



NABRICO

2/5 Ton Winch Owner's Manual

OM-2/5-001-B

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NABRICO

2/5 TON WINCH OWNER'S MANUAL

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OM-2/5-001-B

SAFETY INFORMATION

CAUTION

Prior to installing and operating the winch, please read this manual thoroughly and carefully. Keep this manual and all other instructions accessible at all times.

The Occupational Safety and Health Act of 1970 states that it is the employer's responsibility to provide a workplace free of hazard. To this end, all equipment should be installed, operated and maintained in compliance with applicable trade, industrial, federal, state and local regulations. It is the equipment owner's responsibility to obtain copies of these regulations and to determine the suitability of the equipment for the equipment owner's intended use.

Although this manual will help you become familiar with the basic operation of the winch, it is by no means a substitute for proper training by your company in the safe use of winches, barge rigging and other marine equipment. This manual suggests methods of operation, but ultimately, the owners and operators of the equipment are responsible for determining whether a particular method of operation is safe and appropriate for the equipment being operated. Only individuals trained in the proper use of winches, barge rigging and other marine equipment should operate these winches.

The typical operating environment of barge and towboat winches often includes very high forces, and the potential hazards associated with these high forces should not be underestimated. Improper installation or incorrect or unsafe use could result in injury or death to persons or cause equipment failure or damage.

Recommended Information for Safe Operation:

CAUTION

- Check lubrication before use.
- Do not apply tension to the winch unless there are 3-4 complete wraps of rope on the drum.
- Do not operate the equipment unless you have a firm stance on a non-slippery surface.
- Do not wrap the wire rope around the load. This will damage the wire rope and could cause the load to escape. Rigging connectors are strongly recommended to secure the wire rope to the load.
- Keep fingers, loose clothing and any foreign objects away while operating the equipment.
- Do not divert attention away while operating the equipment. Stay alert to the possibility of accidents and try to prevent them from happening.
- Always remain to the side of the equipment while in operation.
- Never operate the equipment from the front or when bystanders are in front of it.
- Operators and bystanders should stay clear of any load and the wire rope while the equipment is operating.
- Avoid shock loads by starting and stopping the equipment smoothly. Shock loads can overload the equipment which may cause damage.
- Under no circumstances should any equipment be used to move, raise or lower a person(s) or equipment.

<u>NOTICE</u>
<p>Inspect the equipment carefully at least once a month for loose fasteners, worn gears and pawls, cracked welds and other damaged parts. If any worn, cracked or damaged parts are found, stop use immediately and remove equipment from service until all appropriate repairs are completely made.</p>

1.1 INSTALLATION OF EQUIPMENT

NOTICE

It is the responsibility of the customer, not the winch manufacturer, to properly locate and install the winch with regard to the safety of those operating the machinery.

CAUTION

Install the winch in an area where there is ample room to operate the unit without the operator becoming entangled in the cable, lines, chains, winch mechanisms or other nearby equipment.

- 1.1.1** All winches must be installed on a flat, rigid and non-slippery surface. Deck and structure must be strong enough to withstand the weight and holding capacity of the winch, and the forces likely to occur during operation. A qualified professional should inspect or design the foundation to insure that it will provide adequate support.
- 1.1.2** Locate the winch in a suitable area free of traffic and obstacles. The winch should also be visible during entire operation. Keep in mind that the winch needs to be accessible for proper lubrication, maintenance and operation.
- 1.1.3** Mounting direction should be in line with the desired direction of cable pull. The front of the winch should face in the direction from which the cable is reeled. When using the hand wheel, the drum should rotate so that it reels cable onto the TOP of the drum from the front of the winch. Check that there is enough clearance for proper operation of the hand wheel.
- 1.1.4** Fasten the winch securely to the foundation.
 - 1.1.4.1** 2 Ton Winch - Mounting bolts must be 9/16" (14mm) and must be grade 5 or better. Use self locking nuts or nuts with lock washers. Mounting bolt pattern is 7.5" front to back and 10.5" side to side.
 - 1.1.4.2** 5 Ton Winch - Mounting bolts must be 5/8" (16mm) and must be grade 5 or better. Use self locking nuts or nuts with lock washers. Mounting bolt pattern is 7.875" front to back and 10.75" side to side.
- 1.1.5** Maintain a fleet angle no greater than 1-1/2 degrees from winch drum to lead sheave (see appendix 5). The proper fleet angle helps to minimize wire rope damage by assisting the wire rope to wind uniformly onto the drum.
- 1.1.6** Do not weld to any part of the winch.
- 1.1.7** Inspect the winch immediately following installation. This inspection will give a good starting record of the winch condition so that future inspections can be compared.

1.2 INSTALLATION OF WIRE ROPE

- 1.2.1** Purchase the proper wire rope for your application. Keep the following in mind when selecting a wire rope.
- 1.2.1.1** Breaking strength of new wire rope should be at least 3 times greater than the largest load placed on the winch. If loads are lifted or pulled on an incline, the breaking strength must be at least 5 times greater than the largest load. These are minimum values and will vary with the type of load and how it is being moved.
 - 1.2.1.2** Wire rope lay must agree with the winding direction of the drum to help insure proper winding.
 - 1.2.1.3** It is recommended to use 7x19 galvanized aircraft cable for diameters up to 5/16" and use 6x37 IWRC improved plow steel wire rope for diameters of 3/8" and up.

CAUTION

Remember to always wear the proper protective equipment when handling the wire rope.

- 1.2.2** Anchor the wire rope using the recessed anchor.
- 1.2.2.1** Pass the end of the wire rope through the wire rope anchor hole in the drum and through the hole in the wire rope clamp until the wire rope end extends to the inside wall of the drum.
 - 1.2.2.2** Tighten wire rope clamp set screw and lock nut.
- 1.2.3** Turn the handwheel counter clockwise to wind the wire rope onto the drum. Maintain enough tension on the rope to be sure the first coil begins snugly against the side of the drum and each successive coil is snug against the previous coil. Check to make sure the rope is reeled in to pull against the dog.

WARNING

In order for the winch to attain its full holding capacity, 3 to 4 complete wraps of the wire rope must be on the winch drum at all times. Also, make sure the rope is installed securely to the drum. A poorly secured wire rope could come loose from its anchor and allow the load to escape.

WARNING

PERIODICALLY RETIGHTEN THE NUTS ON THE CLAMP TO ENSURE CABLE IS BEING GRIPPED PROPERLY.

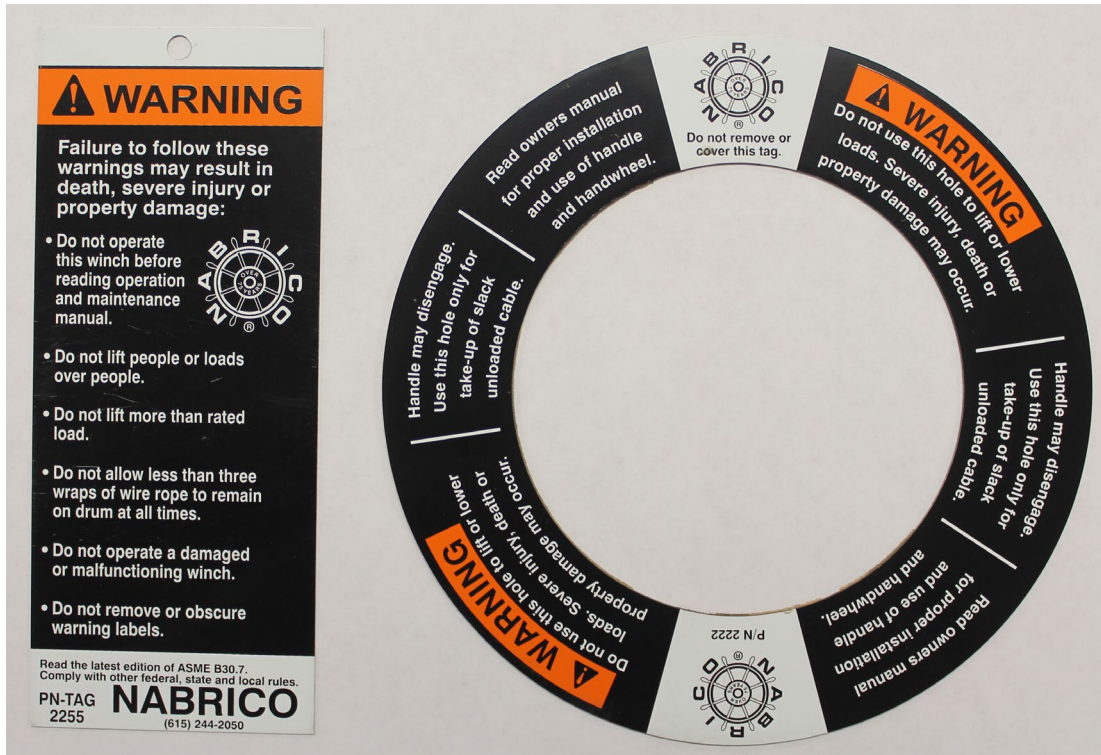
NOTICE

Drum capacity depends on how tightly and evenly the wire rope is wound on the drum. Actual drum capacities are usually 25% to 30% less than values given in performance tables when the wire rope is loosely wound and overlapping. Also, line speed will increase with each additional layer of wire rope that is wound onto the drum.

1.3 WARNING LABELS

1.3.1 The warning labels in Figure #1 should be installed and visible on the winches at all times.

FIGURE #1 - WARNING LABELS



2.1 GENERAL THEORY OF OPERATION

- 2.1.1** The pull required to move the load must not exceed the load rating of the winch. Consider the total force required to move the load, not the weight of the load.
- 2.1.2** This equipment can develop forces that will exceed the load rating. It is the responsibility of the equipment user to limit the size of the load.
- 2.1.3** Performance ratings of the equipment are affected by the amount of wire rope wound on the drum, the way in which it is wound and the way the winch is used.
- 2.1.4** Force required to lift the load increases with each additional layer of wire rope wound onto the drum.
- 2.1.5** Load rating represents the maximum pull that can be placed on new equipment. Load ratings (see appendix 3) are assigned values for specific amounts of load travel or wire rope accumulation. The load rating decreases as layers of wire rope accumulate on the drum.
- 2.1.6** Duty ratings refer to the type of use the equipment is subject to. Consider the following when determining duty ratings.
 - 2.1.6.1** Environment: harsh conditions include hot, cold, dirty, wet, corrosive or explosive surroundings. **Protect the equipment from harsh environments when possible.**
 - 2.1.6.2** Maintenance: poor maintenance (cleaning, lubricating or inspection) leads to poor operation and possible damage of the equipment.
 - 2.1.6.3** Loading: severe loading includes shock loading and moving loads that exceed the load rating of the equipment. **Avoid shock loads and do not exceed the load rating of the equipment.**
 - 2.1.6.4** Frequency of operation: frequent or lengthy operations increase wear and shorten the life span of gears, bearings and other components. **Increase maintenance of the equipment if used in frequent operations.**

2.2 OPERATING THE EQUIPMENT

The following operating instructions will help you become familiar with these basic operating components of the winch. These instructions are not a substitute for proper training by your company in the safe use of winches, barge rigging and other marine equipment.

2.2.1 Breaking-in the Winch

2.2.1.1 Break-in occurs during the first few hours of normal operation. During break-in, mating surfaces become polished and clearances increase. This is desired for efficient operation of bearings and gears.

2.2.1.2 Inspect the winch following break-in to ensure that all components are working properly.

2.2.2 Preparing for Operation

2.2.2.1 Consider the operation. Do not begin until you are sure you can perform the entire operation without hazard.

2.2.2.2 Inspect the winch and other equipment according to your company's inspection program. Do not operate winch until all defects have been corrected.

2.2.2.3 Operators must be in good health, alert, thoroughly trained in operating the equipment and properly clothed (hard hat, safety shoes and glasses, no loose clothing).

2.2.2.4 The load must be clear of other objects and free to move. Make sure the load will not tip, spin, roll away or in any way move uncontrollably.

2.2.2.5 Know your load and make sure you do not exceed the load rating of the winch or any other equipment in the system.

2.2.3 Attaching the Load

2.2.3.1 Clear objects from the path of the load so it can move freely and be observed at all times during operation.

2.2.3.2 Attach the load using a nylon sling or other approved lifting device.

2.2.3.3 Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to escape.

2.2.4 Moving the Load

2.2.4.1 Engage the locking dog when winding wire rope onto the drum, disengage the locking dog to unwind the wire rope.

2.2.4.1.1 Do not engage the locking dog while the winch gears are turning. Stop the winch before engaging the locking dog.

2.2.4.1.2 Disengage the locking dog by moving the load slightly to remove pressure from the locking dog, then pull out on the locking dog handle.

2.2.4.2 The 2 and 5 ton winches come standard with an 18" diameter hand wheel.

2.2.4.2.1 A hand crank handle can be purchased separately (P/N 82635).

2.2.4.2.2 To use the hand crank handle remove the hand wheel, bolts, nuts and plate from the pinion.

2.2.4.2.3 The handle length is adjustable. Insert handle through the slot in the pinion and clamp in the required position with the adjustment knob (P/N 41157).

2.2.4.3 Low Speed Operation

2.2.4.3.1 Check to be sure that the locking dog is fully engaged in the gear prior to winding rope on the drum.

2.2.4.3.2 Ensure that the pinion retaining pin is engage by pulling on the hand wheel.

2.2.4.3.3 Move the load slowly and smoothly only a short distance at first. Make sure the load is balanced and securely attached before continuing.

2.2.4.3.4 Turn the handle clockwise to wind the wire rope onto the drum. If the wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install wire rope correctly before continuing.**

2.2.4.3.5 Grip the handle tightly at all times during operation. If you release the handle the load may back drive causing the handle to spin. **Do not try to stop a spinning handle, step clear until the spinning stops.**

2.2.4.3.6 Observe the wire rope as it winds onto the drum. If it becomes loose, uneven or overlapped, stop the operation and rewind the wire rope before continuing. **Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.**

2.2.4.3.7 Remove the winch hand wheel when the winch is not in use to help avoid unauthorized use.

2.2.4.4 High Speed Operation

2.2.4.4.1 Check to be sure that the locking dog is fully engaged in the gear prior to winding rope on the drum.

2.2.4.4.2 Remove the hand wheel and drive pinion from the low speed position by pulling on the pinion retaining pin.

2.2.4.4.3 Insert the hand wheel and drive pinion into the drive gear assembly.

2.2.4.4.4 Move the load slowly and smoothly only a short distance at first. Make sure the load is balanced and securely attached before continuing.

2.2.4.4.5 Turn the handle counter clockwise to wind the wire rope onto the drum. If the wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install wire rope correctly before continuing.**

2.2.4.4.6 Grip the handle tightly at all times during operation. If you release the handle, the load may back drive causing the handle to spin. **Do not try to stop a spinning handle, step clear until the spinning stops.**

2.2.4.4.7 Observe the wire rope as it winds onto the drum. If it becomes loose, uneven or overlapped, stop the operation and rewind the wire rope before continuing. **Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.**

2.2.4.4.8 Remove the winch hand wheel when the winch is not in use to help avoid unauthorized use.

2.2.4.5 Releasing or Lowering Load

2.2.4.5.1 Make sure the hand wheel is in the low speed position and locked in place.

2.2.4.5.2 Maintain a firm grip on the brake handle with one hand and rotate the locking pawl handle toward the rear of the winch by hand.

2.2.4.5.3 The locking dog should disengage, then slowly pulsate the brake handle to control the pay out to reduce back lashing.

<p style="text-align: center;"><u>WARNING</u></p>
<p style="text-align: center;">A creeping load can cause death or injury. Do not rely on the hand brake to hold a suspended load.</p>

2.2.4.5.4 To reel out wire rope, turn the hand wheel counter clockwise. Some tension should be kept on the wire rope as you unreel it in order to minimize rope fouling on the drum.

2.2.4.5.5 When paying out or hauling in with no load, the pinion is placed into the center of the drive gear assembly (high speed operation). Rotate the hand wheel clockwise to pay out and counter clockwise to pay in.

3.1 EQUIPMENT INSPECTION

NOTICE

An inspection program should be started as soon as any equipment is put into service. A qualified person should be appointed the responsibility of regularly inspecting the equipment. Written records of inspections are recommended by the manufacturer.

3.1.1 Frequent Inspection

- 3.1.1.1** Visually inspect the equipment before each use. Check the equipment for cracks, bending, wear, rust, corrosion and any other damage. If any problems are discovered, stop use immediately and remove the equipment from service until all appropriate repairs are completely performed.
- 3.1.1.2** **ENSURE THAT EQUIPMENT IS PROPERLY LUBRICATED.**
- 3.1.1.3** Check to ensure that the foundation is in good condition. Make sure that mounting fasteners and other hardware are tightened securely.
- 3.1.1.4** Ensure that the wire rope is installed correctly and anchored securely to the drum. Also, check to make sure the wire rope is in good condition.

3.1.2 Periodic Inspection

- 3.1.2.1** Periodic inspections should occur whenever equipment is returned to service from storage, every six months in service, more frequently if an inspection discovers any damage or poor operation, or in any case where the winch may have been over loaded or operationally abused.
- 3.1.2.2** Visually inspect the equipment checking the finish for wear, flaking or other damage as listed in the frequent inspection plan. Disassembly is recommended in order to properly inspect individual components.
- 3.1.2.3** Check the winch drum by moving it with your hands. Check for excessive movement that may be the result of worn or loose gears, bearings or shafts. Some play is normal while excessive play may be the result of overloading.

3.1.3 Wire Rope Inspection

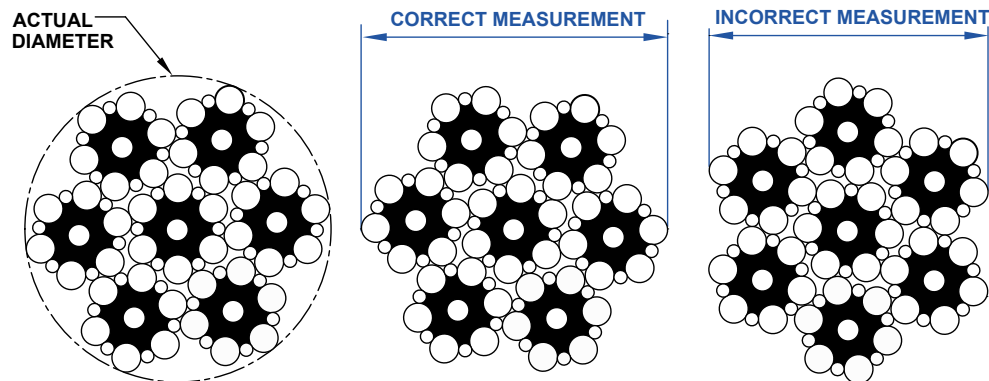
- 3.1.3.1** Wire rope inspection should be conducted as per the manufacturer's recommendations or accepted industry standards.

CAUTION

Remember to always wear the proper protective equipment when handling the wire rope.

- 3.1.3.2** Inspect the entire length of wire cable for bent or crushed areas, broken or cut wires, corrosion and other damage.
- 3.1.3.3** Inspect end connections and fittings for corrosion, kinking, crushing or other damage.
- 3.1.3.4** Check the wire rope diameter for signs of decreased area (see fig. 2). Diameter decrease may be signs of wear and internal degradation in the wire rope. Generally, ropes are manufactured larger than nominal diameter. When placed in service for the first time, diameter can reduce slightly. Minimum diameter specifications can be obtained from the rope manufacturer.

FIGURE #2 - WIRE ROPE DIAMETER



THE WIRE ROPE MUST BE REPLACED IF THE DIAMETER MEASURES LESS THAN THE MINIMUM DIAMETER GIVEN BY THE ROPE MANUFACTURER

EXAMPLE - A $\frac{3}{4}$ " WIRE ROPE HAS A MINIMUM DIAMETER OF $\frac{45}{64}$ " (0.7031")

3.2 EQUIPMENT LUBRICATION

<u>WARNING</u>

Lubricate the spur gears before each operation and periodically during operation. Failure to lubricate the gears will cause damage or deformation of gear teeth.

- 3.2.1** All grease fittings and external gearing should be lubricated using NABRICO's suggested lubricants or similar.
- 3.2.2** Drive shaft and drum shaft grease fittings should be lubricated at least once a month under normal conditions and at least once a day under adverse conditions. Lubricate while gears are rotating slowly.

3.3 CLEANING & STORAGE

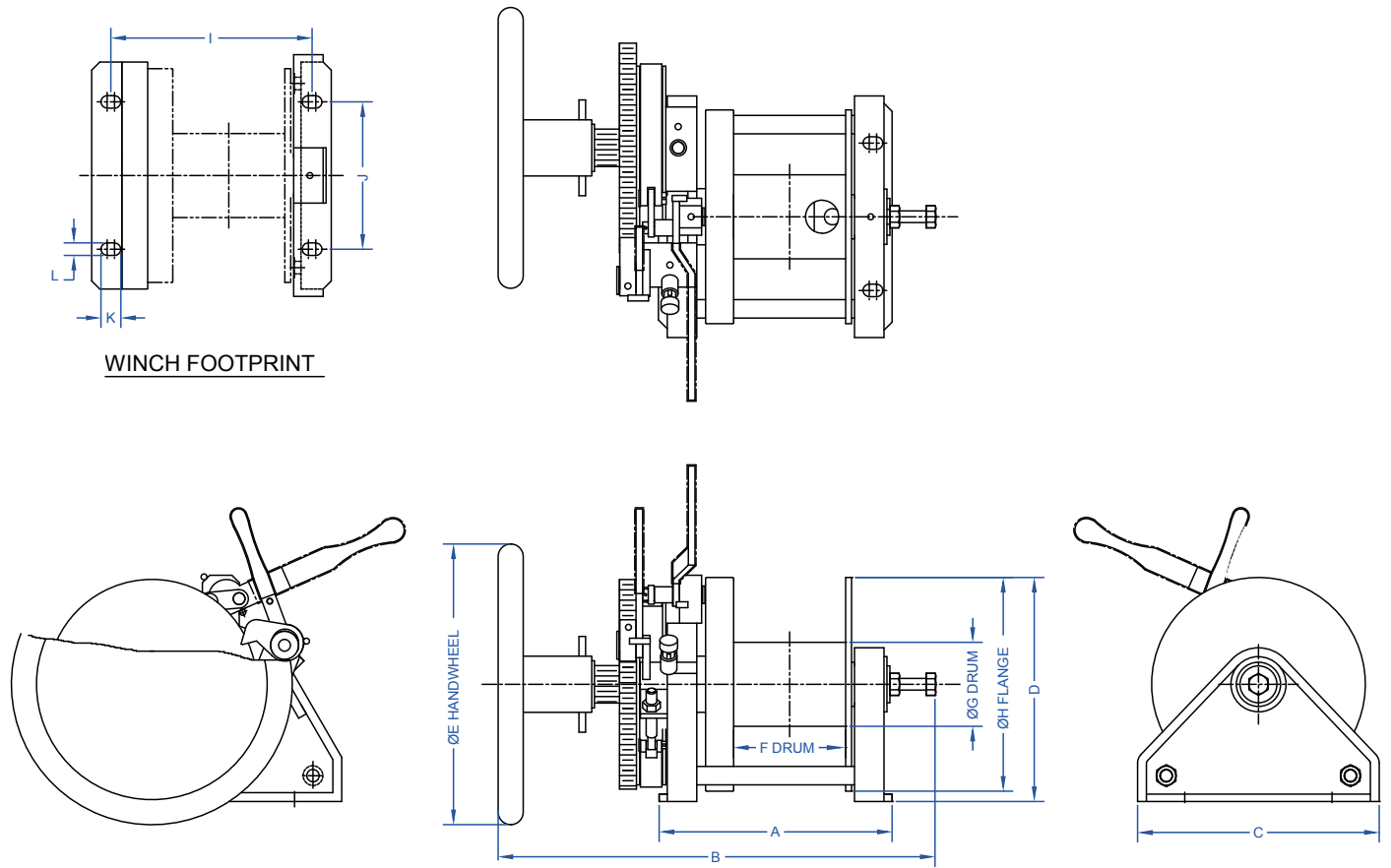
3.3.1 Cleaning the Equipment

- 3.3.1.1** The equipment should be regularly cleaned to remove dirt and to help prevent rust and corrosion.
- 3.3.1.2** When cleaning, be sure to leave a light film of oil on all surfaces to protect them against the elements of nature. Wipe off excessive amounts of oil to avoid the accumulation of dirt.
- 3.3.1.3** Remove all unnecessary objects from the area surrounding the equipment to prevent hazardous situations from occurring.

3.3.2 Storing the Equipment

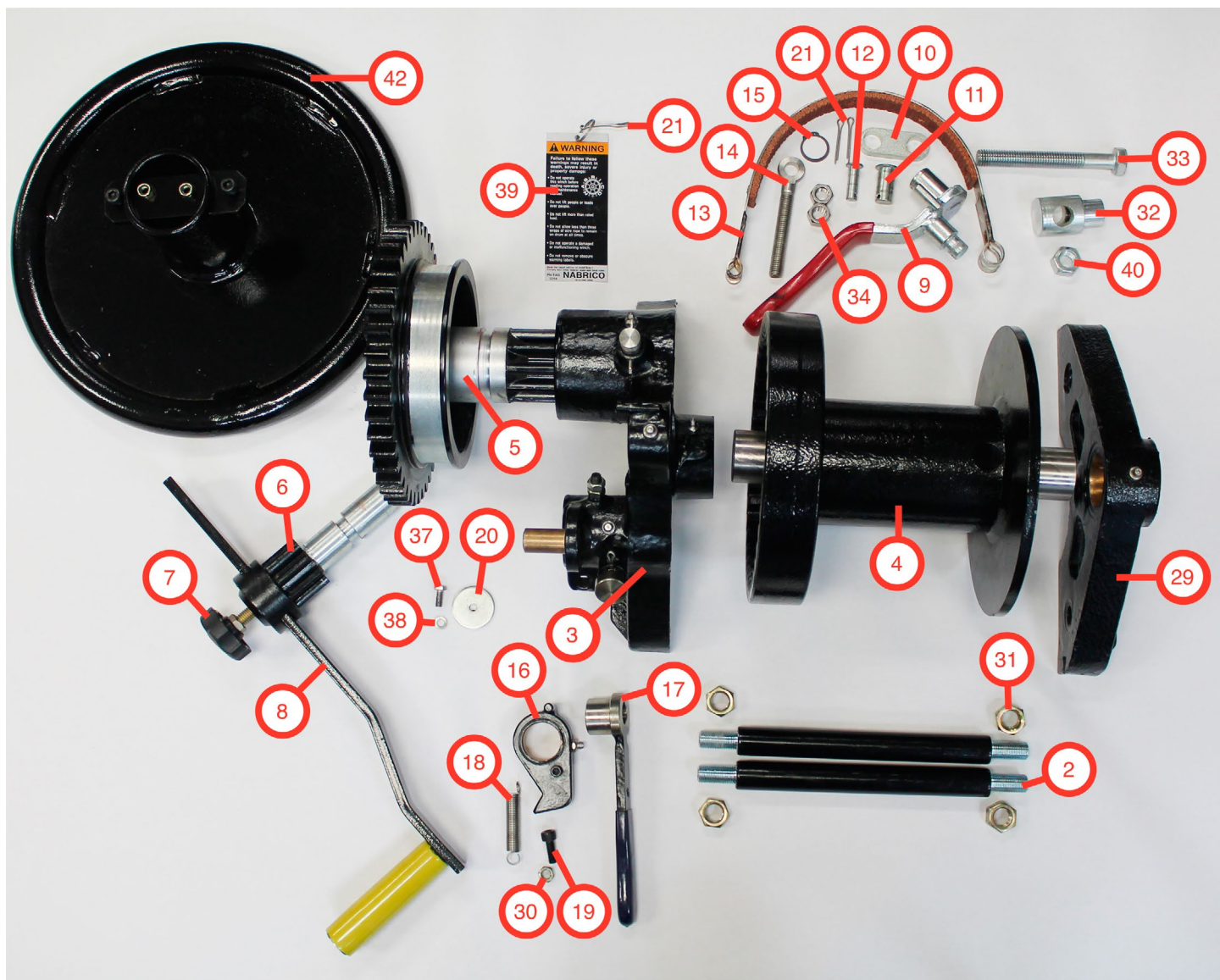
- 3.3.2.1** Lubricate the equipment as necessary to help prevent rust and corrosion during storage. Add a rust preventive for long term storage.
- 3.3.2.2** Seal the equipment in plastic, if possible, to help in the prevention of rust, corrosion and other damage.
- 3.3.2.3** Store the equipment upright in a cool clean place away from corrosive chemicals and moisture.
- 3.3.2.4** Rotate the drum periodically to keep bearing and gear surfaces from becoming lacquered.

A.1 WINCH DIMENSIONAL



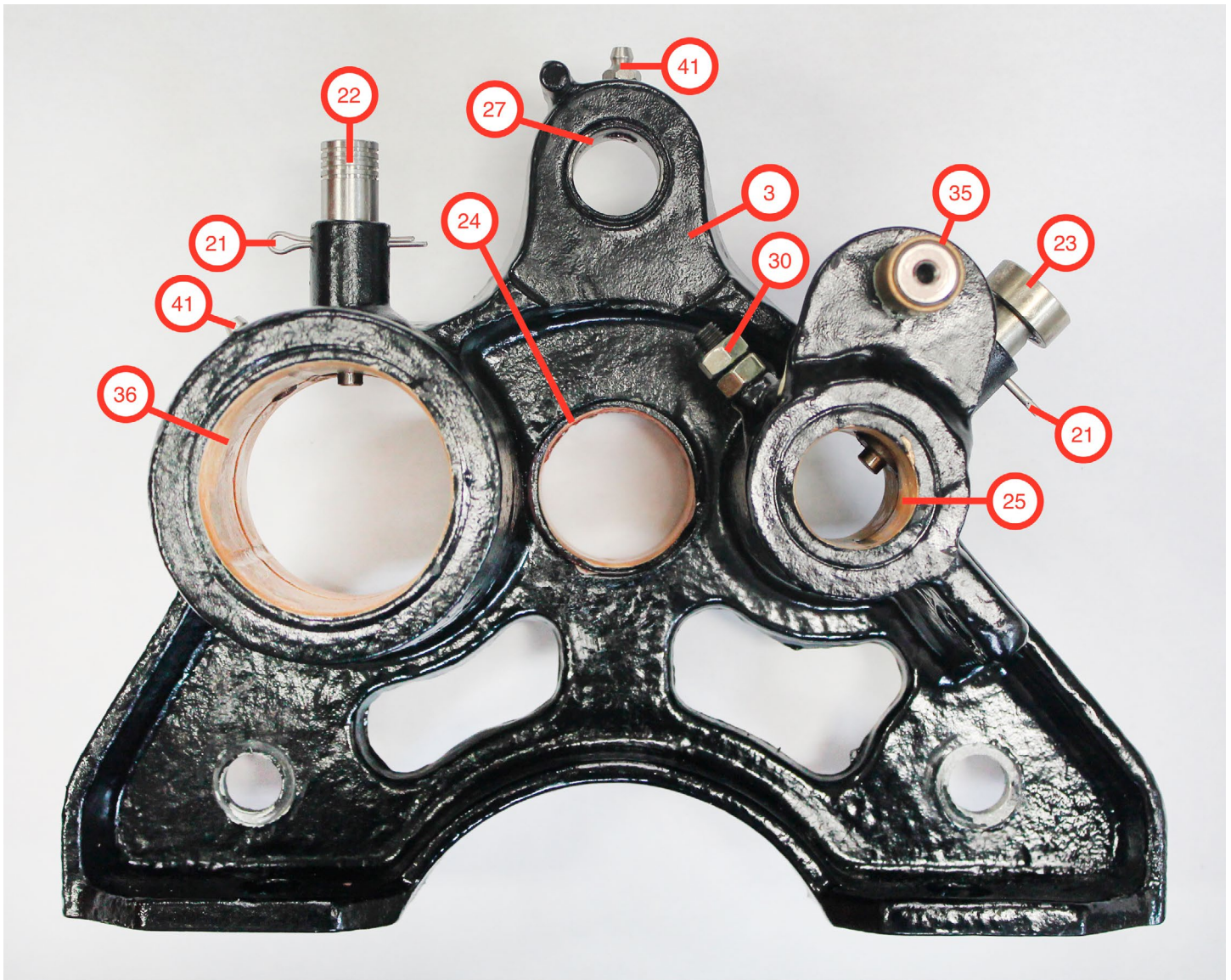
HAND WINCH	PART NUMBER	A	B	C	D	E	F	G	H	I	J	K	L	LBS
2 TON	15550	11 11/16"	23 1/4"	12"	9 5/16"	15"	6 3/32"	4"	9 1/4"	10 1/2"	7 1/2"	1 1/16"	21/32"	65
5 TON	15600	12 7/16"	23 3/8"	12 7/8"	12"	15"	5 15/16"	4 1/2"	11 3/8"	10 3/4"	7 7/8"	1 1/16"	21/32"	115

A.2 WINCH PARTS BREAKDOWN

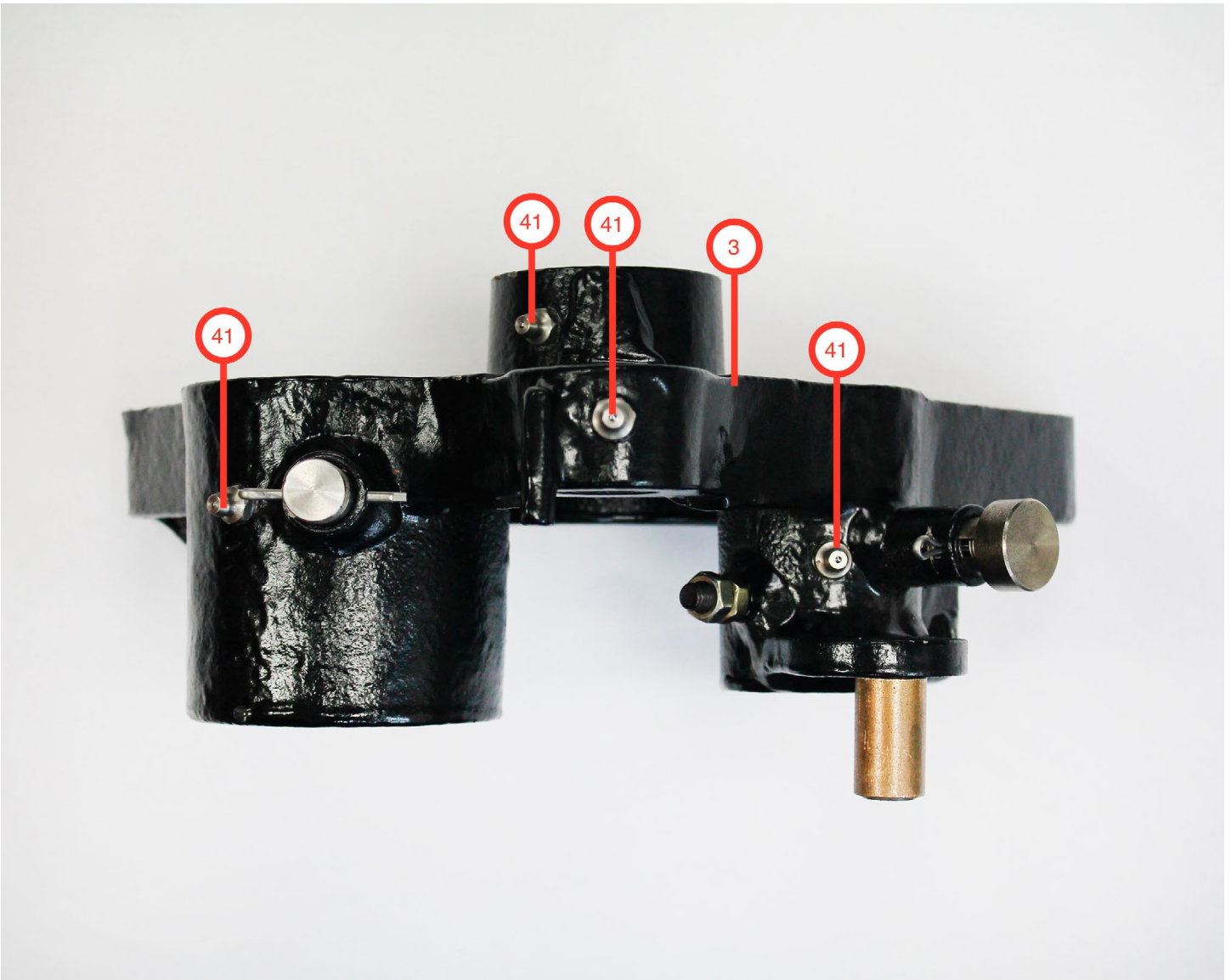


ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
3	41057	42057	GEAR SIDE ASSEMBLY
4	41101	42101	DRUM ASSEMBLY
5	41107	42107	DRIVE GEAR & PINION ASSEMBLY
9	41205	42205	BRAKE HANDLE
13	41215	42215	BRAKE BAND (SS) W/ PAD
29	41050	42050	WINCH SIDE ASSEMBLY

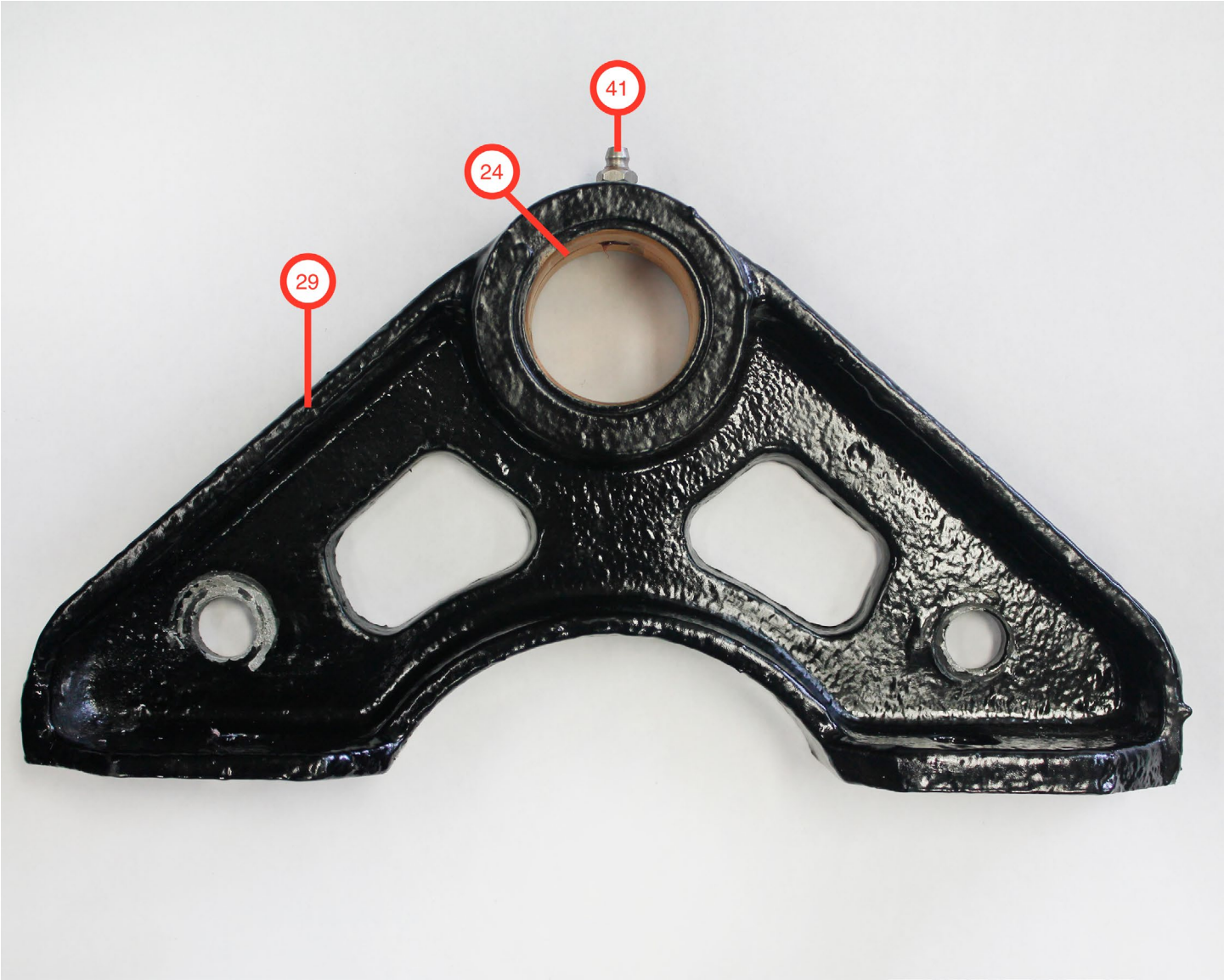
2/5 TON WINCH PARTS		
ITEM #	PART NO.	PART NAME
2	41055	SEPARATOR ROD
6	41152	DRIVE PINION & SHAFT ASSY
7	41157	ADJUSTMENT KNOB
8	41160	HANDLE GRIP
10	41209	BRAKE LINK PLATE
11	41210	CLEVIS PIN (LARGE)
12	41211	CLEVIS PIN (SMALL)
14	41216	BRAKE ADJUSTMENT BOLT
15	41218	EXTERNAL SNAP RING
16	41305	LOCKING DOG
17	41306	DOG HANDLE ASSEMBLY
18	41312	HANDLE SPRING
19	41310	BUTTON HEAD SOCKET SCREW
20	41315	PLAIN WASHER
21	21637	COTTER PIN (SS) 1/8" DIA. X 1-1/4"
22	41059	RETAINING PIN (DRIVE GEAR)
23	41060	RETAINING PIN (DRIVE PINION)
24	41061	DRUM SHAFT BUSHING
25	41062	DRIVE PINION BUSHING
26	41063	LOCKING DOG BUSHING (INCL IN 41305)
27	41064	BRAKE HANDLE BUSHING
30	41314	HEX NUT (ZINC PLATED) M8
31	471	HEX NUT (316 SS) M16-2.0
32	41070	CABLE CLAMP BLOCK
33	41071	HEX HEAD BOLT (ZINC PLATED) 5/8-11 UNC X 5"
34	428	HEX NUT (316 SS) 1/2-13
35	41066	DOG HANDLE BUSHING (NOT INCL IN 41306)
36	41065	DRUM PINION ASSEMBLY BUSHING
37	41320	HH BOLT (SS) M6 X 16MM
38	41318	LOCK WASHER (304 SS) M6
39	2255	SAFETY TAG REC 2\5
40	16180	HEX NUT (316 SS) 5/8-11 UNC
41	9866	STRAIGHT GREASE FITTING (SS) 1/8 PTF
42	22016	15" HANDWHEEL ASSEMBLY
43	41310	BHS SCREW (10.9) M8 X20MM
44	562	LOCK NUT (SS) M8-1.25
45	22002	15" HANDWHEEL MOUNTING PLATE



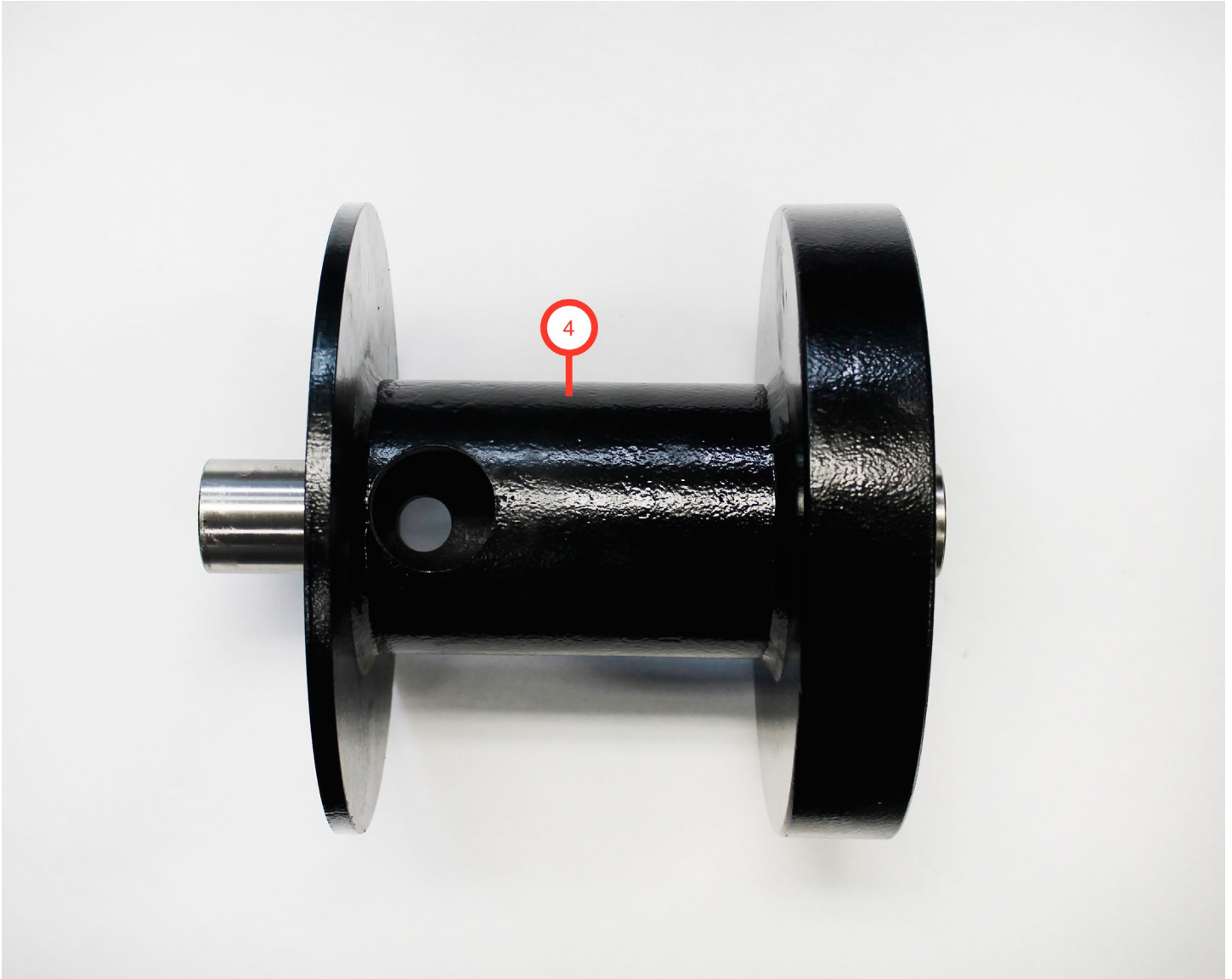
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
3	41057	42057	GEAR SIDE ASSEMBLY
21	21637	21637	COTTER PIN (SS) 1/8" DIA. X 1-1/4"
22	41059	41059	RETAINING PIN (DRIVE GEAR)
23	41060	41060	RETAINING PIN (DRIVE PINION)
24	41061	41061	DRUM SHAFT BUSHING
25	41062	41062	DRIVE PINION BUSHING
27	41064	41064	BRAKE HANDLE BUSHING
30	41314	41314	HEX NUT (ZINC PLATED) M8
35	41066	41066	DOG HANDLE BUSHING (NOT INCL IN 41306)
36	41065	41065	DRUM PINION ASSEMBLY BUSHING
41	9866	9866	STRAIGHT GREASE FITTING (SS) 1/8 PTF



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
3	41057	42057	GEAR SIDE ASSEMBLY
41	9866	9866	STRAIGHT GREASE FITTING (SS) 1/8 PTF



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
24	41061	41061	DRUM SHAFT BUSHING
29	41050	42050	WINCH SIDE ASSEMBLY
41	9866	9866	STRAIGHT GREASE FITTING (SS) 1/8 PTF



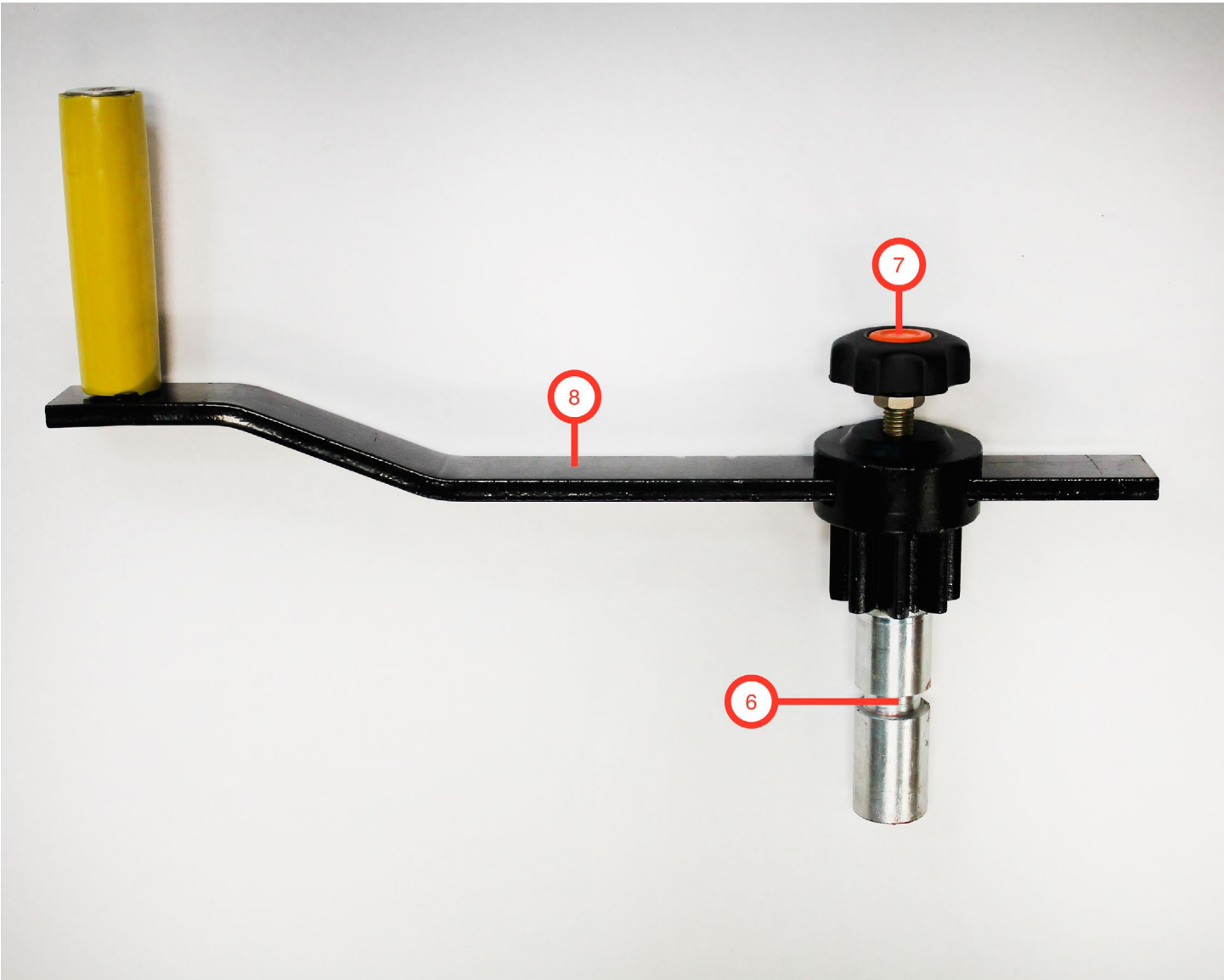
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
4	41101	42101	DRUM ASSEMBLY



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
5	41107	42107	DRIVE GEAR & PINION ASSEMBLY



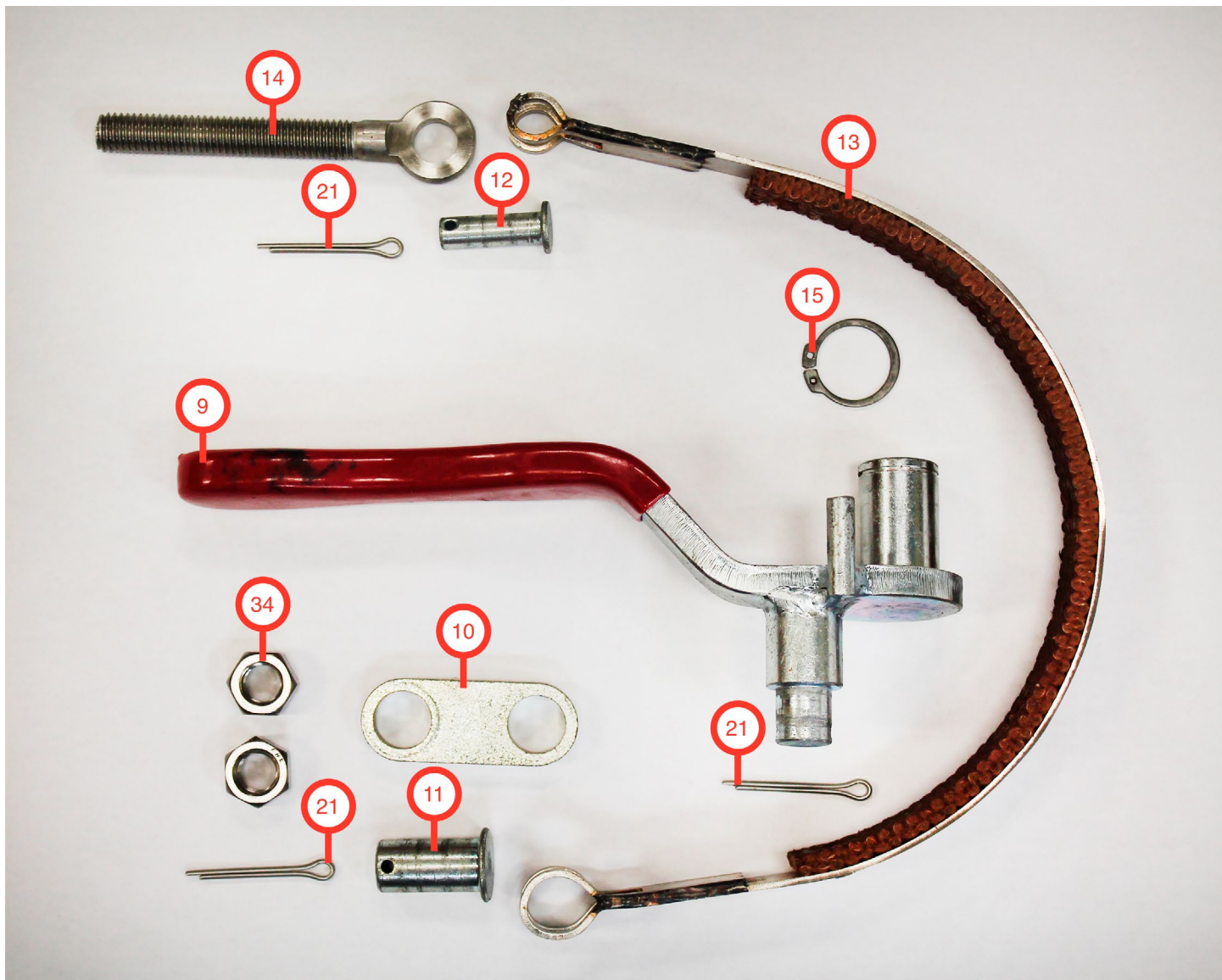
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
42	22016	22016	15" HANDWHEEL ASSEMBLY
43	41310	41310	BHS SCREW (10.9) M8 X20MM
44	562	562	LOCK NUT (SS) M8-1.25
45	22002	22002	15" HANDWHEEL MOUNTING PLATE



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
6	41152	41152	DRIVE PINION
7	41157	41157	ADJUSTMENT KNOB
8	41160	41160	HANDLE GRIP



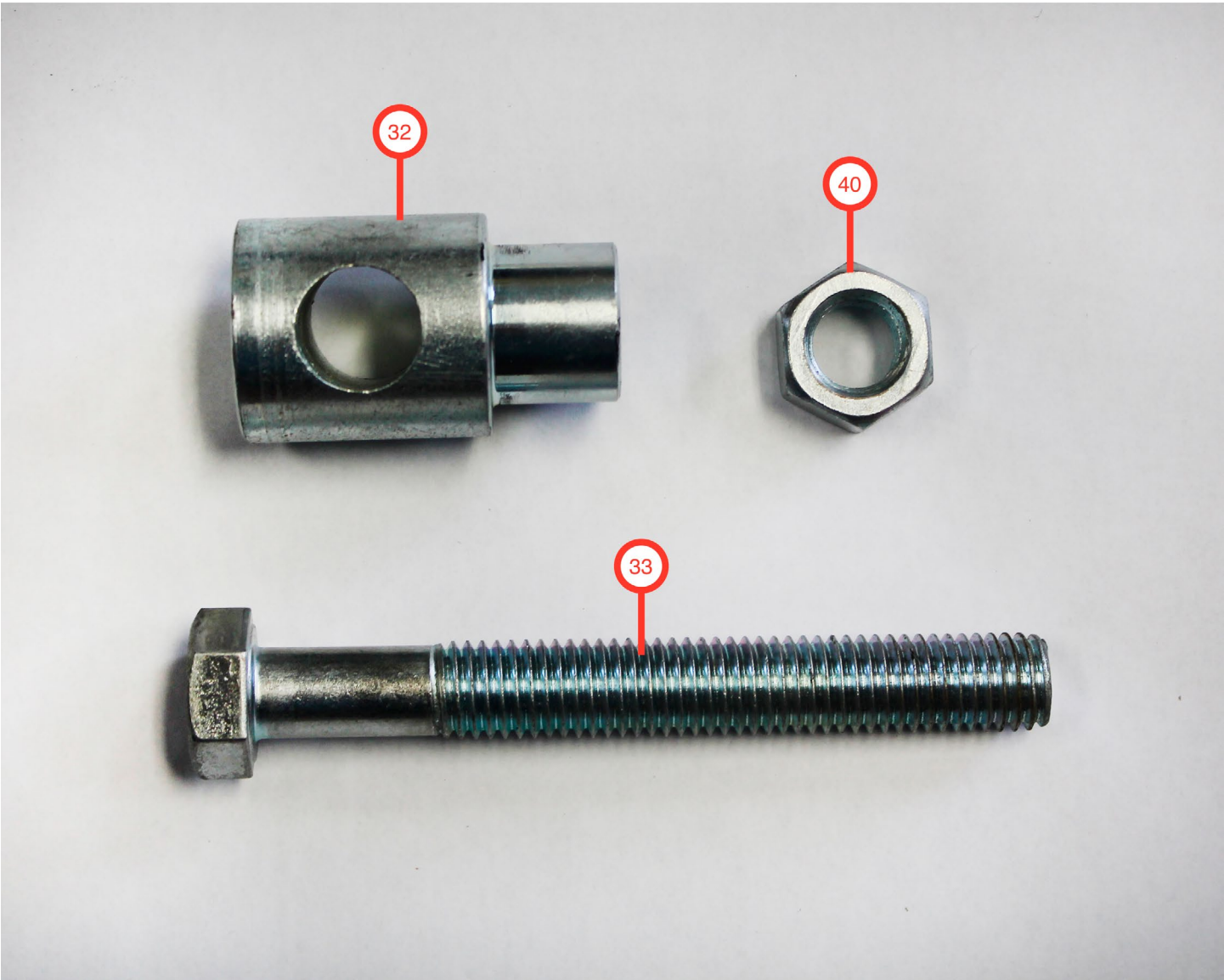
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
16	41305	41305	LOCKING DOG
17	41306	41306	DOG HANDLE ASSEMBLY
18	41312	41312	HANDLE SPRING
19	41310	41310	BUTTON HEAD SOCKET SCREW
26	41063	41063	LOCKING DOG BUSHING (INCL IN 41305)
30	41314	41314	HEX NUT (ZINC PLATED) M8
41	9866	9866	STRAIGHT GREASE FITTING (SS) 1/8 PTF



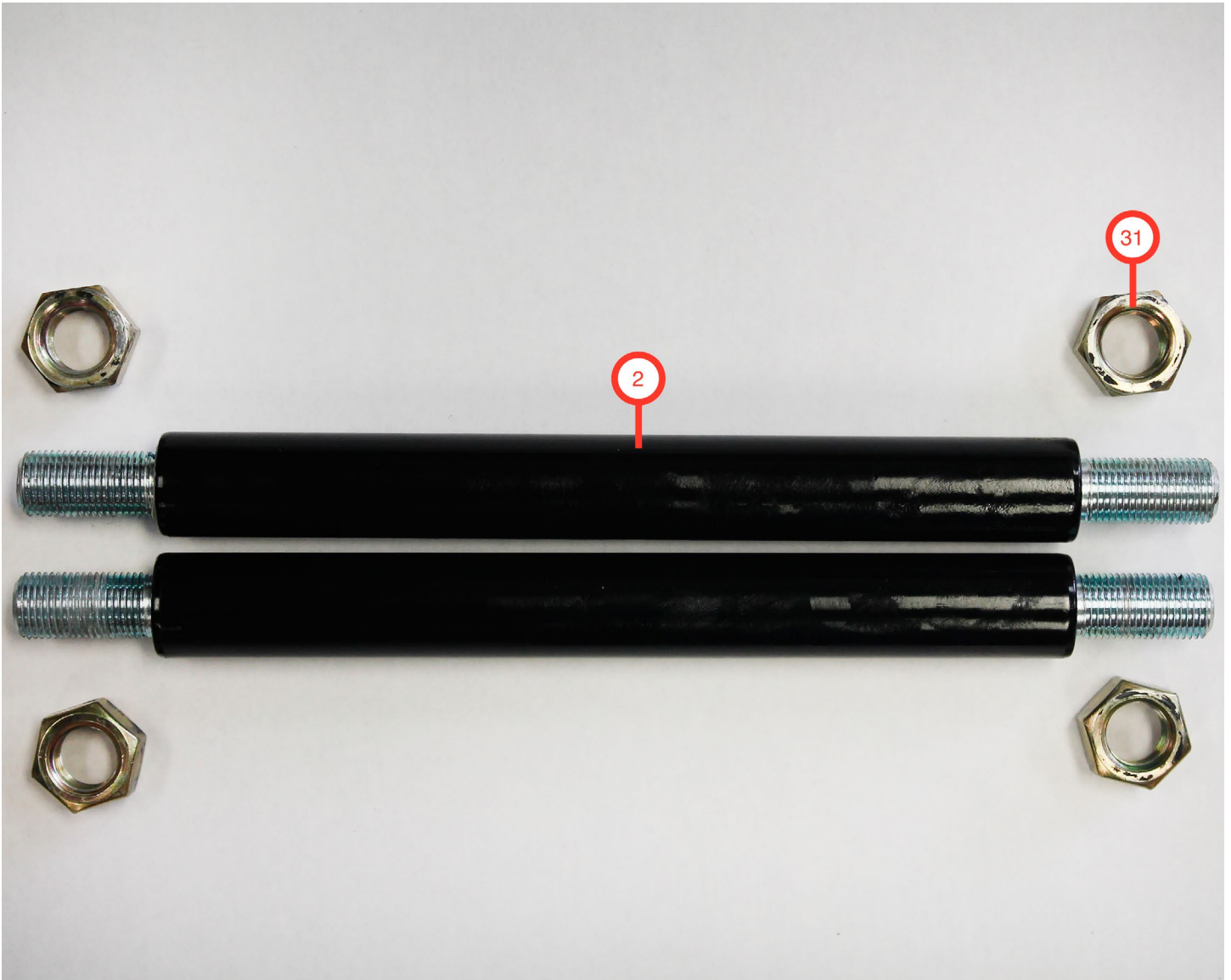
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
9	41205	42205	BRAKE HANDLE
10	41209	41209	BRAKE LINK PLATE
11	41210	41210	CLEVIS PIN (LARGE)
12	41211	41211	CLEVIS PIN (SMALL)
13	41215	42215	BRAKE BAND (SS) W/ PAD
14	41216	41216	BRAKE ADJUSTMENT BOLT
15	41218	41218	EXTERNAL SNAP RING
21	21637	21637	COTTER PIN (SS) 1/8" DIA. X 1-1/4"
34	428	428	HEX NUT (316 SS) 1/2-13



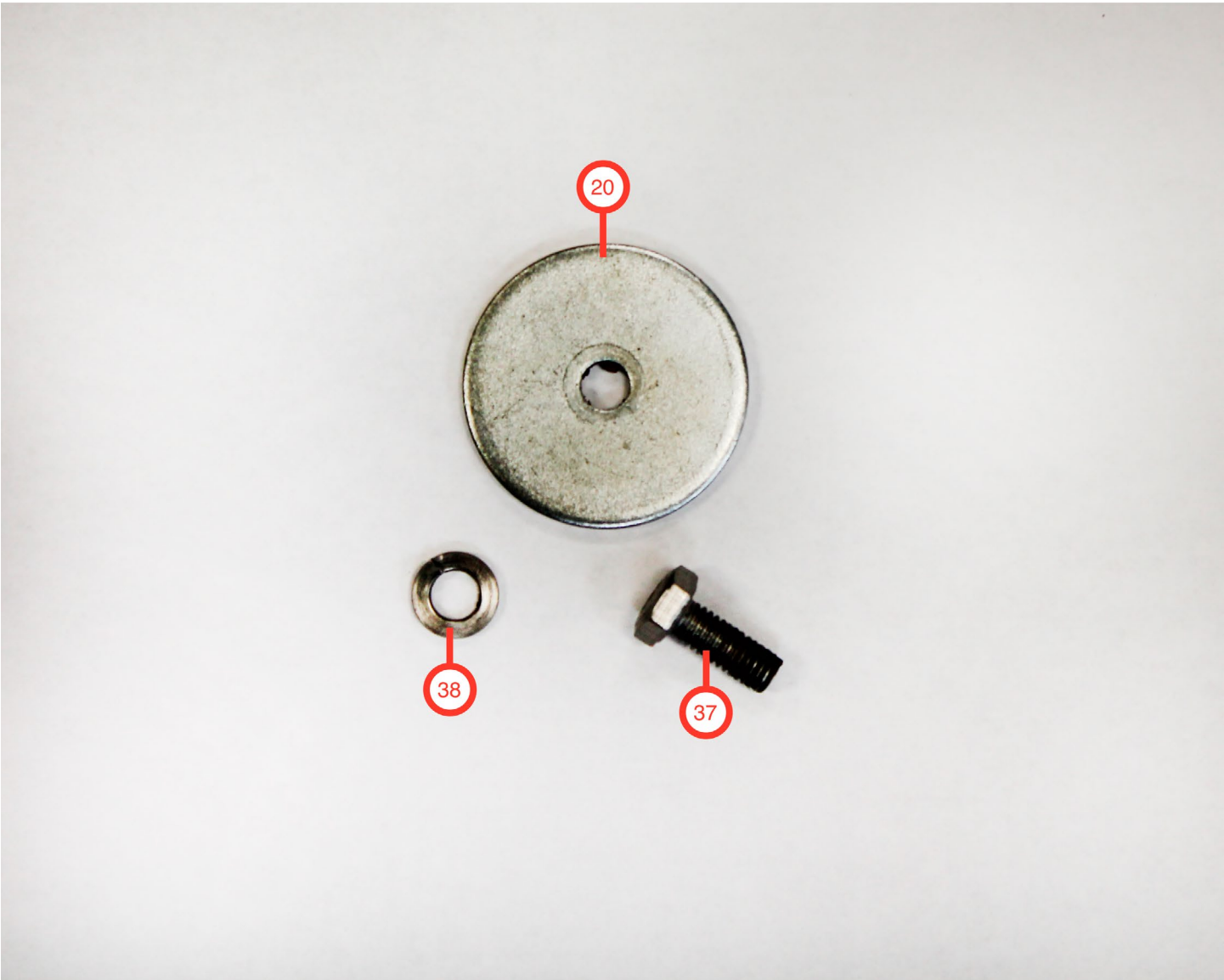
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
21	21637	21637	COTTER PIN (SS) 1/8" DIA. X 1-1/4"
22	41059	41059	RETAINING PIN (DRIVE GEAR)
23	41060	41060	RETAINING PIN (DRIVE PINION)
30	41314	41314	HEX NUT (ZINC PLATED) M8



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
32	41070	41070	CABLE CLAMP BLOCK
33	41071	41071	HEX HEAD BOLT (ZINC PLATED) 5/8-11 UNC X 5"
40	16180	16180	HEX NUT (316 SS) 5/8-11 UNC



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
2	41055	41055	SEPARATOR ROD
31	471	471	HEX NUT (316 SS) M16-2.0



ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
20	41315	41315	PLAIN WASHER
37	41320	41320	HH BOLT (SS) M6 X 16MM
38	41318	41318	LOCK WASHER (304 SS) M6



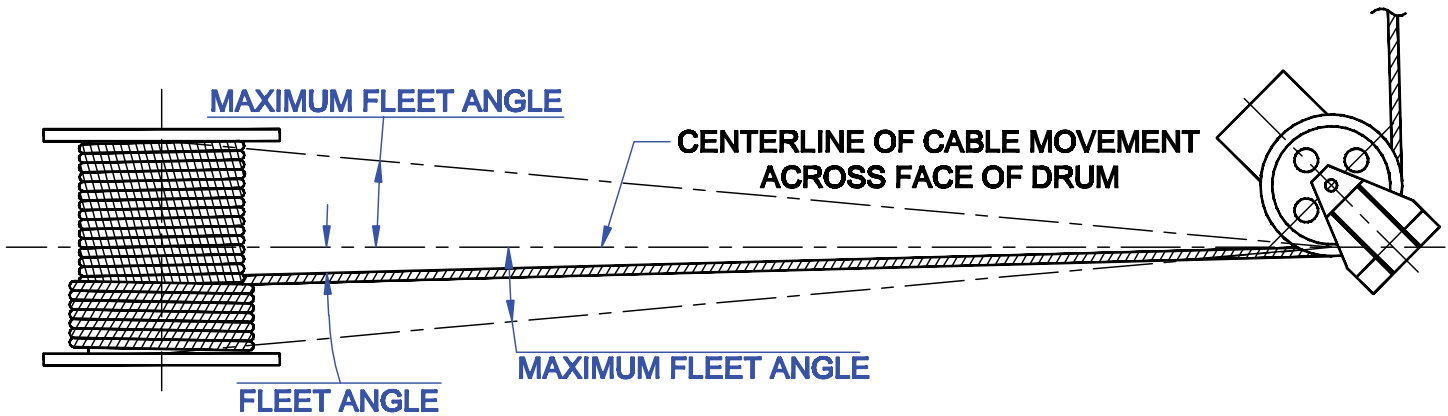
ITEM #	2 TON WINCH PART NO.	5 TON WINCH PART NO.	PART NAME
21	21637	21637	COTTER PIN (SS) 1/8" DIA. X 1-1/4"
39	2255	2255	SAFETY TAG REC 2\5

A.3 WINCH PERFORMANCE CHARACTERISTICS

MODEL NO.	LINE PULL SLOW SPEED	LINE PULL FAST SPEED	SHOCK LOAD	HAND BRAKE HOLDING OR DOG
2 TON	4,025 LBS	3,500 LBS	3,800 (3 FOOT DROP)	6,000 LBS
5 TON	10,000 LBS	8,500 LBS	8,250 (3 FOOT DROP)	14,000 LBS

MODEL NO.	DRUM WIDTH	CABLE CAPACITY (FULL DRUM)					WEIGHT
		1/4"	5/16"	3/8"	7/16"	1/2"	
2 TON	6"	275'	200'	105'	100'	60'	65 LBS
5 TON	6"	-	-	300'	240'	170'	116 LBS

A.4 FLEET ANGLE



Fleet Angle:

In order to insure proper wrapping on the drum and no undue wear of the wire rope, the fleet angle should be kept as small as practical. This is important to consider during the planning of a winch installation. Sheaves and drums should be placed so that the fleet angle will be equal on each side of the centerline of rope travel.

For a smooth drum a maximum fleet angle of 1-1/2 degrees is recommended. When the drum is grooved to suit the wire rope, the fleet angle should not exceed 2 degrees.

Example: Fleet Angle Calculation for 36" Chain Drive Barge Moving Winch

36" Chain Drive Moving Winch

$$a=18''$$

$$b=x \text{ (distance to be determined)}$$

$$A^\circ=1.5^\circ \text{ (minimum for a smooth drum)}$$

$$\tan A = a/b$$

$$\tan 1.5^\circ = 18''/x$$

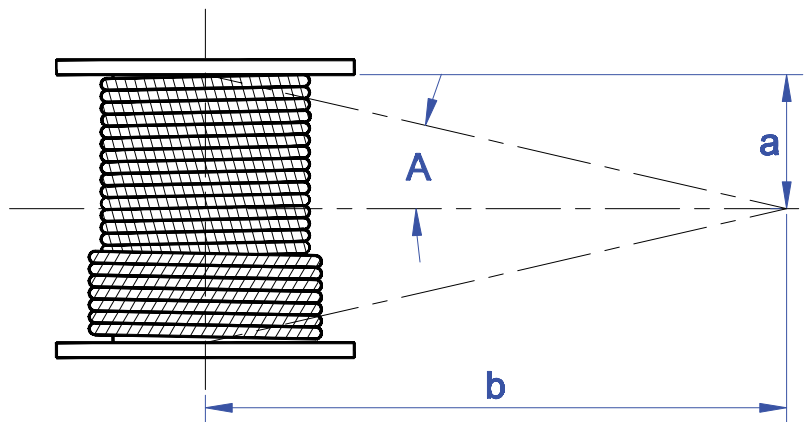
$$.02619 = 18''/x$$

$$x = 18''/.02619$$

$$x \sim 688'' \text{ (rounded up to next whole number)}$$

$$x \sim 688'' / 12 \text{ (convert to feet)}$$

$$x \sim 58'$$



PRODUCT WARRANTY

NABRICO warrants that all NABRICO products shall be free from defects in material and workmanship during the Warranty Period (as herein defined); provided, however that NABRICO's warranty hereunder shall not apply to any equipment, material, or component that is not manufactured by NABRICO, and NABRICO makes no expressed or implied warranty that any such equipment, material, or component is free from manufacturer or supplier defects. To the extent permitted, NABRICO agrees to transfer and assign to a Buyer or End User any warranties extended by the manufacturer or supplier of such equipment, material or components. NABRICO shall have no obligation or responsibility to repair or replace any defective NABRICO product if a notice of defect is not reported in writing to NABRICO within 180 days from the date of shipment of any NABRICO Winch Products and 90 days from the date of shipment of any other NABRICO Products (such 180 day and 90 day periods are hereinafter referred to as "Warranty Period").

In the event Buyer or End User timely notifies NABRICO in writing of any claim of defect covered by this warranty, NABRICO shall correct the nonconforming work by making repairs or replacements, at NABRICO's option and at NABRICO's expense, if NABRICO's examination shall disclose to its satisfaction that all or a portion of the NABRICO Product is defective. However, this warranty is conditional upon compliance by the Buyer or End User with the loading, use, and handling in accordance with good commercial practices of the trade, and NABRICO shall not be responsible for defects caused by misloading, overheating, improper cleaning, misapplication, physical abuse or from normal wear and tear. This warranty is void where any NABRICO Product has been altered or repaired by anyone other than NABRICO or its authorized agent.

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Usage Warnings. All NABRICO Products must be correctly sized, properly located, and installed to serve their intended functions and it is the responsibility of Buyer or End User to insure such action is taken. Please note and consider the following warnings: Improper installation can result in failure of a NABRICO Product. NABRICO Products that have failed because of overloads, or which have been dislodged from foundations, or have fractures and/or deformations should be repaired or replaced immediately. Loads to bitts must be applied to the posts between the base and the midpoint in a horizontal or downward direction. Properly placed chocks will prevent line chafing. Kevels should be installed horizontally on foundation bases of sufficient size, and forces to kevels must be direct to the trunk and not the horns. Horns will fail when exposed to direct loads. And, NABRICO Products are not designed for use to lift a vessel.

Dimensions. All dimensions shown in this catalog are in feet and inches. Weights are in English pounds. Capacities are in short tons of 2,000 pounds. Please note that dimensions and weights are nominal and are subject to standard variations. Maximum test pressure on hatches, doors, and enclosures is 2 PSI unless advised in writing by NABRICO of a higher allowance. Product details and specifications are subject to change without notice.

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WINCHES

ELECTRIC
HYDRAULIC
MANUAL

HATCHES

WATERTIGHT
TWIST LOCK
QUICK ACTING

BITTS

DOUBLE BITT
SINGLE BITT
THRU-DECK BITT

CAPSTANS

HYDRAULIC
ELECTRIC
CUSTOMIZABLE

DOORS

6 DOG MANUAL
QUICK ACTING
4 DOG MANUAL

KEVELS

KEVEL CHOCK
KEVEL
THRU-DECK KEVEL

SIGNS

WARNING
CUT-OFF
OIL POLLUTION

CHOCKS

CAST STEEL
BUTTON
ROLLER BUTTON

BARGE CRANES

ELECTRIC OPERATION
MANUAL OPERATION

OIL TANKS

300 GALLON
600 GALLON
CUSTOM SIZES

OCEAN DOMES

MILD STEEL
STAINLESS STEEL

SUCTION BELLMOUTHS

6" SIZE
8" SIZE
10" SIZE