ENDURANCE
marine products ltd.

DAVIT CRANES

Instructions & Operation Manual

CE

ISO 9001:2015
IATF 16949:2016

TO PREVENT SERIOUS INJURY, READ AND UNDERSTAND ALL WARNINGS AND INSTRUCTIONS BEFORE USE.

Due to continuing improvements,actual product may differ slightly from the product described herein.

Description

Davit cranes are perfect for permanent or portable installation. These cranes consist of an angled beam which pivots over a vertical axis. They can have fixed or adjustable booms, and are available in portable as well as stationary units. Davit cranes incorporate a hand operated and cable assembly for load handling. Independent bases (Optional-Sold Separately) allow you to move the davit crane from base to base, so one davit crane can serve more than one lift station. Standard davit cranes feature an electrostatic powder coating to resist corrosion. Galvanized and stainless steel models provide added protection in harsh environments.

Unpacking

After unpacking the crane, inspect carefully for any damage that may have occurred during transit. Check for missing or damaged parts. Shipping damage claims must be filed with carrier.

Davit Cranes Series 500 lb, 1,000 lb and 2,000 lb
Hand or power winch operation up to 2000 lb capacity

- Hand winch operated models include spur gear or worm gear hand winch with automatic disc brake for load control.
- The worm gear hand winch can be power driven with a maximum 400 rpm drill-motor. Not available for 500 LB series cranes.
- Corrosion resistant finish with electrostatic powder coating and corrosion resistant fasteners. Galvanized finish also available,
- Adjustable booms provide different height and reach combinations for various size loads.
- Crane rotates 360° on a pin and fitting bush in the base.
- Stainless steel models for long service life in corrosive environments, with stainless steel hand winch.
- Bases in Pedestal and Socket style.

Safe Warnings and Precautions

When using this crane, safety precautions should always be followed to reduce the risk of personal injury and damage to the crane.

1) Read and follow the guidelines set forth in this owner's manual. Keep the manual, and all decals adhered to the crane at all times.
2) Inspect all components of the crane according to owner's manual before operation.
3) Operators must be well trained in operating this crane, and should be properly dressed (hard hat, safety shoes and safety glasses, no loose clothing).
4) Operators must know the load and the load must not exceed the crane rated capacity.
5) 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.
6) Adjust the boom to proper position so that the load hook is centered over the load. Avoid side pulls which could damage the crane or cause the load to tip. Fig.1

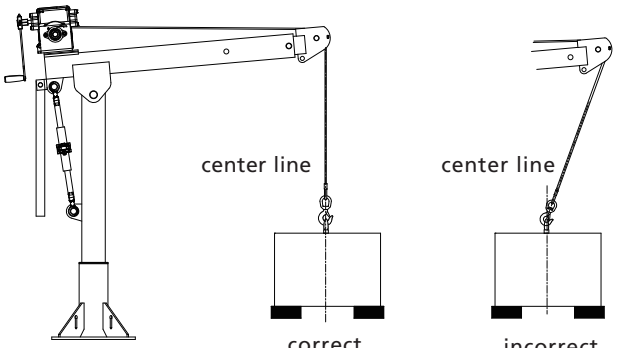


Figure 1

7) When adjusting the boom, set the boom angle a bit above horizontal and hold telescopic boom weldment firmly to avoid it from sliding out of upper bracket weldment causing damage or injury.
8) Keep at least 5 wraps of wire rope wound on the drum of the winch at all times, to serve as anchor wraps. With less than 5 wraps on the drum the wire rope could come loose, causing the load to fall off.
9) Keep hands away from sheaves, gears, wire rope, and other moving parts of the equipment.
10) Keep all unnecessary personnel away from the crane while in operation. Keep out of the path of the load.
11) Do not lift people. The crane is not designed for lifting people.
12) Stay Alert: Watch what you are doing. Use your common sense. Do not use this crane when you are tired, stressed or when under the influence of drugs, alcohol or medication.

Installing the Crane

- A qualified professional should inspect or design the foundation to insure that it will provide adequate support.
- Locate the crane so it will be visible during the entire operation.

1) CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on installing the equipment.
2) Locate the crane in an area clear of traffic and obstacles that could interfere with operation. Make sure the crane is accessible for maintenance and operation.
3) Install the crane on a level surface. An unlevel surface may cause the boom to rotate in the direction the mast is leaning.
4) Fasten the base securely to the foundation to withstand applicable overturning moments and mounting bolt reaction. See Table 1. For standard products referred to in this manual, use 3/8 inch or 5/8 inch coarse thread fasteners, grade 5 or better. Torque for 3/8 inch grade 5 fasteners without lubrication is 30 ft lbs , Torque for 5/8 inch grade 5 fasteners without lubrication is 150 ft lbs. Make sure mounting holes are secured to a solid foundation able to support the crane and the load under all conditions with design factors based on accepted engineering practices.

Table 1-Crane Reactions

Model	Master Moment N.m		Suggested Bolt Size	Axial Force① pedestal base only		Torgue for grade 8.8 fasteners without lubrication
	in-lb	N.m		Lb	N	N.m
E500	21000	2373	M10	2121	9435	40
E1000	36000	4068	M16	1756②	7811	200
E2000	91200	10306	M16	4447②	19781	200

① Force in tension
② Crane at 45°

Assemble Crane E500series

1. Mounting Base
   There are three ways to mount the base. One is to mount the base on the ground(pedestal) or under the ground(socket) fig.2 , and on Roll Base fig.3.
   After the base is installed, insert Fixing Bush(#1-1) as sown in fig.4.

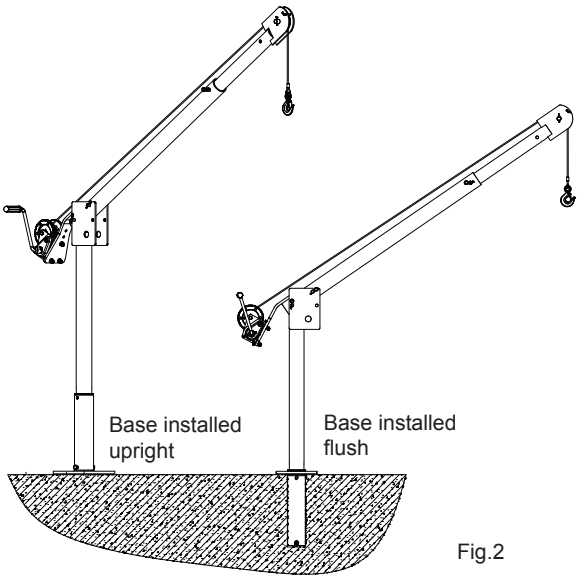


Fig.2

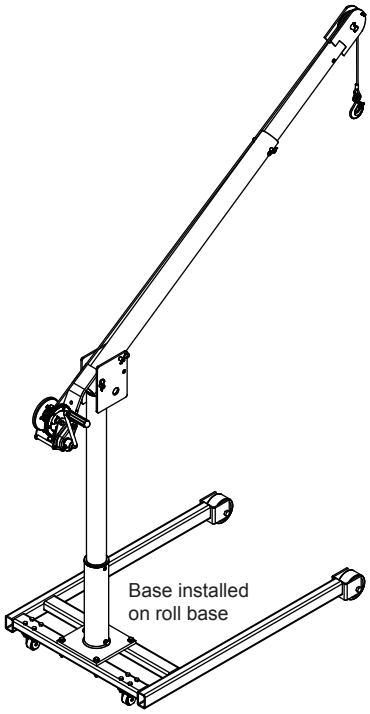


Fig.3

2. Put the mast weldment(#2) into the base(#1).
   The mast weldment can rotate 360° in the base(#1).
   Refer to Assembly Drawing and Part List on page x.
3. Fasten the upper bracket weldment(#3) to the mast weldment(#2) with 2 clevis pins(#5) provided.
   Secure the clevis pins(#5) in place with 2 cotter pins(#6).
   There are two mount positions for the upper bracket weldment (#3), A-A(fig.5-A) and B-B(fig.5-B) to regulate the crane angle.
   View fig.5 below.

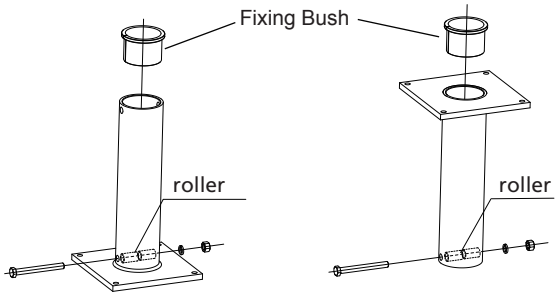


Fig.4

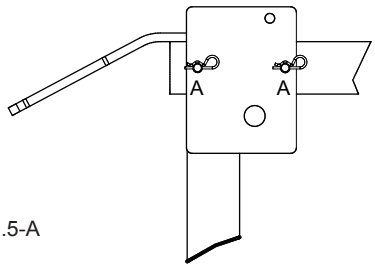


Fig.5-A

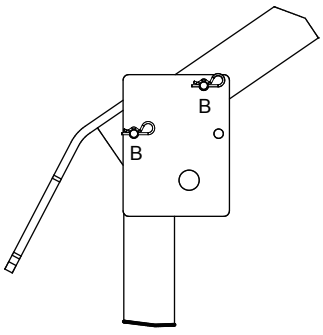


Fig.5-B

4. Slide the telescopic boom(#4) into the upper bracket weldment (#3) and secure in place with clevis pin(#5) and cotter pin(#6) provided.
   There are 3 positions for the telescopic boom(#4) in the upper bracket weldment(#3) to regulate the boom extended length.
   Refer to Assembly Drawing and Parts List on page 9.
5. Fit the pulley assembly(#9) to the boom with the axis pin(#7) and secure the axis pin with cotter pin(#11) provided.
6. Fit the stop pin(#8) at the very front side of the boom and secure the stop pin with the hair cotter pin(#10) provided. Fig.5

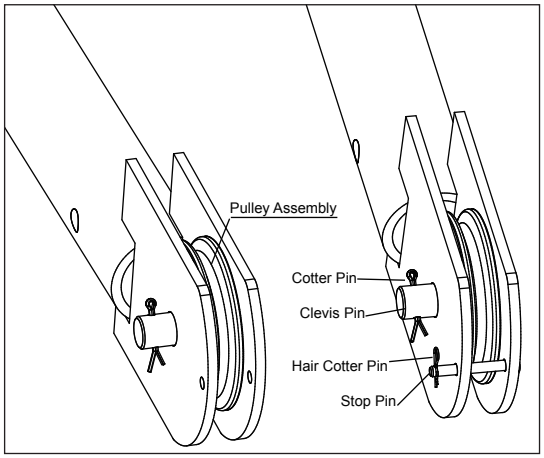


Fig.6

Install Crane E500 series-continue

7. Mount the winch using hardware provided. Fig.7
   For winch installation refer to winch operation manual provided.

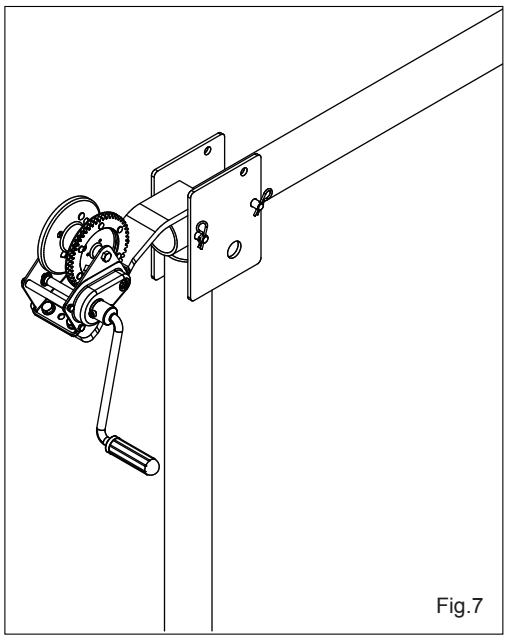


Fig.7

Install Crane E1000 series & E2000 series

1. Mounting Base
   There are three ways to mount the base. One is to mount the base on the ground(pedestal) or under the ground(socket) fig.8 , and on Roll Base fig.9.
   After the base is installed, insert Fixing Bush(#2) fig.10.

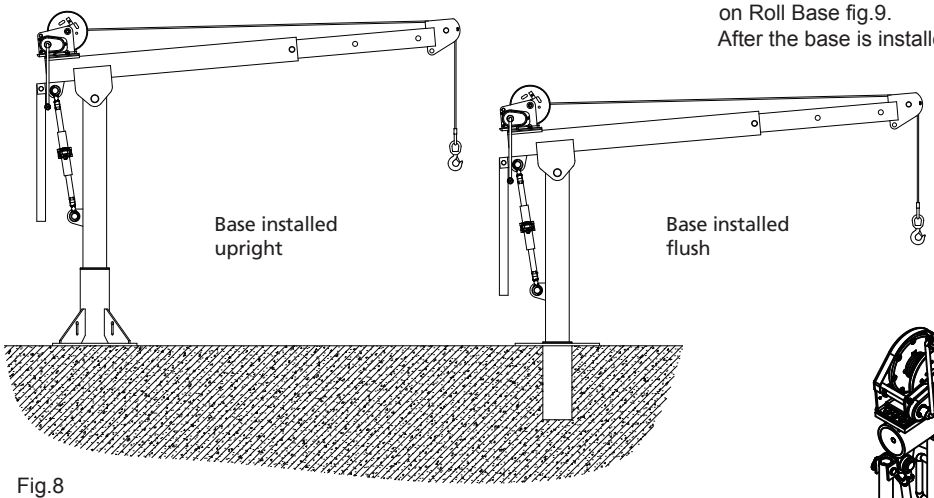


Fig.8

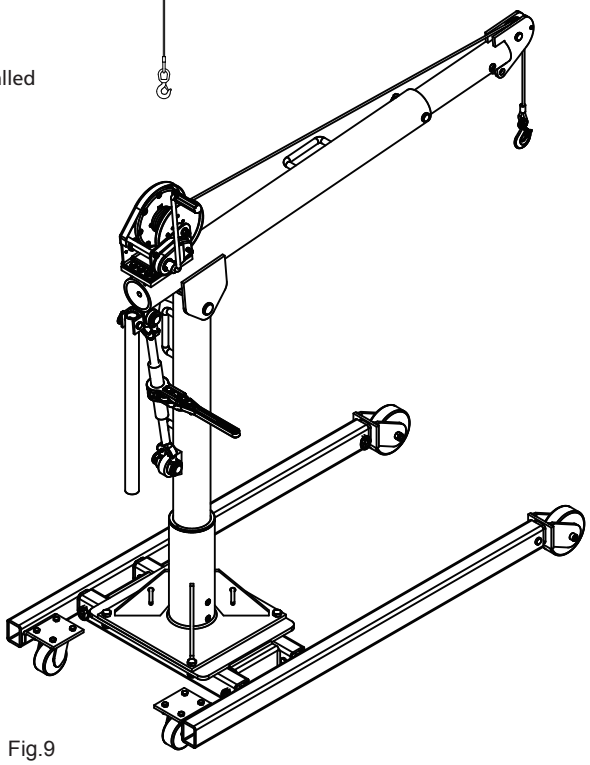


Fig.9

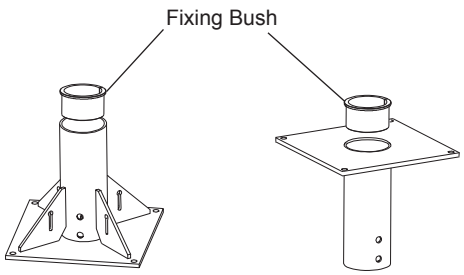


Fig.10

Install Crane E1000 series & E2000 series-continue

2. Put the mast weldment(#3) into the base(#1) fig.11.
   The mast weldment can rotate 360° in the base(#1).
   Refer to Assembly Drawing and Part List on page x for E1000 series and page x for E2000 series.
3. Fasten the upper bracket weldment(#10-RC1000, #9-E2000) to the mast weldment(#3) with clevis pins(#9-E1000, #10-E2000) provided fig.12.
   Secure the clevis pins in place with lynch pins provided (#7-E1000,#11-E2000).
   Refer to Assembly drawing & parts list for E1000 series on page 10, for E2000 series on page 11.
4. Assemble Ratchet Jack(#5)
   Adjust the ratchet jack to the greatest length and fit it to the upper boom weldment with the the upper boom weldment(#10-RC1000; #9-E2000) at horizontal postion by applying clevis pins to secure two ends of the ratchet jack to the mast weldment(#3) and the upper boom weldment respectively fig.13.
5. Fit the lever(#6) to the low end of the upper bracket weldment using cotter pin and lynch pin to secure in place.

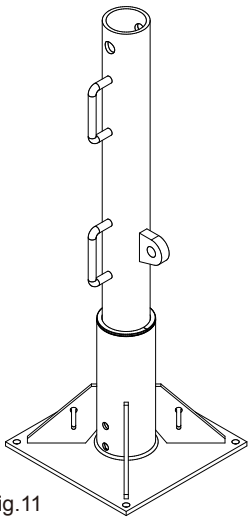


Fig.11

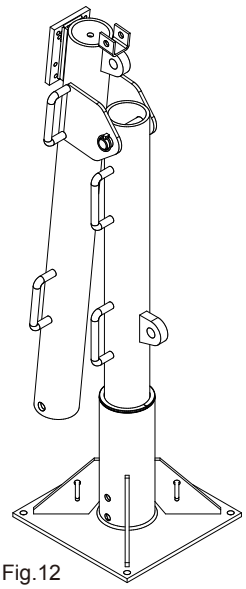


Fig.12

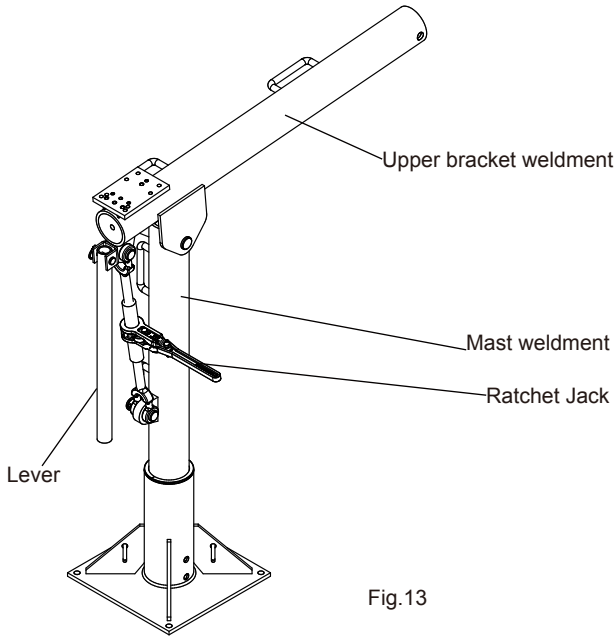


Fig.13

6. Slide the telescopic boom(#12-E1000; #13-E2000) into the upper bracket weldment(#10-E1000; #9-E2000) and secure in place with clevis pin lynch pin provided fig.14.
There are 3 positions for the telescopic boom in the upper bracket weldment to regulate the boom extended length.
7. Fit the pulley assembly(#17-E1000, #18-E2000) to the telescopic boom with axis pin and cotter pin provided.

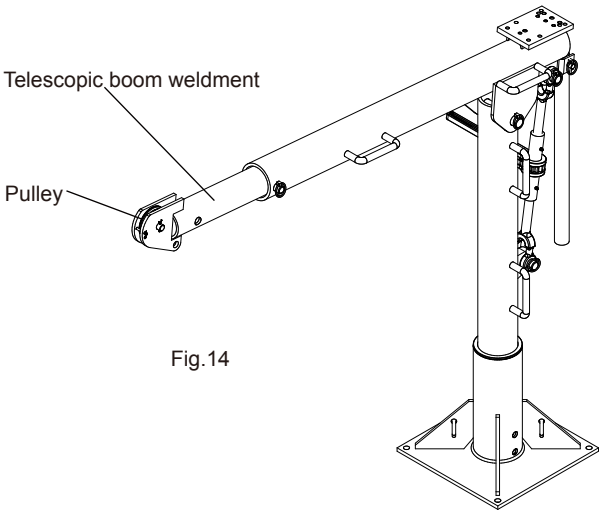


Fig.14

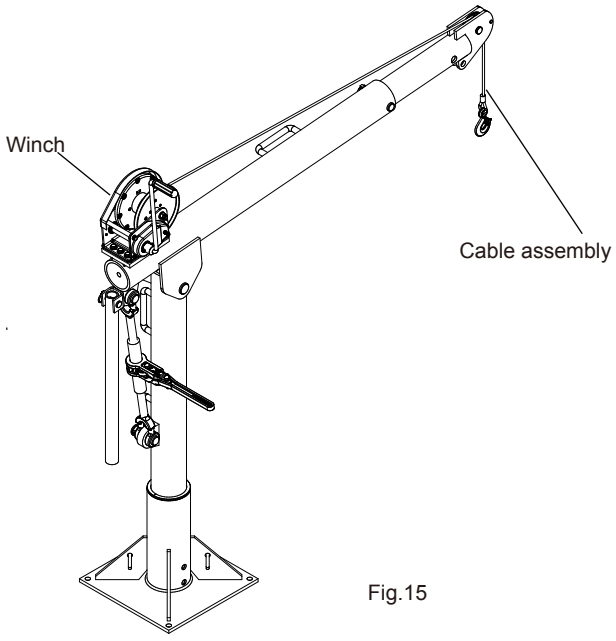


Fig.15

8. Secure the winch to the mounting plate using fasteners provided. Lead the steel cable assembly through between the pulley and the stop pin and fit to the winch drum as instructed in the winch operation manual provided.

OPERATION

A. Cautions before operation

1. The force required to lift the load must not exceed the load rating of the crane. Consider the total force required to lift the load, not the weight of the load.
2. This equipment can not develop forces that will exceed the load rating.
3. Performance ratings of the equipment are affected by the position of the boom. See the performance characteristics Table 4, Table 5, Table 6.

- Load rating represents the maximum force that can be placed on new equipment. Load ratings are assigned values for specific boom positions and wire rope lengths. Crane load ratings decrease as you extend the boom.
- Lift varies with the position of the boom and the length of the wire rope.
- Reach varies with the position of the boom.

4. Duty ratings refer to the type of use the equipment is subject to. Consider the following when determining duty rating.

- Environment: harsh environments include hot, cold, dirty, wet corrosive, or explosive surroundings. Protect the equipment from harsh environments when possible.
- Maintenance: poor maintenance, meaning poor cleaning, lubrication, or inspection, leads to poor operation and possible damage of the equipment. Minimize poor maintenance by carefully following the instructions contained in this manual.
- Loading: severe loading includes shock loading and lifting loads that exceed the load rating of the equipment. Avoid shock loads, and do not exceed the load rating of the equipment.
- Frequency of operation: frequent or lengthy operations increase wear and shorten the life span of gears, bearings, pulley, and other components.

B. Prepare operation

When adjusting boom length, set the boom angle just above horrizontal and hold the telescopic boom securely so it does not slide abruptly in or out of the upper bracket weldment causing damage or injury.

When adjusting the boom angle, raise the rotation lever(#6-E1000 & E2000) with one hand and operate the ratchet jack (#5) with the other to avoid jamming or injury.

1. Be conscious that you can perform the entire operation without hazard.
2. Inspect all components and parts of the equipment.
3. 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.
4. Konw your load and make sure you do not exceed the load rating of the crane and its any components.
5. Position the boom so the load hook is centered over the load avoid sidepulls which could damage the crane or cused the load to tip. Refer to fig.1 on page 1.
6. Adjust the boom length by moving the telescopic boom weldment in or out. The load rating decrease as you move the boom out. Refer to performace characteristics table on page 9-11.
7. Adjust boom angle by operating the ratchet jack(for E1000 and E2000) to raise the boom or lower the boom.

C. Attaching the load

⚠ **WARNING**

Do not wrap the wire rope round the load. This will damage the wire rope and could cause the load to slip out. Use a sling or other approved lifting device.

1. Clear objects from the path of the load so you can move it freely and obseve it at all times during the operation.
2. Make sure the wire rope is not twisted. A twised wire rope could cuase the load to spin when it is raised off the ground.
3. Seat the wire rope or sling in the saddle of the hook with hook safety latch completely closed.
4. Centre the load on the hook so it will remain balanced and not tip or rotate to one side.

D. Moving the load

1. Move the load slowly and smoothly at the beginning to make sure the load is balanced and securely attached before continuing.
2. Operate the winch to raise or lower the load. Refer to the winch operation manual provided.
3. 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.
4. Operate the ratchet jack(for E1000 & E2000), if necessary, to adjust the angle of the boom to keep the pulley centered over the load.
5. Rotate the boom to move the load side to side.
   1). Rotate the boom slowly and smoothly to avoid swinging the load or causing shock loads. **Do not jam the boom against other objects.**
   2). Use the handle to rotate the boom. **Do not push or pull the load or the wire rope to rotate the boom.**

MAINTENANCE

A. Cleaning the crane

Clean the crane after the use or whenever it is dirty.
Oil a slight film on all crane surface to protect against rust and corrosion before storing.

B. Lubricating the crane

Lubricate the crane properly to help protect it from wear and rust.

1. Lubricate all pins before installation and at least every 3 months. Use a grease brush to apply a light film of NLGI#2 grease to all pins.
2. Lubricate the mast bush before installation and at least every 3 months.
3. Lubricate the rollers(#1-6-RC500) on the bottom of the base weldment(#1-2-RC500) before installation and at least every 3 months. Use a grease brush to apply a film of NLGI#2 grease to the rollers.
4. Lubricate the ratchet jack assembly(#5-RC1000,RC2000) before installation and at least every 3 months. Use a grease gun to apply an NLGI#2 grease to the grease fittings on the ratchet jack assembly till excess grease can be seen.

C. Lubricate the winch

1. Lubricate winch gears before every operation and at least every 10 hours during operation.
2. Lubricating the worm gear hand Winch(for E1000 & E2000)
   • The winch is shipped from the factory with the proper amount (44 ounces) of Mobil gear 600 XP 220 lubricant in the gearbox. See fig.16, and fig.17.

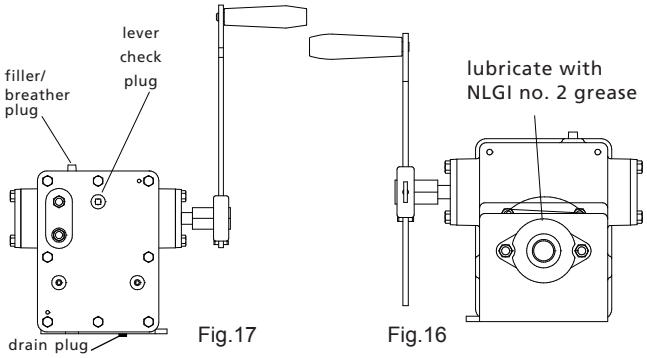


Fig.17

Fig.16

   • Check oil level before every operation and every 10 hours during operation. Remove the level check plug and make sure oil is even with the plug hole. Add oil to the gearbox if necessary. Do not use synthetic lubricants and do not mix different lubricants.
   • Change gearbox oil at least every 6 months, or whenever it is dirty or contaminated. Remove the drain plug to drain oil from the gearbox.
   • Lubricate the outboard bearing at least once every month or more, depending on usage. Use a grease gun to insert NLGI no. 2 grease until clean grease appears at the seals. The bearing will squeak if it is dry.
   * Lubricate the steel cable with a brush to apply a thin film of NLGI#2.
3. Refer to winch operation manual provided.

D. Inspecting the crane

Inspection should be performed by a qualified person or qualified persons. Inspection should be performed frequently.

1. Inspect the crane to detect signs of damage or poor operation before they become hazardous.
2. Check all parts which are properly fitted and tightened.
3. Test the crane performance by moving a test load of 10% of rated load capacity.
   * Listen for unusual noises and look for signs of damage as you operate the crane.
   * Make sure the wire rope winchs evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
   • Make sure the load moves smoothly, without hesitation or strain.
   • On hand operated models, make sure the winch handle rotates freely in both directions.
   • On power operated models, make sure the winch responds to the control device. It must rotate as shown on the control labels, and it must turn off when you release the control.
   • Make sure the boom rotates freely when you push the handle, and remains stationary when you release it.
   • Check the brake. Raise the load, then lower it and stop it a few feet off the ground. If the load continues to coast or creep, the brake may be in need of repair or adjustment.

Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. Refer to "E" on page 7.

4. Periodic Inspection
   1) VISUALLY INSPECT the crane and all other equipment.
   • Check the finish for wear, flaking, or other damage.
   • Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage. If the equipment was over-loaded, or if you notice cracks and other signs of overloading and damage, promptly remove equipment from use and have it repaired or replaced.
   DO NOT CONTINUE TO USE DAMAGED OR OVER-LOADED EQUIPMENT.
   • Check all fasteners for stripped threads, wear, bending, and other damage.
   • Make sure the entire crane is properly lubricated.
   • Check the ratchet jack for signs of damage, and make sure it operates smoothly to raise and lower the boom.
   • Make sure all labels and plates are readable, firmly attached, free of damage and clean. Replacements are available from the factory.

   2) REMOVE THE WIRE ROPE entirely from the crane.
   • Always wear protective clothing when handling wire rope.
   • Check the entire length of wire rope for bent wires, crushed areas, broken or cut wires, corrosion, and other damage. Carefully inspect areas that pass over sheaves or through roller guides.
   • Make sure the load hook or other device is securely attached to the wire rope, and the wire rope where it is attached is not frayed, corroded, broken,or otherwise damaged.
   • Measure the throat opening, thickness, and twist of the hook. Replace the hook if it shows signs of damage. See fig.18.
   • Make sure hook latch opens without binding and closes when released.

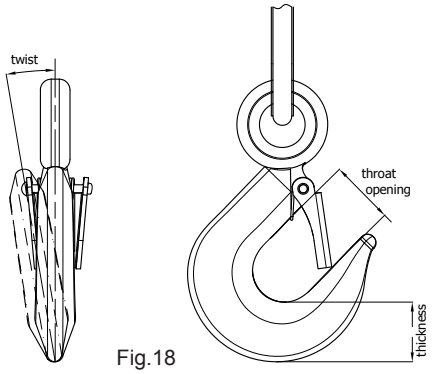


Fig.18

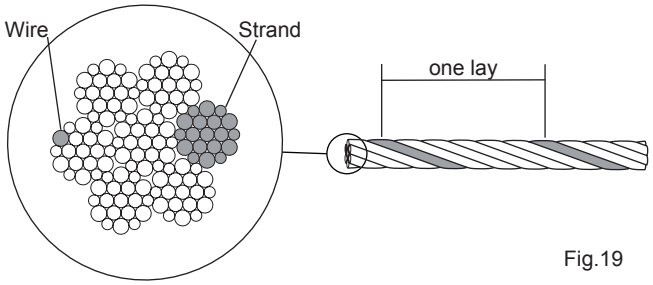


Fig.19

- Note the location and concentration of broken wires. Replace wire rope if more than 6 wires are broken in one lay, or more than 3 wires are broken in one strand in one lay. See figure 19
- Check the anchor holes in the drum and the surrounding area for signs of wear or distortion.

3) PLACE 100 POUNDS of tension on the wire rope

- Measure the diameter of the wire rope, especially in areas where wear is noticeable. Replace the wire rope if the diameter measures below the minimum diameter at any point.

Wire rope norminal diameter:	Minimum diameter:
1/4 in.	15/64 in.(6mm)
5/16 in.	19/64 in.(7.5mm)

E. Trouble shooting

Contact the supplier for detailed instructions if you are required to disassemble the crane or winch for any reason. Disassembly of the crane or winch before contacting supplier will voids all warranties.

problem	cause	correction
overheating	• operated too long without rest	allow to cool
	• load too heavy	lighten load
	• poor lubrication	inspect and lubricate as necessary
boom bounces up and down	• load too heavy	lighten load
	• mounting bolts loose	tighten mounting bolts to proper torqu
	• Pulley worn or damaged	inspect and replace as necessary
	• foundation loose or unlevel	inspect and repair as necessary
	• winch gears worn or damaged	inspect and repair as necessary
boom does not rotate	• rotation points contaminated or worn	inspect and repair as necessary
	• Mast Bush is broken or locked	inspect and replace as necessary
boom rotates on its own	• foundation loose or unlevel	inspect and repair as necessary
	• mast bent, distorted, or leaning	inspect and repair as necessary
unusual noises		
high pitched squeak	• poor lubrication	lubricate entire crane properly
grinding noise	• contaminated lubricant at rotation points	clean and lubricate rotation points
rattling noise	• loose bolts, set screws or other fasteners	tighten all bolts and other fasteners

Refer to the Winch Operation Manual for possible problems with the winch and brake.

F. Storing the crane

Store the crane in a cool clean place away from corrosive chemicals and moisture.

Technical Data & Specifications

Table 2-weight chart

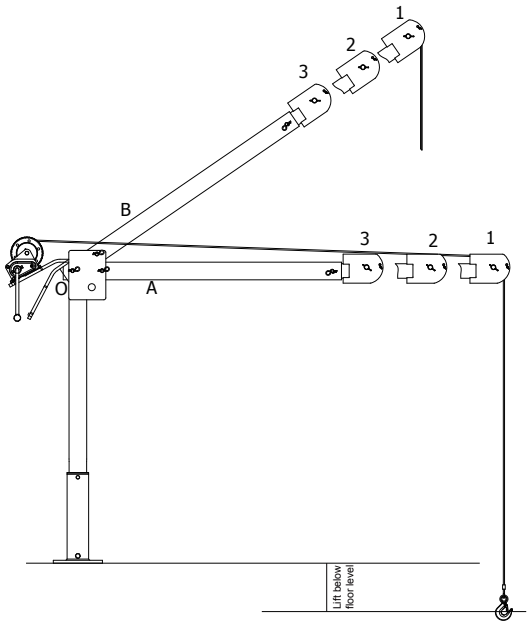
Component	E500 series		E1000 series		E2000 series	
	kgs	lbs	kgs	lbs	kgs	lbs
Pedestal	8.1	17.8	22.0	48.5	29.0	63.9
Socket Base	8.1	17.8	19.0	41.9	22.5	49.6
Roll Base	26.5	58.4	112.0	247.0	112.0	247.0
Mast	13.7	30.2	25.6	56.4	31.5	69.4
Upper Bracket Weldment	12.0	26.5	17.5	38.6	30.5	67.2
Telescopic Boom Weldment	9.6	21.2	10.2	22.5	24.5	54.0
Ratchet Jack(Lever included)	/	/	8.6	19.0	8.6	19.0
Winch RBW1500-05	3.4	7.5	/	/	/	/
Winch RBW1000SS	6.0	13.2	/	/	/	/
Winch RBW2500-16	/	/	6.9	15.2	6.9	15.2
Winch RWP2000-02	/	/	16.6	36.6	16.6	36.6
Winch RBW3500-03	/	/	/	/	6.8	15.0

Table 3-Winch performance

Model	Load rating (lbs)			Wire rope dia. in.	Drum capacity (ft)			Handle force at load rating (lbs)
	1st layer	Mid drum	Full drum		1st layer	Mid drum	Full drum	
EABW1500-05	1500	1100	800	3/16	3.8	19.4	50.4	44
EABW1000SS	1000	700	500	3/16	6	39	86	44
EABW2500-16	2500	200	1600	1/4	4.8	18	52	44
EWP2000-02	2000	1500	1200	1/4	4.8	17	52	44
EABW3500-03	3500	2700	2000	1/4	6	30	91	44

Table 4-E500 series Performance Characteristics

Wire rope dia. in.	Wire rope length ft.	Load rating (lbs)				Lift below floor level (min-max) ft.
		Position	1	2	3	
3/16	20/45	O-A	250	340	500	6.9-8.6/31.9-33.6
3/16	20/45	O-B	300	420	600	3.8-6.2/28.8-31.2



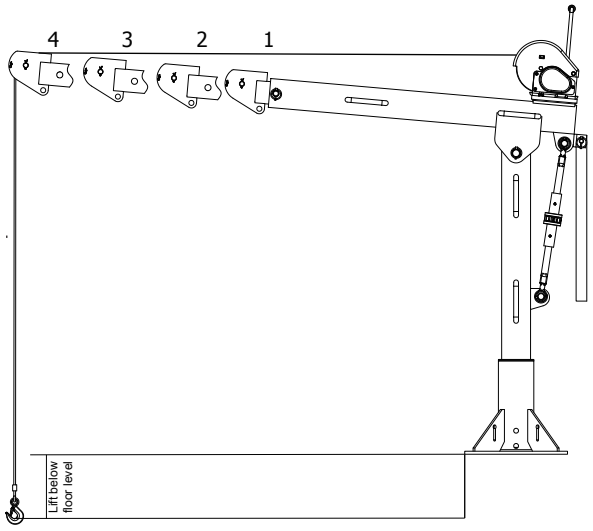


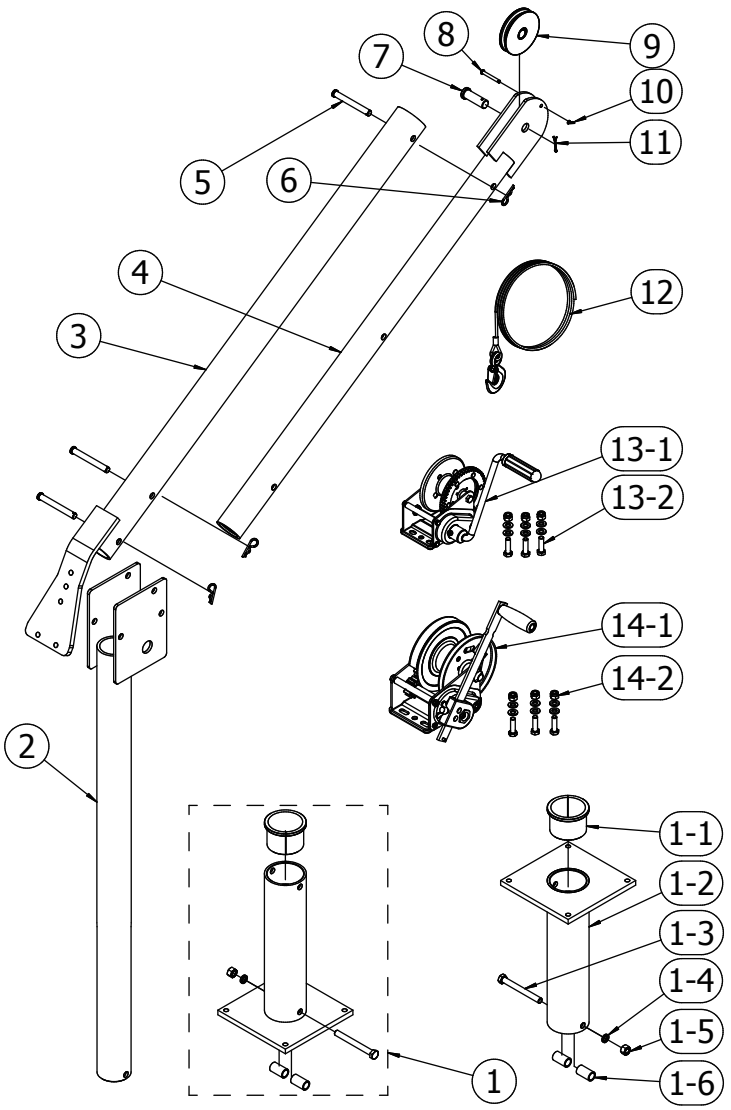
Table 5-E1000 series Performance Characteristics

Wire rope dia. in.	Wire rope length ft.	Load rating (lbs)				Lift below floor level (min-max) ft.
		1	2	3	4	
1/4	36	1000	700	600	500	17-21
1/4	60	1000	700	600	500	41-45

Table 6-E2000 series Performance Characteristics

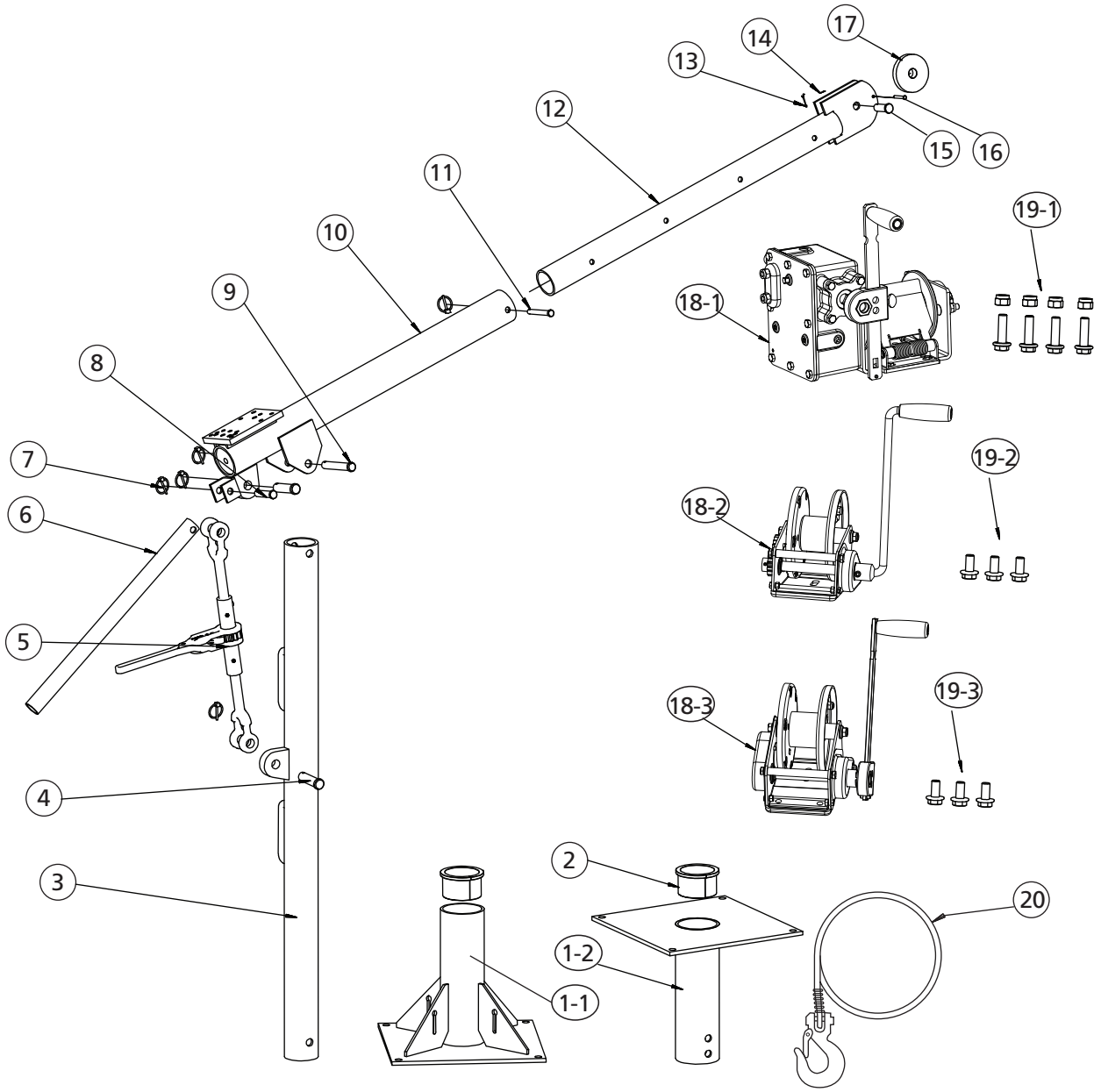
Wire rope dia. in.	Wire rope length ft.	Load rating (lbs)				Lift below floor level (min-max) ft.
		1	2	3	4	
1/4	36	2000	1600	1300	1000	16-20
1/4	60	2000	1600	1300	1000	40-44

Assembly Drawing & Parts List for E500 series



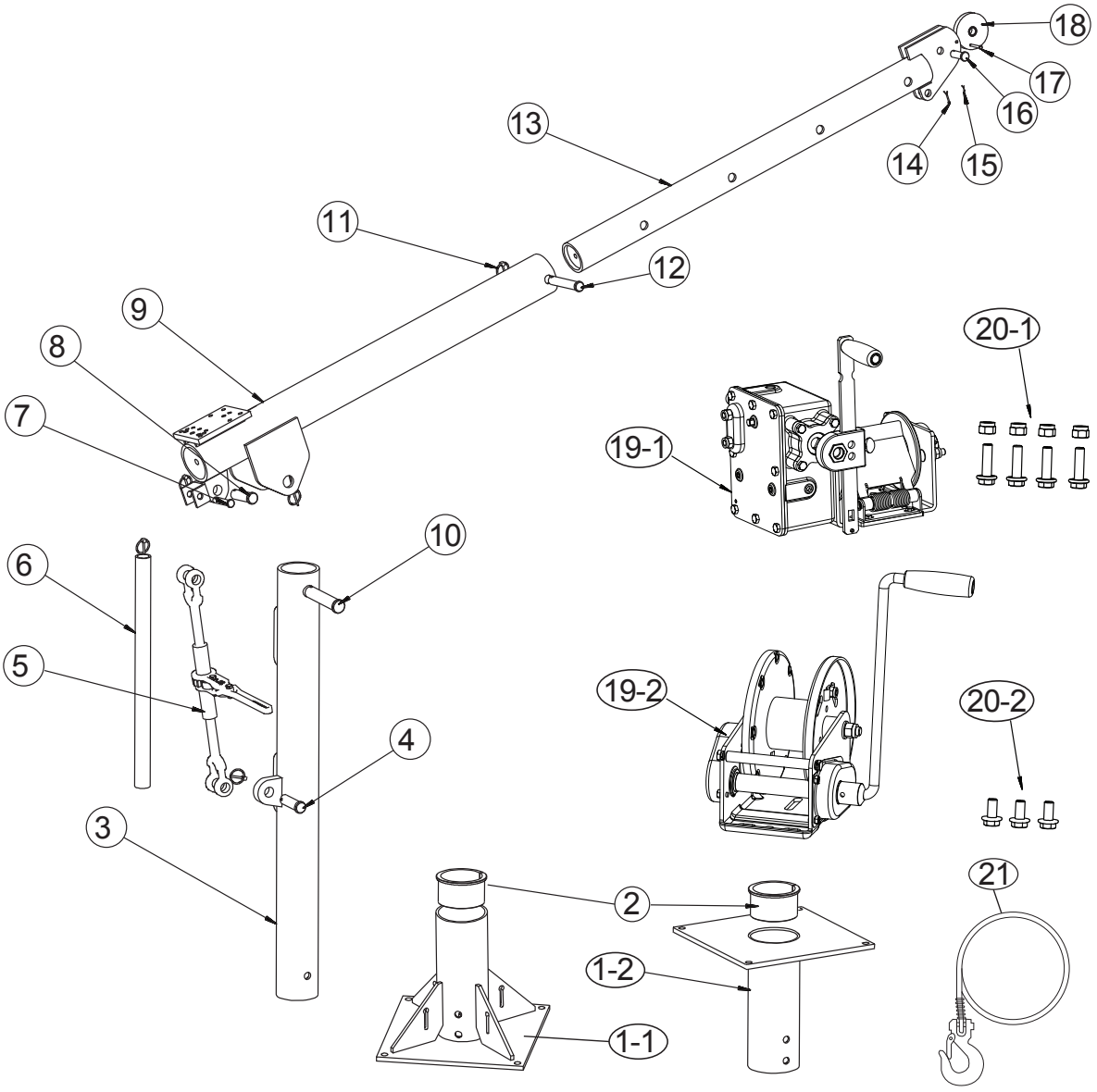
Part N0.	Description	Qty
1	Base	1
1-1	Mast Bush	1
1-2	Base Weldment	1
1-3	Bolt M12x110	1
1-4	Spring Washer M12	1
1-5	Nut M12	1
1-6	Roller	2
2	Mast Weldment	1
3	Upper Bracket Weldment	1
4	Telescopic Boom Weldment	1
5	Clevis Pin	3
6	Cotter Pin	3
7	Axis Pin	1
8	Stop Pin 6 x 50	1
9	Pulley Assembly	1
10	Hair Cotter Pin	1
11	Cotter Pin 3.2 x 32	1
12	Steel Cable Assembly Ø4.76 with hook(for RC500)	1
	Steel Cable Assembly Ø5.56(stainless steel for E500ss)	1
13-1	Hand Winch EBW1500-05(for E500)	1
13-2	Fastener(bolt M10×35 、flat washer Ø10 、lock nut M10)	3
14-1	Hand Winch EABW1000SS(stainless steel for E500ss)	1
14-2	Fastener(stainless steel, bolt M10×35 、flat washer Ø10、lock nut M10)	3

Assembly Drawing & Parts List for E1000 series



Part N0.	Description	Qty	Part N0.	Description	Qty
1-1	Pedestal Base	1	13	Cotter Pin	1
1-2	Socket Base	1	14	Hair Cotter Pin	1
2	Mast Bush	1	15	Axis Pin	1
3	Mast Weldment	1	16	Stop Pin	1
4	Pin Ø23x85	2	17	Pulley	1
5	Ratchet Jack Assembly	1	18-1	Winch EWP2000-02 for RC1000P	1
6	Lever	1	18-2	Winch EABW2500-16 for RC1000Z	1
7	Lynch Pin	5	18-3	Winch EABW2500-23 stainless steel for RC1000S	1
8	Clevis Pin	1	19-1	Bolt M10x34 + Nut M10	3
9	Clevis Pin	1	19-2	Bolt M10x18	3
10	Upper Bracket Weldment	1	19-3	Bolt M10x18 stainless steel	3
11	Clevis Pin	1	20-1	Cable Assembly Ø6.35 for #18-1,#18-2	1
12	Telescopic Boom Weldment	1	20-2	Cable Assembly Ø6.35 for #18-3	1

Assembly Drawing & Parts List for E2000 series



Part N0.	Description	Qty	Part N0.	Description	Qty
1-1	Base Weldment for upright	1	13	Telescopic Boom Weldment	1
1-2	Base Weldment for flush	1	14	Cotter Pin 3.2x28	1
2	Fixing Bush	1	15	Cotter Pin 1.2x12	1
3	Mast Weldment	1	16	Clevis Pin Ø19x55	1
4	Clevis Pin Ø23x85	1	17	Stop Pin	1
5	Ratchet Jack	1	18	Pulley	1
6	Lever	1	19-1	Winch EWP2000-02	1
7	Clevis Pin Ø16x75	1	19-2	Winch EABW3500-30	1
8	Clevis Pin Ø27x85	2	20-1	Bolt M10x34,Nut M10,	4
9	Upper Bracket Weldment	1	20-2	Bolt M12x18,	3
10	Clevis Pin Ø32x154	1	20-3	Bolt M12x18,stainless steel	3
11	Lynch Pin	5	21	Steel Cable Assembly Ø6.35 for #19-1, Ø7 for #19-2,	3
12	Clevis Pin Ø23x135	1			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