	M6007103	Screw M6x50 UNI6107
12	1	S413120002	Washer Ø22.5xØ45x1	28	1	A94136400	Assy Socket W20-80
13	1	S413070004	Pin Ø9-Ø12x32.5		1	S415130085	Socket Handle W20/80 Washer Ø7.7xØ25x5.8
14	1	A94130500	Assy Gear Z20 Gear Z20		1	M0614303	Screw M8x20 UNI 6109
	2	S414900080	Bushing Ø12xØ14x8	29	1	S4141900A5	Cover 2 speed W40
15	1	A94141500	Assy Housing Winch 40 Housing W40				
	2	S414890080	Bushing Ø9xØ11x7 Heli-coil M6x9				
	1	S4130900A7	Bushing Ø22xØ25x8.5				

\*Available with service kit; see website www.harken.com





## Radial Winch 40.2 STC

#### C=drum in chrome bronze

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A94141300	Winch 40 Base Assy	16	6	M0635103	Socket head screw M6x16 UNI 5931
			Base W40 Heli-coil M6x9	17	1	S413150082	Washer Ø62xØ80x1.5
	1	S413350080	Roller Ø6x19	18	2	A74136000	Bearing Ø56xØ68x24
		S4152300A7	Bushing Ø22xØ25x9.5 Bushing Ø9xØ11x12	19	1	A94139000	Assy Central Shaft W35/40 Central shaft W35/40 ST
	1	S413960085 S413330085	Bushing Ø12xØ14x11		1	S413880002	Washer Ø17.2xØ32x1.5
2	1	A94141400	Assembly Skirt Winch 40	20			Winch Serial Number Sticker
			Skirt W40 Winch Product Sticker**	21	1	S4129400A0	Stripper arm Housing
3	4	041000004	Gear Z12	22	1	S414180043	Drum W40 C
4	1	S413020004	Pawls Carrier Ø8xN2	23	1	S281680097	Red line
		S413030004		24	1	A94131800	Assy Winch 40 Jaws
5	4	S000080003	Pawl Ø8*				Lower Jaw W35/40
6	4	S000380001	Pawl Spring Ø8*		1	S413610080	Upper Jaw W35/40 Peeler W20 - 40
7	1	S412830041	Gear Z23		4	S385970001	SPRING
8	1	S413000004	Pin Ø9x55	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35
9	1	S279090002	Washer Ø36xØ9,5x1				- A4
10	1	S412970004	Gear Z20	26	1	S414200019	Stripper Arm W35/40
11	1	S412850041	Pinion Z13	27	3	M6007103	Screw M6x50 UNI6107
12	1	S413120002	Washer Ø22.5xØ45x1	28	1	A94136400	Assy Socket W20-80
13	1	S413070004	Pin Ø9-Ø12x32.5		4	041010000	Socket Handle W20/80 Washer Ø7.7xØ25x5.8
14	1	A94130500	Assy Gear Z20 <i>Gear Z20</i>		1	S415130085 M0614303	Screw M8x20 UNI 6109
	2	S414900080	Bushing Ø12xØ14x8	29	1	S4141900A5	Cover 2 speed W40
15	1	A94141500	Assy Housing Winch 40 Housing W40				
	2	S414890080	Bushing Ø9xØ11x7 Heli-coil M6x9				
	1	S4130900A7	Bushing Ø22xØ25x8.5				

\*Available with service kit; see website www.harken.com





## Radial Winch 40.2 STCW

CW = chrome/white

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A94141300	Winch 40 Base Assy	16	6	M0635103	Socket head screw M6x16 UNI 5931
			Base W40 Heli-coil M6x9	17	1	S413150082	Washer Ø62xØ80x1.5
	1	S413350080	Roller Ø6x19	18	2	A74136000	Bearing Ø56xØ68x24
		S4152300A7	Bushing Ø22xØ25x9.5	19	1	A94139000	Assy Central Shaft W35/40
	1	S413960085 S413330085	Bushing Ø9xØ11x12 Bushing Ø12xØ14x11		1	S413880002	Central shaft W35/40 ST Washer Ø17.2xØ32x1.5
2	1	A94141400W	Assembly Skirt Winch 40	20			Winch Serial Number Sticker
			Skirt W40 RAL9003 Winch Product Sticker**	21	1	S4129400A0	Stripper arm Housing
3	4	041000004	Gear Z12	22	1	S414180043	Drum C W40
		S413020004	Pawls Carrier Ø8xN2	23	1	S281680097	Red line
4		S413030004	Pawl Ø8*	24	1	A94131800W	Assy Winch 40 Jaws
5	4	S000080003					Lower Jaw W35/40 RAL9003
6	4	S000380001	Pawl Spring Ø8*		1	S413610080W	<i>Upper Jaw W35/40 RAL9003</i> <i>Peeler W20 - 40 RAL9003</i>
7	1	S412830041	Gear Z23		4	S385970001	SPRING
8	1	S413000004	Pin Ø9x55	25	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35
9	1	S279090002	Washer 36x9,5x1				- A4
10	1	S412970004	Gear Z20	26	1	S414200019	Stripper Arm W35/40
11	1	S412850041	Pinion Z13	27	3	M6007103	Screw M6x50 UNI6107
12	1	S413120002	Washer Ø22.5xØ45x1	28	1	A94136400	Assy Socket W20-80
13	1	S413070004	Pin Ø9-Ø12x32.5		4	S415130085	Socket Handle W20/80 Washer Ø7.7xØ25x5.8
14	1	A94130500	Assy Gear Z20 Gear Z20		1	M0614303	Screw M8x20 UNI 6109
	2	S414900080	Bushing Ø12xØ14x8	29	1	S4141900A5W	Cover 2 speed W40 RAL9003
15	1	A94141500	Assy Housing Winch 40 Housing W40				
	2	S414890080	Bushing Ø9xØ11x7 Heli-coil M6x9				
	1	S4130900A7	Bushing Ø22xØ25x8.5				

\*Available with service kit; see website www.harken.com





#### Radial Winch 40.2 STBBB

BBB = all bronze

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A96633200	Winch 40 Base Assy	17	2	A74136000	Bearing Ø56xØ68x24
			PERFORMA Base W40 Heli-coil M6x9	18	1	A94139000	Assy Central Shaft W35/40
	1	S413350080	Roller Ø6x19		4	041000000	Central shaft W35/40 ST Washer Ø17.2xØ32x1.5
	1	S4152300A7	Bushing Ø22xØ25x9.5	19	1	S413880002	Winch Serial Number Sticker
	1	S413960085	Bushing Ø9xØ11x12			0.4400.400.40	
	1	S413330085	Bushing Ø12xØ14x11	20	1	S4129400A0	Stripper arm Housing
2	1	S413020004	Gear Z12	21	1	S688160043	Drum W40 BBB
3	1	S413030004	Pawls Carrier Ø8xN2	22	1	S281680097	Red line
4	4	S000080003	Pawl Ø8*	23	1	A96932800	Assy Jaws Winch 35/40 BBB
5	4	S000380001	Pawl Spring Ø8*				Lower Jaw W35/40 BBB Upper Jaw W35/40
6	1	S412830041	Gear Z23		1	S413610080	Peeler W20 - 40
7	1	S413000004	Pin Ø9x55		4	S385970001	SPRING
8	1	S279090002	Washer Ø36xØ9,5x1	24	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35
9	1	S412970004	Gear Z20	25	4	000000010	- A4 Stripper arm W35/40 BBB
10	1	S412850041	Pinion Z13		1	S693220019	
11	1	S413120002	Washer Ø22.5xØ45x1	26	3	M6007103	Screw M6x50 UNI6107
12	1	S413070004	Pin Ø9-Ø12x32.5	27	1	A94136400	Assy Socket W20-80 Socket Handle W20/80
13	1	A94130500	Assy Gear Z20		1	S415130085	Washer Ø7.7xØ25x5.8
			Gear Z20		1	M0614303	Screw M8x20 UNI 6109
	2	S414900080	Bushing Ø12xØ14x8	28	1	A76932600	Cover 2 speed W40
14	1	A94141500	Assy Housing Winch 40 Housing W40	29			Winch Product Sticker**
	2	S414890080	Bushing Ø9xØ11x7				
			Heli-coil M6x9				
	1	S4130900A7	Bushing Ø22xØ25x8.5				
15	6	M0635103	Socket head screw M6x16 UNI 5931				
16	1	S413150082	Washer Ø62xØ80x1.5				

\*Available with service kit; see website www.harken.com





#### Radial Winch 40.2 STCCC

#### CCC = All-Chrome bronze

Pos.	Q.ty	Code	Description	Pos.	Q.ty	Code	Description
1	1	A96633200	Winch 40 Base Assy	17	2	A74136000	Bearing Ø56xØ68x24
			PERFORMA Base W40 Heli-coil M6x9	18	1	A94139000	Assy Central Shaft W35/40 Central shaft W35/40 ST
	1	S413350080	Roller Ø6x19		1	S413880002	Washer Ø17.2xØ32x1.5
	1	S4152300A7 S413960085	Bushing Ø22xØ25x9.5 Bushing Ø9xØ11x12	19			Winch Serial Number Sticker
	1	S413330085	Bushing Ø12xØ14x11	20	1	S4129400A0	Stripper arm Housing
2	1	S413020004	Gear Z12	21	1	S681050043	Drum CCC W40
3	1	S413030004	Pawls Carrier Ø8xN2	22	1	S281680097	Red line
4	4	S000080003	Pawl Ø8*	23	1	A96811900	Assy Jaws Winch 35/40 CCC
5	4	S000380001	Pawl Spring Ø8*				Lower Jaw W35/40 CCC Upper Jaw W35/40 RAL9003
6	1	S412830041	Gear Z23		1	S413610080 W	Peeler W20 - 40 RAL9003
7	1	S413000004	Pin Ø9x55		4	S385970001	SPRING
8	1	S279090002	Washer Ø36xØ9,5x1	24	4	M0601803	Screw UNI EN ISO 1207:1996 - M6x35
9	1	S412970004	Gear Z20	25	-	0.44.400.004.0	- A4 Ctripper Arm W/2E /40
10	1	S412850041	Pinion Z13		1	S414200019	Stripper Arm W35/40
11	1	S413120002	Washer Ø22.5xØ45x1	26	3	M6007103	Screw M6x50 UNI6107
12	1	S413070004	Pin Ø9-Ø12x32.5	27	1	A94136400	Assy Socket W20-80 Socket Handle W20/80
13	1	A94130500	Assy Gear Z20		1	S415130085	Washer Ø7.7xØ25x5.8
	2	S414900080	Gear Z20 Bushing Ø12xØ14x8		1	M0614303	Screw M8x20 UNI 6109
14	1		Assy Housing Winch 40	28	1	A76811200	Cover 2 speed W40
14		A94141500	Housing W40	29			Winch Product Sticker**
	2	S414890080	Bushing Ø9xØ11x7 Heli-coil M6x9				
	1	S4130900A7	Bushing Ø22xØ25x8.5				
15	6	M0635103	Socket head screw M6x16 UNI 5931				
16	1	S413150082	Washer Ø62xØ80x1.5				

\*Available with service kit; see website www.harken.com

