ELECTRIC CHAIN HOIST

OPERATING, MAINTENANCE, & PARTS MANUAL

ACI Hoist & Crane
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SECTION **PAGE**

1.0: GENERAL INFORMATION

This manual provides important information for personnel involved with installation, operation and maintenance of the ACI Electric Chain Hoist. The operator and/or person maintaining the hoist should be familiar with this manual.

The person responsible for the installation, operation, and/or maintenance of the hoist equipment should be familiar with the American National Standard ANSI B30.16 for guidelines on the safe operation of hoist. That document contains rules on inspection requirements and records that may be required by some of the regulatory agencies.

Following the precautions, procedures and maintenance practices in this manual should ensure long and reliable operation for your hoist.

1.1: CONSTRUCTION

This equipment should not be installed, operated or maintained by anyone who has not read and understood all the contents of this manual. Failure to read and comply with the contents of this manual may result in serious bodily injury or death, and/or property damage.

2.0: SAFETY PRECAUTIONS

2.1: TERMS & SUMMARY

Although you may be familiar with the product or similar equipment, it is strongly recommended that you read this manual before installing, operating or maintaining the hoist.

2.1.1: DANGER, WARNING, CAUTION & NOTICE

Throughout this manual, are steps and procedures that can prevent hazardous situations. The following signals words are used to identify the degree or level of hazard seriousness.

DANGER	Danger indicates an imminently hazardous situation which, if not avoided, **will** result in **death or serious** injury and property damage.
WARNING	Warning indicates an imminently hazardous situation which, if not avoided, **could** result in **death or serious** injury and property damage.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, **may** result in **minor or moderate** injury or property damage.
NOTICE	Notice is used to notify people of installation, operation or maintenance information which is important but not directly hazard related

⚠ WARNING ⚠

This equipment should not be installed, operated or maintained by any person who has not read all the contents to these instructions. Failure to read and comply with these instructions or any one of limitations noted herein can result in serious bodily injury and/or property damage.

Only competent engineering and fabrication personnel, familiar with standard machinery and crane design and fabrication practices, should be employed using this equipment because of the necessity of properly interpreting these instructions and for the purposes of determining appropriate compatible equipment and product applications. ACI disclaims any responsibility for the quality of design and workmanship employed in the design and fabrication of a crane or other system using this equipment or the sufficiency of the structure in which and to which this equipment is to be installed or the sufficiency of the machinery/crane or system to sustain any particular load that may be imposed upon it. Contact ACI or distributor for additional information if necessary.

There are no other warranties, which extend beyond the description on the order Acknowledgment and as it may apply to the specifications provided in this publication.
THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. ACI shall in no event be liable for special, direct, indirect, incidental or consequential damages to anyone beyond the cost of replacement of the goods sold hereby.

⚠ CAUTION ⚠

These general instructions deal with the normal installation, operation, and maintenance situations encountered with the equipment described herein. The instructions should not be interpreted to anticipate every possible contingency or to anticipate the final machinery/crane or system configuration that uses this equipment.

This manual includes instruction and parts information for a full range of HOIST for machinery or crane equipment. Therefore, all instructions and parts information not apply to any one type or size of equipment. Disregard those portions of the instructions, which do not apply.
Use only ACI authorized replacement parts in the service and maintenance of this equipment.

⚠ DANGER ⚠

HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

Before performing any mechanical or electrical maintenance on the equipment, de-energize (disconnect) the main switch supplying power to the equipment; and lock and tag the main switch in the de-energized position.

Only trained and competent personnel should inspect and repair this equipment.

⚠ WARNING ⚠

Equipment described herein is not designed for and should not be used for lifting, supporting, or transporting humans.

Equipment described herein should not be used in conjunction with other equipment unless crane builder or user installs necessary and/or required safety devices applicable to the system, crane, and application.

Modifications to upgrade, re-rate, or otherwise alter this equipment shall be authorized only by the original equipment manufacturer or qualified professional engineer.

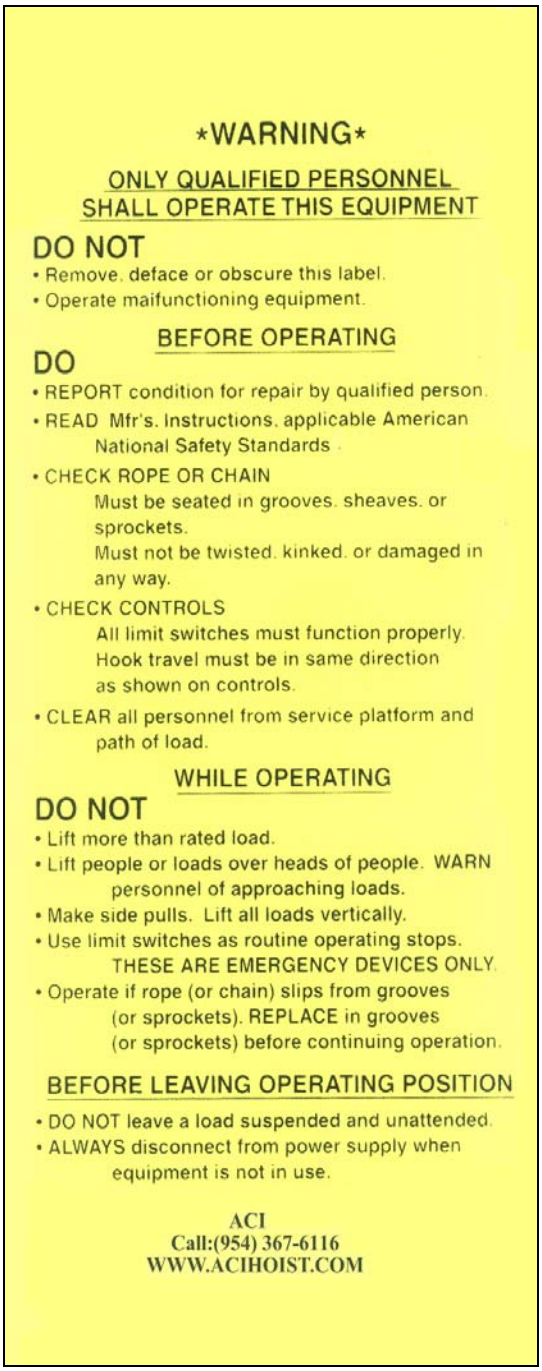
Equipment described herein is only for use in the design and manufacture of machinery/cranes. Additional equipment or devices may be required other than the crane to comply with applicable crane design and safety standards. The machinery and crane designer, crane manufacturer, or user is responsible to furnish these additional items for compliance. Refer to ASME B30.17 for top-running single girder cranes, ASME B30.11 for under hung single girder cranes, or ASME B30.2 for top running multiple girder cranes.

Electrical equipment described herein is designed and built in compliance with ACI interpretation of IEC or NFPA 70 (National Electrical Code). The machinery and crane designer, crane manufacturer or user is responsible to assure that the installation and associated wiring of these electrical components is in compliance with IEC or ANSI / NFPA70, and all applicable federal, state and local codes.

Failure to read and comply with any one of the limitations noted herein can result in serious bodily injury and/or property damage.

2.2: SAFETY RULES: WARNING TAGS & LABELS

The warning tag illustrated below is supplied with each hoist shipped from the factory. If the tag is not attached to your hoist's pendant cord, call ACI Hoist & Crane immediately to receive it and install it. Read and obey all warnings attached to this hoist. Tag is not shown actual size:



WARNING

ONLY QUALIFIED PERSONNEL SHALL OPERATE THIS EQUIPMENT

DO NOT

- Remove. deface or obscure this label.
- Operate maifunctioning equipment.

BEFORE OPERATING

DO

- REPORT condition for repair by qualified person.
- READ Mfr's. Instructions. applicable American National Safety Standards
- CHECK ROPE OR CHAIN
  Must be seated in grooves. sheaves. or sprockets.
  Must not be twisted. kinked. or damaged in any way.
- CHECK CONTROLS
  All limit switches must function properly.
  Hook travel must be in same direction as shown on controls.
- CLEAR all personnel from service platform and path of load.

WHILE OPERATING

DO NOT

- Lift more than rated load.
- Lift people or loads over heads of people. WARN personnel of approaching loads.
- Make side pulls. Lift all loads vertically.
- Use limit switches as routine operating stops. THESE ARE EMERGENCY DEVICES ONLY.
- Operate if rope (or chain) slips from grooves (or sprockets). REPLACE in grooves (or sprockets) before continuing operation.

BEFORE LEAVING OPERATING POSITION

- DO NOT leave a load suspended and unattended.
- ALWAYS disconnect from power supply when equipment is not in use.

ACI
Call:(954) 367-6116
WWW.ACIHOIST.COM

3.0: INSPECTION BEFORE INITIAL USE

When the hoist is unpacked inspect carefully for any damage that may have occurred during shipping. Check for loose, missing or damaged parts.

3.1: INSTALLATION

Be sure that the supporting structures for the hoist are strong enough to support the full rated load of the hoist with a low safety factor. The hoist body must be free to align between two hooks. Do not allow the hoist frame to rest against the supporting structure.

Installation MUST be performed by a qualified person in accordance with ACI Hoist & Crane. Severe injury, death and/or property damage can result if the hoist is not correctly installed. For service in this area, please contact:

ACI Hoist & Crane
757 S.E. 17th Street
Fort Lauderdale, FL 33316
Phone: 954-367-6116
Fax: 954-272-0334
Toll Free: 1-866-424-6478

Make sure to check that the power supply where the hoist is to be connected matches the information shown on the identification plate located on the bottom of the hoist.

Before using the hoist, fill in the information below:

Model No.: _____
Serial No.: _____
Purchase Date: _____

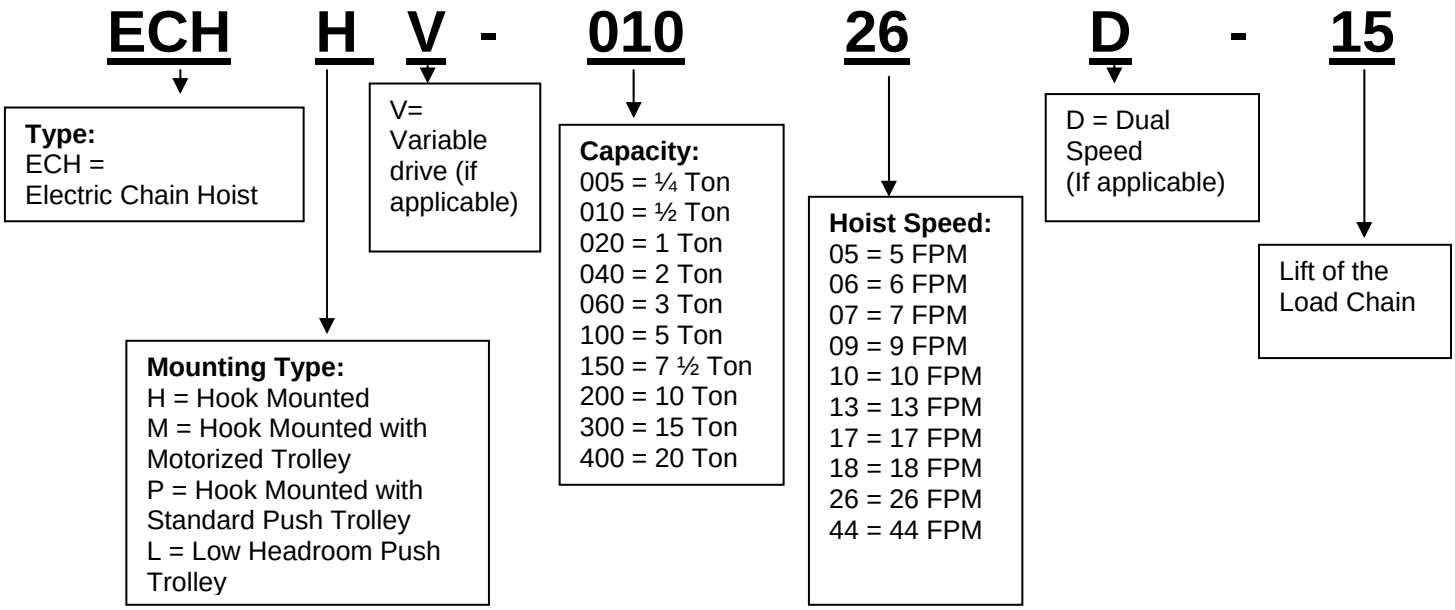
3.2: TESTING

Lift a light load with the hoist to check for a smooth operation and proper braking. If the hoist works properly with the light load, connect the rated load to the hoist and lift the load just clear of the floor. Check that the brake is holding the load before lifting it any higher.

4.0: DRAWINGS, DIMENSIONS & SPECIFICATIONS

4.1: SPECIFICATIONS

Model Number

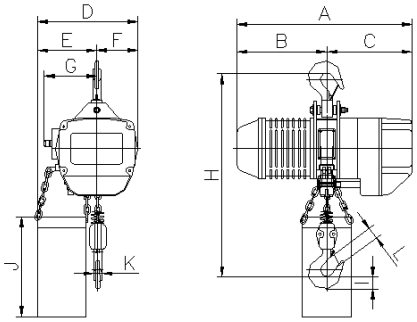


Example of Model Number: ECHH-01026D-15
Electric Chain Hoist, Hook Mounted, ½ Ton, 26/8 FPM, Dual Speed Operation, 15 ft Lift

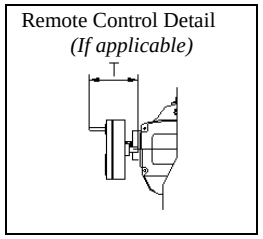
Features & General Specifications

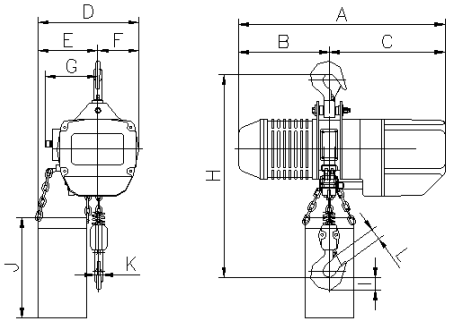
Duty Cycle	= H4 Duty
Parts Availability	= Order direct; No minimum order.
Chain Guide	= Provide quiet and smooth guiding of construction for improved wear and jam resistance.
Rain Cover	= Optional
Load Sheave	= Deep-grooved with five pockets. Reduces vibration and chain wear and provides a true vertical lift.
Gears	= Precision machined heat treated helical and spur gears. Oil bath lubrication for quiet, smooth and cool operation.
Mechanical Load Brake	= Secondary Weston type as an added safety feature located inside the gear box.
Motor Brake	= Pull-rotor type. An extremely durable and advanced design. Contains no brake coil to fail like conventional brakes. Standard feature.
Overload Clutch	= Long life friction clutch protects hoist from damage and prevents overloading.
Motor	= Aluminum die cast body is light weight with a baked paint finish. Increased performance through heavy duty H4 rating. Standard thermal protection.
Limit Switches	= Power upper and lower limit switch. Cuts power directly to the motor. This added safety device is required in hot metal and critical uses.
Hook	= Forged carbon steel hook. Under excessive loads will open gradually and not fracture. Ball bearings produce smooth rotation. Boon hook will swivel 360
Load Chain	= Heavy duty, heat-treated, wear-resistant load chain standard.
Chain Bag	= Heavy-duty chain bag included as standard.
Lifting Eye	= Standard. Required in many specifications for equipment over 40 pounds.
Trolley	= Motorized trolley available
Trolley Bumper	= Standard, Required on trolleys used for cranes/
Trolley Brake	=Standard
Trolley Roller Guides	=Trolley roller guides for smooth operation, especially on curves (on models equipped with trolley).

4.2: ELECTRIC CHAIN HOIST, HOOK MOUNTED: DRAWINGS & DIMENSION



Single Speed/Dual Speed





Hoist Control Options

¼ Ton- 2 Ton (1 Chain)

4.2.1: SPECIFICATION & DIMENSIONS:

Capacity (ton)	Model Number	Hoist Lift Speed (ft/min)	No. of Chain Falls	Load Chain Dia. (in)	Hoist Motor 3 Ph / 60 Hz			Dimension (in)									Special Dim. (in)	Approx. Gross Weight 1-sp Hoist (lbs)
					Hp	Rated Current		H	D	E*	F	G	I	J*	K	L		
						230 V (amps)	*460 V (amps)*	*Headroom**										
1/4	ECHH-00518	18	1	0.28	1.3	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 1	138
	ECHH-00526	26			1.3	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 1	138
	ECHH-00544	44			2.0	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 2	138
1/2	ECHH-01018	18			1.3	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 1	138
	ECHH-01026	26			1.3	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 1	138
	ECHH-01044	44			2.0	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.4	11.2	0.9	1.3	Table 2	138
1	ECHH-02018	18			1.3	8.0	4.0	22.0	11.8	7.0	4.8	6.3	1.5	11.2	0.9	1.3	Table 1	138
	ECHH-02026	26			2.0	10.0	5.0	22.0	11.8	7.0	4.8	6.3	1.5	11.2	0.9	1.3	Table 2	138

Table 1	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	20.8	10.7	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Table 2	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	21.6	11.5	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Hoist Speed:

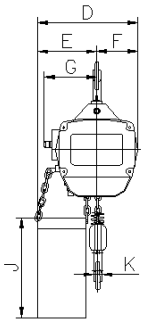
- Dual Speed (2-Speed, 3:1 Ratio)
- Variable Frequency Drive (2-Speed, 6:1 Ratio)
- Other configurations available upon request

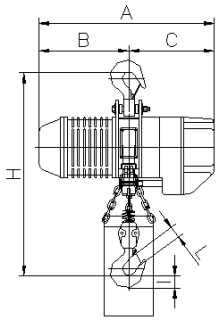
Special Notes:

* Dimensions are based on 10 ft Lift.

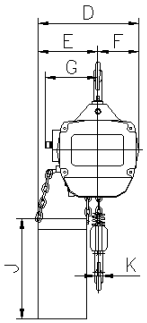
† Contact us for additional flange width

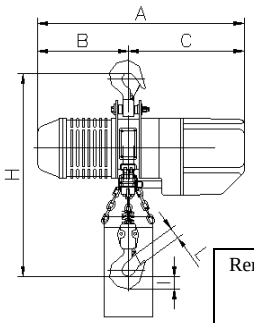
4.2.2: SPECIFICATION & DIMENSIONS:





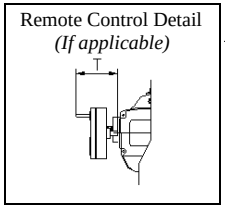
Single Speed/Dual Speed

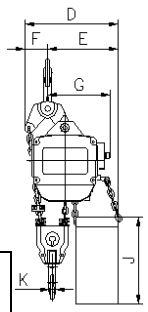


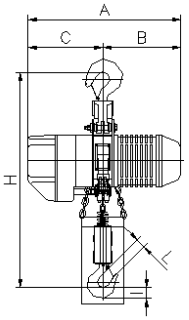


Hoist Control Options

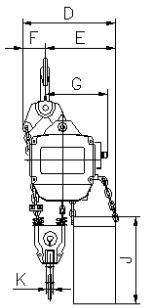
2 Ton (1 Chain)

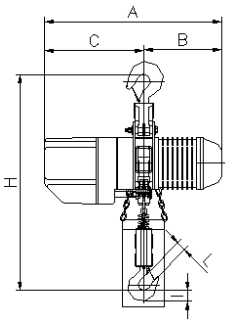






Single Speed/Dual Speed





Hoist Control Options

2 Ton-3 Ton (2 Chain)

Capacity (ton)	Model Number	Hoist Lift Speed (ft/min)	No. of Chain Falls	Load Chain Dia. (in)	Hoist Motor 3 Ph / 60 Hz			Dimension (in)									Special Dim. (in)	Approx. Gross Weight 1-sp Hoist (lbs)
					Hp	Rated Current		H	D	E*	F	G	I	J*	K	L		
						230 V (amps)	*460 V (amps)*	*Headroom**										
2	ECHH-04009	9	2	0.28	1.3	8.0	4.0	27.6	12.5	9.4	3.2	8.6	1.5	11.2	0.9	1.3	Table 1	168
	ECHH-04013	13	2		2.0	10.0	5.0	30.1	12.5	9.4	3.2	8.6	1.5	11.2	0.9	1.3	Table 2	168
	ECHH-04026	26	1	0.39	4.0	20.0	10.0	30.1	16.3	10.1	6.2	7.5	2.0	14.0	1.4	1.9	Table 3	270
3	ECHH-06017	17	2		4.0	20.0	10.0	35.1	16.5	12.4	2.9	9.6	2.0	14.0	1.4	1.9	Table 3	335
5	ECHH-10010	10	2	0.43	4.0	19.0	10.0	36.6	16.5	12.4	3.7	9.6	2.5	14.0	1.8	2.2	Table 3	335

Table 1	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	20.8	10.7	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Table 2	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	21.6	11.5	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Table 3	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	24.5	11.9	12.6	6.0
2-Sp Hoist	25.5	12.9	12.6	6.0
VFD Hoist	24.5	11.9	12.6	6.0

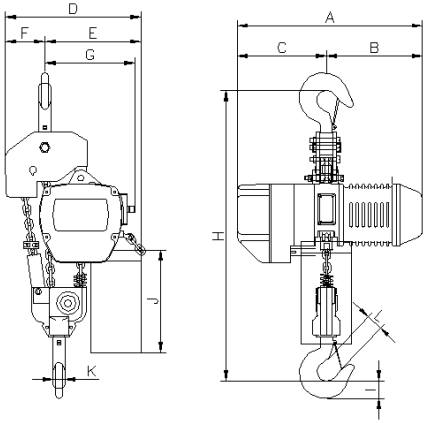
Special Notes:

* Dimensions are based on 10 ft Lift.
† Contact us for additional flange width

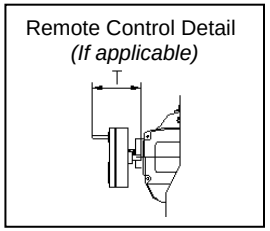
Hoist Speed:

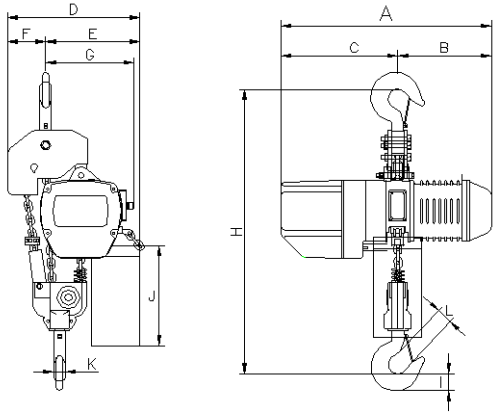
- Dual Speed (2-Speed, 3:1 Ratio)
- Variable Frequency Drive (2-Speed, 6:1 Ratio)
- Other configurations available upon request

4.2.3 SPECIFICATION & DIMENSIONS:



Single Speed/Dual Speed





Hoist Control Options

3 Ton (3 Chain)

Capacity (ton)	Model Number	Hoist Lift Speed (ft/min)	No. of Chain Falls	Load Chain Dia. (in)	Hoist Motor 3 Ph / 60 Hz			Dimension (in)									Special Dim. (in)	Approx. Gross Weight 1-sp Hoist (lbs)
					Hp	Rated Current		H	D	E*	F	G	I	J*	K	L		
						230 V (amps)	*460 V (amps)*	*Headroom**										
3	ECHH-06006	6	3	0.28	1.3	10.0	5.0	31.6	15.8	11.2	4.6	10.4	2.0	14.0	1.4	1.8	Table 1	240
3	ECHH-06009	9	3	0.28	2.0	10.0	5.0	31.6	15.8	11.2	4.6	10.4	2.0	14.0	1.4	1.8	Table 2	240

Table 1	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	20.8	10.7	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Table 2	Dimensions (in)			
	A	B	C	T
1-Sp Hoist	20.8	10.7	10.1	6.0
2-Sp Hoist	21.6	11.5	10.1	6.0
VFD Hoist	24.3	10.7	13.6	6.0

Special Notes:

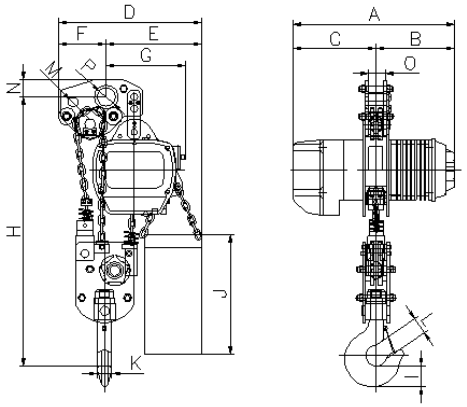
* Dimensions are based on 10 ft Lift.

† Contact us for additional flange width

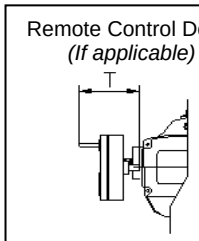
Hoist Speed:

- Dual Speed (2-Speed, 3:1 Ratio)
- Variable Frequency Drive (2-Speed, 6:1 Ratio)
- Other configurations available upon request

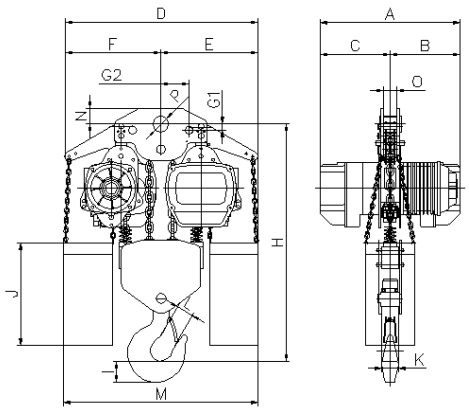
4.2.4: SPECIFICATION & DIMENSIONS:



Remote Control Detail
(If applicable)



Single Speed/Dual Speed
Hoist Control Options
7 ½ Ton (2 Chain)



Single Speed/Dual Speed
Hoist Control Options
10 Ton (4 Chain)

Capacity (ton)	Model Number	Hoist Lift Speed (ft/min)	No. of Chain Falls	Load Chain Dia. (in)	Hoist Motor 3 Ph / 60 Hz			Dimension (in)										Special Dim. (in)	Approx. Gross Weight 1-sp Hoist (lbs)
					Hp	Rated Current		H	D	E*	F	I	J*	K	L	N	O		
						230 V (amps)	*460 V (amps)*	*Headroom**											
7 ½	ECHH-15007	7	2	0.43	4.0	19.0	10.0	38.6	21.7	14.4	7.3	3.1	14.0	2.2	2.8	2.6	38.6	Table 1	480
10	ECHH-20010	10	4	0.43	2 x 4.0	2 x 10.0	2 x 10.0	42.1	34.4	17.2	17.2	3.8	14.0	3.1	2.9	2.7	2.3	Table 2	810

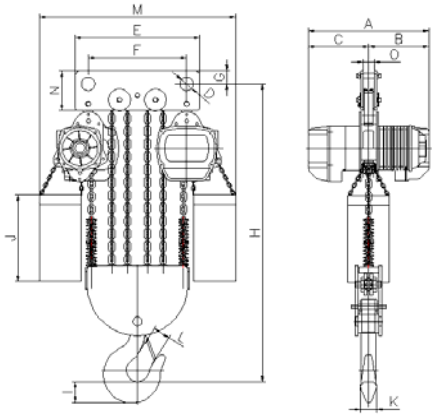
Table 1	Dimensions (in)						
	A	B	C	G	M	P	T
1-Sp Hoist	24.5	11.9	12.6	11.7	1.3	2.5	5.9
2-Sp Hoist	25.5	12.9	12.6	11.7	1.3	2.5	5.9
VFD Hoist	24.5	11.9	12.6	11.7	1.3	2.5	5.9

Table 2	Dimensions (in)						
	A	B	C	G1/G2	M(*)	P	T
1-Sp Hoist	25.2	12.6	12.6	1.0/5.0	34.6	2.7	5.9
2-Sp Hoist	25.8	12.9	12.9	1.0/5.0	34.6	2.7	5.9
VFD Hoist	25.2	12.6	12.6	1.0/5.0	34.6	2.7	5.9

Special Notes:
* Dimensions are based on 10 ft Lift.
† Contact us for additional flange width & Yoke dimensional drawing.

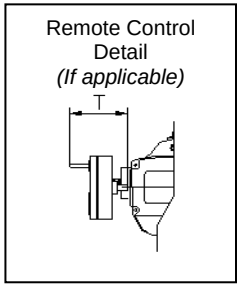
Hoist Speed:
- Dual Speed (2-Speed, 3:1 Ratio)
- Variable Frequency Drive (2-Speed, 6:1 Ratio)
- Other configurations available upon request

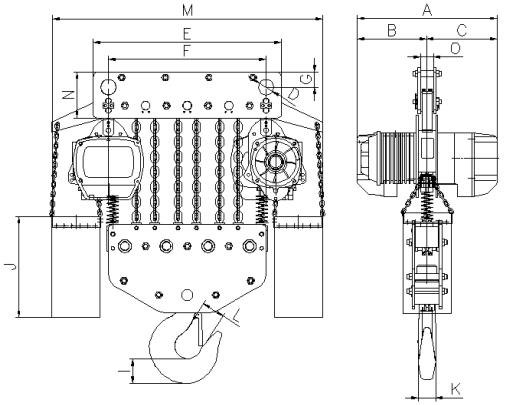
4.2.5: SPECIFICATION & DIMENSIONS:



Single Speed/Dual Speed
Hoist Control Options

15 Ton (6 Chain)





Single Speed/Dual Speed
Hoist Control Options

20 Ton (8 Chain)

Capacity (ton)	Model Number	Hoist Lift Speed (ft/min)	No. of Chain Falls	Load Chain Dia. (in)	Hoist Motor 3 Ph / 60 Hz			Dimension (in)										Special Dim. (in)	Approx. Gross Weight 1-sp Hoist (lbs)
					Hp	Rated Current		H	D	E*	F	I	J*	K	L	N	O		
						230 V (amps)	*460 V (amps)*	*Headroom**											
15	ECHH-30007	7	6	0.43	2 x 4.0	2 x 19.0	2 x 19.0	47.8	2.7	26.0	20.5	4.4	19.1	3.3	3.6	8.3	2.3	Table 1	1025
20	ECCH-40005	5	8	0.43	2 x 4.0	2 x 19.0	2 x 19.0	48.6	2.8	33.8	28.3	4.4	19.1	3.1	4.1	8.3	5.1	Table 2	1580

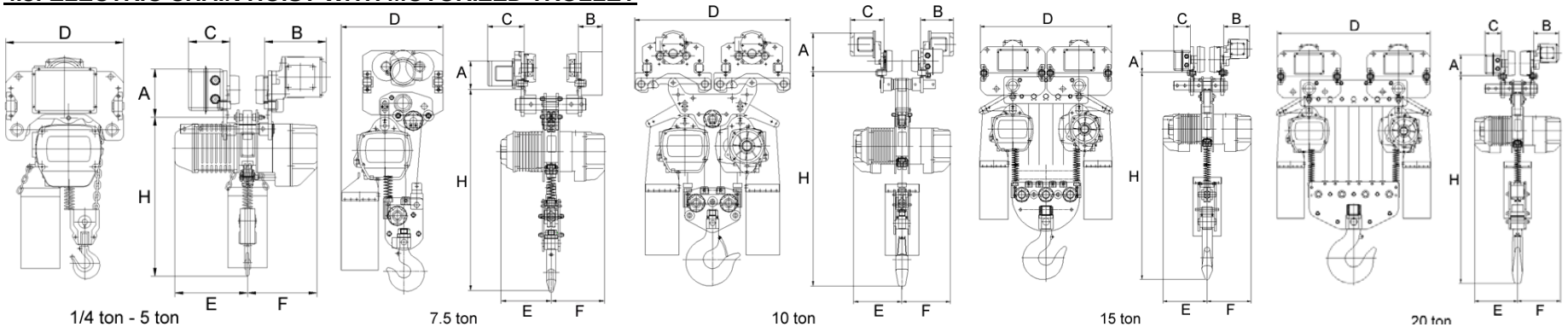
Table 1	Dimensions (in)					
	A	B	C	G	M(*)	T
1-Sp Hoist	25.2	12.6	12.6	2.8	40.8	5.9
2-Sp Hoist	25.8	12.9	12.9	2.8	40.8	5.9
VFD Hoist	25.2	12.6	12.6	2.8	40.8	5.9

Table 2	Dimensions (in)					
	A	B	C	G	M(*)	T
1-Sp Hoist	25.2	12.6	12.6	2.8	48.6	5.9
2-Sp Hoist	25.8	12.9	12.9	2.8	48.6	5.9
VFD Hoist	25.2	12.6	12.6	2.8	48.6	5.9

Special Notes:
* Dimensions are based on 10 ft Lift.
† Contact us for additional flange width & Yoke dimensional drawing.

Hoist Speed:
- Dual Speed (2-Speed, 3:1 Ratio)
- Variable Frequency Drive (2-Speed, 6:1 Ratio)
- Other configurations available upon request

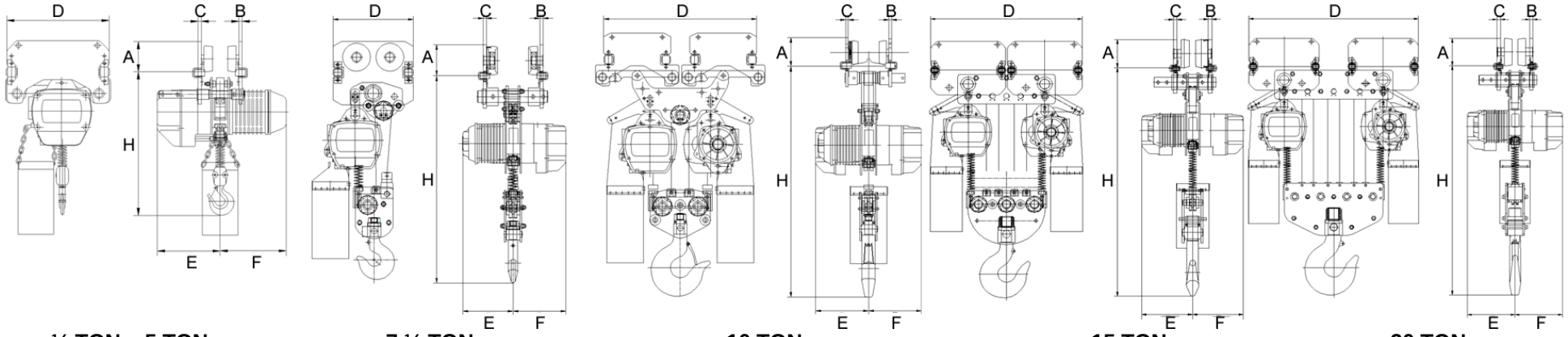
4.3: ELECTRIC CHAIN HOIST WITH MOTORIZED TROLLEY



4.3.1: ELECTRIC CHAIN HOIST WITH MOTORIZED TROLLEY: DIMENSIONS & SPECIFICATION: *Headroom (H) is based on 10 ft lift*

Capacity (ton)	Model Number	Lift (ft)	Lift Speed ft/min	No. of Chain Falls	Load Chain Diameter (in)	Hoist Motor			Trolley Motor						H Headroom (in)(*)	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	Flange Width Range (in)
									50 fpm			100 fpm										
						HP	Rated Current		HP	Rated Current		HP	Rated Current									
							@ 230V (amps)	@ 460V (amps)		@ 230V (amp)	@ 460V (amp)		@ 230V (amp)	@ 460V (amp)								
1/4	ECHM-00518	10	18	1	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
	ECHM-00526		26	1	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
	ECHM-00544		44	1	0.28	2	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
1/2	ECHM-01018		18	1	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
	ECHM-01026		26	1	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
	ECHM-01044		44	1	0.28	2	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
1	ECHM-02018		18	1	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.6	9.4	9.2	19.8	11	11	3 - 7
	ECHM-02026		26	1	0.28	2	10	5	0.5	1.34	0.68	0.5	1.53	0.76	19.5	5.8	11	9.2	20.5	11	11	3 - 7
2	ECHM-04009		9	2	0.28	1.3	8	4	0.5	1.34	0.68	0.5	1.53	0.76	22.0	5.6	9.4	9.2	20.5	11	11	3 - 7
	ECHM-04013		13	2	0.28	2	10	5	0.5	1.34	0.68	0.5	1.53	0.76	26.4	5.8	11	9.2	20.5	11	11	3 - 7
	ECHM-04026		26	1	0.39	4	19	10	1	1.34	0.68	1	2.13	1.07	26.4	6.1	9.8	9.2	22	12	13	3 - 7
3	ECHM-06006		6	3	0.28	1.3	10	5	1	1.34	0.68	1	2.13	1.07	28.7	5.6	9.4	9.2	20.5	11	11	5 - 8
	ECHM-06009		9	3	0.28	2	10	5	1	1.34	0.68	1	2.13	1.07	28.7	5.6	9.4	9.2	20.5	12	11	5 - 8
	ECHM-06017		17	2	0.39	4	19	10	1	1.34	0.68	1	2.13	1.07	32.0	7.3	9.8	9.2	20.5	12	13.6	5 - 8
5	ECHM-10010		10	2	0.43	4	19	10	1	1.34	0.68	1	2.13	1.07	33.8	6.1	9.8	9.2	24	12	13.6	5 – 8
7 1/2	ECHM-15007		7	3	0.43	4	19	10	1	1.34	0.68	1	2.13	1.07	43.4	6.1	9.8	11.5	27	12	13.6	6 - 11
10	ECHM-20010		10	4	0.43	2 x (4.0)	2 x (19)	2 x (10)	2 x (.5)	2 x (1.34)	2 x (0.68)	2 x (1)	2 x (2.13)	2 x (1.07)	49.7	7.6	11.5	11.5	36	13.6	13.6	6 - 11
15	ECHM-30007		7	6	0.43	2 x (4.0)	2 x (19)	2 x (10)	4 x (.5)	4 x (1.34)	4 x (0.68)	4 x (1)	4 x (2.13)	4 x (1.07)	51.9	10.2	11.5	11.5	40.6	13.6	13.6	6 - 11
20	ECHM-40005		5	8	0.43	2 x (4.0)	2 x (19)	2 x (10)	4 x (.5)	4 x (1.34)	4 x (0.68)	4 x (1)	4 x (2.13)	4 x (1.07)	52.7	10.2	11.5	11.5	48.5	13.6	13.6	6 - 11

4.4: ELECTRIC CHAIN HOIST WITH LOW HEADROOM PUSH TROLLEY

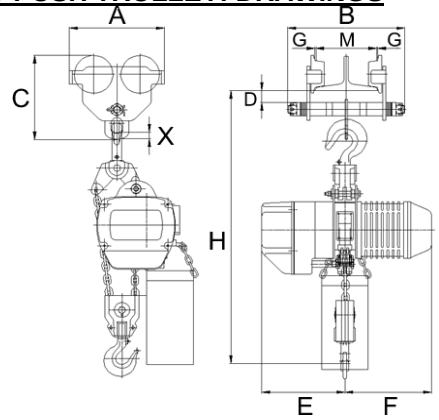


¼ TON – 5 TON | 7 ½ TON | 10 TON | 15 TON | 20 TON

4.4.1: ELECTRIC CHAIN HOIST WITH LOW HEADROOM PUSH TROLLEY: *Headroom (H) is based on 10 ft lift*

Capacity (ton)	Model Number	Standard Lift (ft)	Lift Speed (ft/min)	No. of Chain Falls	Load Chain Diameter (in)	Hoist Motor			H Headroom (in)(*)	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	Flange Width Range (in)
						HP	Rated Current									
							@ 230V (amps)	@ 460V (amps)								
1/4	ECHL-00518	10	18	1	0.28	1.3	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
	ECHL-00526		26	1	0.28	1.3	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
	ECHL-00544		44	1	0.28	2	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
1/2	ECHL-01018		18	1	0.28	1.3	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
	ECHL-01026		26	1	0.28	1.3	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
	ECHL-01044		44	1	0.28	2	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
1	ECHL-02018		18	1	0.28	1.3	8	4	22.0	4.2	0.5	0.5	17	11	11	3 - 5
	ECHL-02026		26	1	0.28	2	10	5	22.0	4.2	0.5	0.5	17	11	11	3 - 5
2	ECHL-04009		9	2	0.28	1.3	8	4	27.6	4.2	0.5	0.5	17	11	11	4 - 6
	ECHL-04013		13	2	0.28	2	10	5	30.1	4.2	0.5	0.5	17	11	11	4 - 6
	ECHL-04026		26	1	0.39	4	19	10	30.1	4.2	0.5	0.5	17	12	14	4 - 6
3	ECHL-06006		6	3	0.28	1.3	10	5	31.6	4.2	0.5	0.5	21	11	11	5 - 7
	ECHL-06009		9	3	0.28	2	10	5	31.6	4.2	0.5	0.5	20	12	14	5 - 7
	ECHL-06017		17	2	0.39	4	19	10	35.1	4.9	0.6	0.6	20	12	14	5 - 7
5	ECHL-10010		10	2	0.43	4	19	10	36.6	5.5	0.6	0.6	21	12	13.6	5 - 7

4.5: ELECTRIC CHAIN HOIST WITH STANDARD PUSH TROLLEY: DRAWINGS



¼ - 5 Ton

4.5.1: ELECTRIC CHAIN HOIST WITH STANDARD PUSH TROLLEY: DIMENSIONS & SPECIFICATIONS

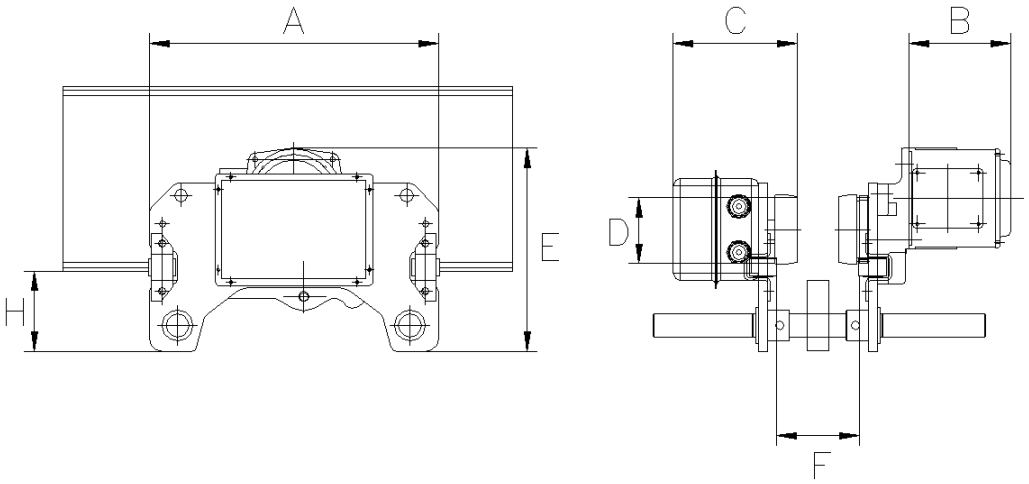
Headroom (H) is based on 10 ft lift:*for details on other capacities, please call for more information.

Capacity (ton)	Model Number	Standard Lift (ft)	Lift Speed (ft/min)	No. of Chain Falls	Load Chain Diameter (in)	Hoist Motor			H Headroom (in)	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	Flange Width Range (in)
						HP	Rated Current									
							@ 230V (amps)	@ 460V (amps)								
1/4	ECHP-00518	10	18	1	0.28	1.3	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
	ECHP-00526		26	1	0.28	1.3	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
	ECHP-00544		44	1	0.28	2	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
1/2	ECHP-01018		18	1	0.28	1.3	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
	ECHP-01026		26	1	0.28	1.3	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
	ECHP-01044		44	1	0.28	2	8	4	26.1	4.2	0.5	0.5	16.5	10.7	11	3 - 5
1	ECHP-02018		18	1	0.28	1.3	8	4	26.9	4.2	0.5	0.5	16.5	10.7	11	3 - 5
	ECHP-02026		26	1	0.28	2	10	5	26.9	4.2	0.5	0.5	16.5	10.7	11	3 - 5
2	ECHP-04009		9	2	0.28	1.3	8	4	33.5	4.2	0.5	0.5	17.3	10.7	11	4 - 6
	ECHP-04013		13	2	0.28	2	10	5	36.0	4.2	0.5	0.5	17.3	10.7	11	4 - 6
	ECHP-04026		26	1	0.39	4	19	10	36.0	4.2	0.5	0.5	17.3	12	13.6	4 - 6
3	ECHP-06006		6	3	0.28	1.3	10	5	20.7	4.2	0.5	0.5	20.7	10.7	11	5 - 7
	ECHP-06009		9	3	0.28	2	10	5	30.2	4.2	0.5	0.5	20.1	12	13.6	5 - 7
	ECHP-06017		17	2	0.39	4	19	10	41.8	4.9	0.6	0.6	20.1	12	13.6	5 - 7
5	ECHP-10010		10	2	0.43	4	19	10	44.3	5.5	0.6	0.6	20.5	12	13.6	5 - 7

4.6: TROLLEYS: GENERAL INFORMATION

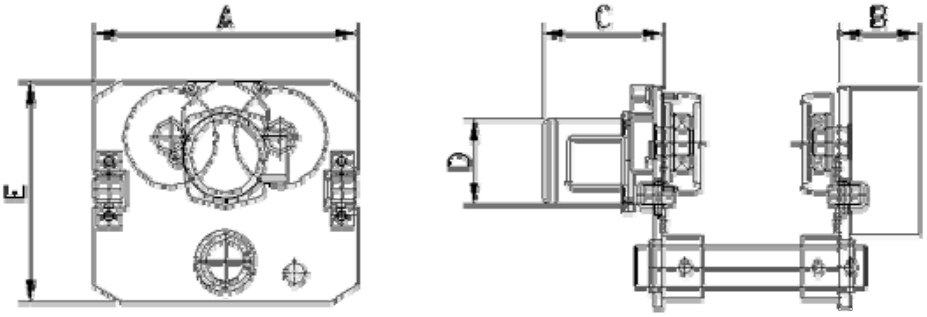
The Motorized Trolleys are designed for use with the Electric Chain Hoists. The trolleys have rugged steel side plates with anti-drop fins, steel wheel axels, steel suspension bolts, construction steel load plate seated in the middle of two suspension bolts for top hook of hoist to hook onto. The carbon steel traveling wheels suit both the I-beams and flat beams. Hardened steel gears are attached to two tack wheels and driven by a hardened steel pinion. The pinion is driven by gear reducer in high quality grease. A weather proof motor drives the gear reducer. The electric housing contains a reversing contactor and terminal boards. The 3-phase motor is always equipped with a magnetic brake over the end of the driven motor.

4.6.1: LOW HEADROOM MOTORIZED TROLLEY



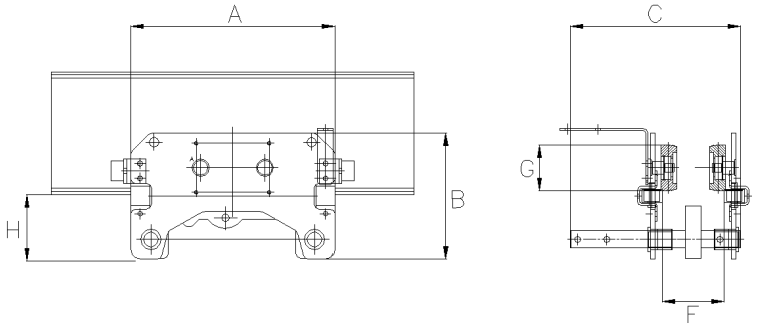
Capacity (ton)	Model Number	No. of Chain Falls	Trolley Motor						A (in)	B (in)	C (in)	D (in)	E (in)	F Flange Width Range (in)	H (in)
			50 fpm			100 fpm									
			HP	Rated Current		HP	Rated Current								
				@ 230V (amp)	@ 460V (amp)		@ 230V (amp)	@ 460V (amp)							
1/4	MT-020-1	1	0.5	1.34	0.68	0.5	1.53	0.76	16.5	11.3	8.7	4.1	12.5	4-8	5.23
1/2	MT-020-1	1	0.5	1.34	0.68	0.5	1.53	0.76	16.5	11.3	8.7	4.1	12.5	4-8	5.23
1	MT-020-1	1	0.5	1.34	0.68	0.5	1.53	0.76	16.5	11.3	8.7	4.1	12.5	4-8	5.23
2	MT-040-2	2	0.5	1.34	0.68	0.5	1.53	0.76	17.3	11.3	8.7	4.1	12.5	4-8	5.23
	MT-040-1	1	1	1.34	0.68	1	2.13	1.07	17.3	11.6	8.7	4.1	12.5	4-8	5.23
3	MT-060-3	3	1	1.34	0.68	1	2.13	1.07	20.6	11.3	8.7	4.1	12.5	4-9	5.23
	MT-060-2	2	1	1.34	0.68	1	2.13	1.07	20.0	11.4	8.7	4.9	15.2	5-10	5.72
5	MT-100-2	2	1	1.34	0.68	1	2.13	1.07	20.4	13.3	10.5	5.5	15.2	5-10	6.47

4.6.2: STANDARD MOTORIZED TROLLEY



Capacity (ton)	Model Number	No. of Chain Falls	Trolley Motor						A (in)	B (in)	C (in)	D (in)	E (in)	Flange Width Range (in)
			50 fpm			100 fpm								
			HP	Rated Current		HP	Rated Current							
				@ 230V (amp)	@ 460V (amp)		@ 230V (amp)	@ 460V (amp)						
7.5	MT-150-3	3	1	1.34	0.68	1	2.13	1.07	17.7	12.4	10.6	6.7	14.2	6 - 11
10	MT-200-4	4	2 x (1)	2 x (1.34)	2 x (0.68)	2 x (1)	2 x (2.13)	2 x (1.07)	20.1	14.7	10.9	7.9	15.1	6 - 11
15	2 x (MT-150-3)	6	2 x (1)	2 x (1.34)	2 x (0.68)	2 x (1)	2 x (2.13)	2 x (1.07)	n/a	n/a	n/a	n/a	n/a	n/a
20	2 x (MT-200-4)	8	4 x (1)	4 x (1.34)	4 x (0.68)	4 x (1)	4 x (2.13)	4 x (1.07)	n/a	n/a	n/a	n/a	n/a	n/a

4.6.3: LOW HEADROOM PUSH TROLLEY



Capacity (ton)	Model Number	Dimension (in)							
		A	B	C	D	E	F	G	H
1/4	PT-005-1	16.54	10.12	13.78	6.08	5	4-8	4.17	5.23
1/2	PT-010-1	16.54	10.12	13.78	6.08	5	4-8	4.17	5.23
1	PT-020-1	16.54	10.12	13.78	6.08	5	4-8	4.17	5.23
2	PT-040-2	17.32	10.12	13.78	6.08	5	4-8	4.17	5.23
	PT-040-1	20.00	10.87	16.93	6.08	5	4-8	4.92	5.23
3	PT-060-3	20.67	10.12	13.78	6.08	5	4-9	4.17	5.23
	PT-060-2	20.00	10.87	16.93	6.08	5	5-10	4.92	5.72
5	PT-100-2	20.47	12.68	16.93	6.46	5	5-10	5.47	6.47

4.7: TOP HOOK & BOTTOM HOOK DIMENSIONS

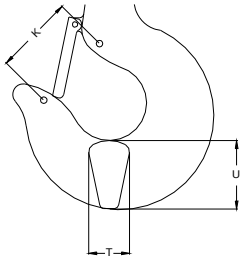
These values are nominal since the dimension is not controlled to a tolerance. The “K” dimension should be measured when the hook is new - this becomes a reference measurement. Subsequent measurements are compared to this reference to make determinations about hook deformation/stretch.

Top Hook & Bottom Hook Dimensions

“K” Measured When New:

Top:

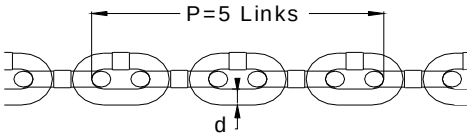
Bottom:



Capacity (Ton)	Nominal “K” Dimension (In)		“U” Dimension (In)		“T” Dimension (In)	
	Standard	Discard	Standard	Discard	Standard	Discard
1/4,1/2, 1	2.52	2.14	1.14	1.2	0.91	0.97
2	3.11	2.64	1.61	1.7	1.22	1.28
3	3.5	2.98	1.89	1.98	1.34	1.41
5	4.41	3.75	2.36	2.48	1.77	1.86
10	5.12	4.35	3.74	3.93	2.36	2.48

4.8: CHAIN WEAR DIMENSIONS

Chain Wear Dimension



Model	Capacity (Ton)	Chain Dim (In)	“P” Dimension (In)		“D” Dimension (In)	
			Standard	Discard	Standard	Discard
ECH-00518	1/4	0.28	4.13	4.34	0.28	0.25
ECH-00526						
ECH-00544						
ECH-01018	1/2					
ECH-01026						
ECH-01044						
ECH-02018	1					
ECH-02026						
ECH-04009	2					
ECH-04013						
ECH-04026		0.39	5.91	6.2	0.39	0.35
ECH-06006	3					
ECH-06009						
ECH-06017						
ECH-10010	5	0.44	6.69	7.03	0.44	0.4
ECH-15007	7 1/2					
ECH-20010	10					
ECH-30007	15					
ECH-40005	20					

5.0: PREOPERATIONAL PROCEDURES

5.1: FILL GEAR BOX WITH OIL

⚠ CAUTION ⚠

Use SAE 80W/90W brand oil. The oil is specially blended.

- For a new hoist, the correct quantity and type of oil is pre-supplied with the hoist in the gear box.
- Refer to Section 8.0 Maintenance & Handling when replacing the gear oil or checking the gear oil level (refer to *Table 5.1* for the correct amounts of Oil that each Hoist should have.

Table 5.1: Amount of Gear Oil

Capacity-Model		Liters	Quarts
¼	ECH-00518	1.1	1.06
	ECH-00526		
	ECH-00544		
½	ECH-01018		
	ECH-01026		
	ECH-01044		
1	ECH-02018		
	ECH-02026		
2	ECH-04009		
	ECH-04013		
	ECH-04026	2.3	2.43
3	ECH-06006	1.1	1.06
	ECH-06009		
	ECH-06017	2.3	2.43
5	ECH-10010		
7 ½	ECH-15007		
10	ECH-20010	2 x 2.3	2 x 2.43
15	ECH-30007		
20	ECH-40005		

5.2: CHAIN

With Chain Container: When the standard chain container is used, unfold it fully and install it on the hoist body. To place the chain into the chain container, feed the chain into the container beginning with the free end. Take care to avoid twisting or tangling the chain.
Without Chain Container: When the hoist is used without a chain container, the free end of the chain is attached to the body. In connecting the free end of the chain to the hoist body, ensure that the chain remains free of twists.

Never operate the hoist with incorrect, missing or damaged chain components; ensure that all chain components are in the correct location and properly installed.

5.2.1: LIMIT SWITCH

Lumped or twisted chain may:

- Upper Limit Switch Only: jam against the hoist body activating the friction clutch and potentially damaging the chain.
- Upper and Lower Limit Switch (Optional): activate the down limit switch and stop the hoist during lowering.

5.2.2: CHAIN CONTAINER

Each chain container indicates the maximum length of the load chain that can be stored in the container. The amount of chain the container must hold is equal to the lift on the hoist (number of chain falls and the lift determine the total amount of chain).

⚠ CAUTION ⚠

DO NOT use a chain container with a storage capacity less than the lift length on the hoist. If all of the chain can not be stored in the container, the limit switch will not operate properly.

5.2.3: CHAIN

Verify that the load chain is not twisted or tangled prior to operating the hoist. Make sure the bottom hook on the double falls models are not capsized, giving a twist in the load. If the bottom hook has capsized, restore it to normal. Never try to suspend a load on a unit with twisted chain. If the load chain is not twisted, the welded parts of the chain links are in alignment. Correct all chain irregularities before conducting the first hoist operation.

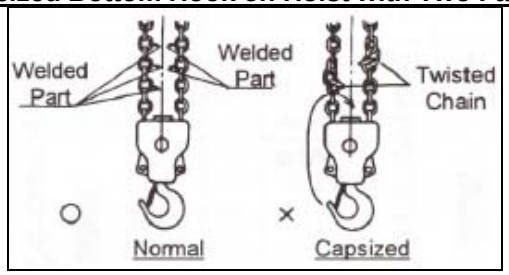
5.2.4: LUBRICATION

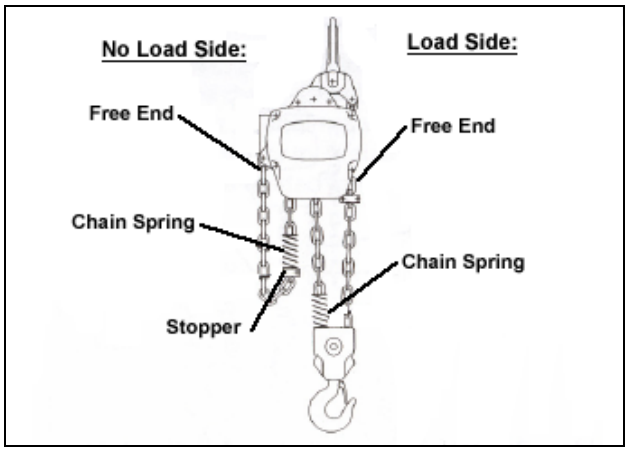
For longer life, lightly coat the chain with machine or gear oil. Ensure that the oil is applied to the bearing surfaces of the chain links. For applications in dusty environments it is acceptable to substitute a dry lube. In any case, the load chain must be inspected and maintained at regular intervals see Section 8.0.

5.2.5: PREVENT TWIST IN DOUBLE CHAIN HOISTS

If your hoist is a double chain hoist capacity, the bottom hook is suspended by two falls of the load chain. Check to be sure the bottom hook has not capsized, giving a twist in the load chain shown on *Figure 5.2.6* below. If the bottom hook has not capsized, restore it to normal. Never try to suspend a load on a unit with twisted chain. If the load chain is not twisted, the welded parts of the chain links are in alignment. See *Figure 5.2.6* below.

Figure 5.2.6: **Capsized Bottom Hook on Hoist with Two Falls of Load Chain**





5.2.6: TROLLEY INSTALLATION

"I" Beam Adjustment: Adjustment for "I" beam sizes and tolerance is done by locating the spacer washers. Beam Manufacturing tolerances allow wide variations form handbook flange widths, and slight changes to recommended washer. The specific beam on which the hoist is to be installed should be measured and trolley spacer washers adjusted as required achieving a clearance of 3/32" to 1/8".

5.3: MOUNTING LOCATION

Prior to mounting the hoist, ensure that the suspension and its supporting structure are adequate to support the hoist and its loads. If necessary consult a professional that is qualified to evaluate the adequacy of the suspension location and its supporting structure.

5.4: ELECTRICAL CONNECTIONS

⚠ CAUTION ⚠

Ensure that the voltage of the electric power supply is correct for the hoist & trolley.

⚠ WARNING ⚠

Before proceeding, ensure that the electrical supply for the hoist or trolley has been de-energized (disconnected) and locked and tagged. Lock out and tag out in accordance with ANSI Z24.1.

- Make sure all power supply components (plugs, wires, breakers, fuses, etc.) are adequately rated for the voltage and amperage draw of the hoist.

- These instructions apply to installations where the hoist is hook mounted to a fixed suspension point or installed on a manual trolley.

5.4.1: POWER SUPPLY CABLE TO TROLLEY CONTROL BOX

Connection- The connection of the Power Supply Cable to the Trolley Control Box does not use a plug and socket connector. Rather, the wires of the Power Supply Cable are hardwired to the Trolley Control Box. For specific termination information refer to the wiring diagram.

Installation- With the hoist installed on a motorized trolley the Power Supply Cable must be installed along the beam that the trolley runs on. For curved beams a special cable suspension system will be needed, and this instruction does not apply. For straight beams install Power Supply Cable as follow:

- Install a guide wire system parallel tot eh beam.

If a longer Power Supply Cable is required, the cable used must be selected and sized properly. This is to ensure that the motor terminal voltage remains within ±5% of the motor's nameplate data.

5.4.2: CONNECTION TO ELECTRICAL POWER SOURCE

This instruction applies to the connection of the Power Supply Cable to the Electrical Power Source.

Wiring:

The red, white, and black wires of the Power Supply Cable should be connected to the Electrical Power Disconnect Switch. This connection should be made so that the hoist is phased properly. **If the phasing of the power to the hoist is not correct, the hoist will not operate. If this happens, disconnect and swap any two of the three wires, then re-connect.**

Grounding:

⚠ DANGER ⚠

An improper or insufficient ground connection creates an electrical shock hazard when touching any part of the hoist or trolley.

In the Power Supply Cable the ground wire will be either Green and Yellow striped or solid Green. It should always be connected to a suitable ground connection. Do not paint the trolley wheel running surfaces of the beam as this can affect grounding.

5.5: Frequency Drive Setup (VFD)

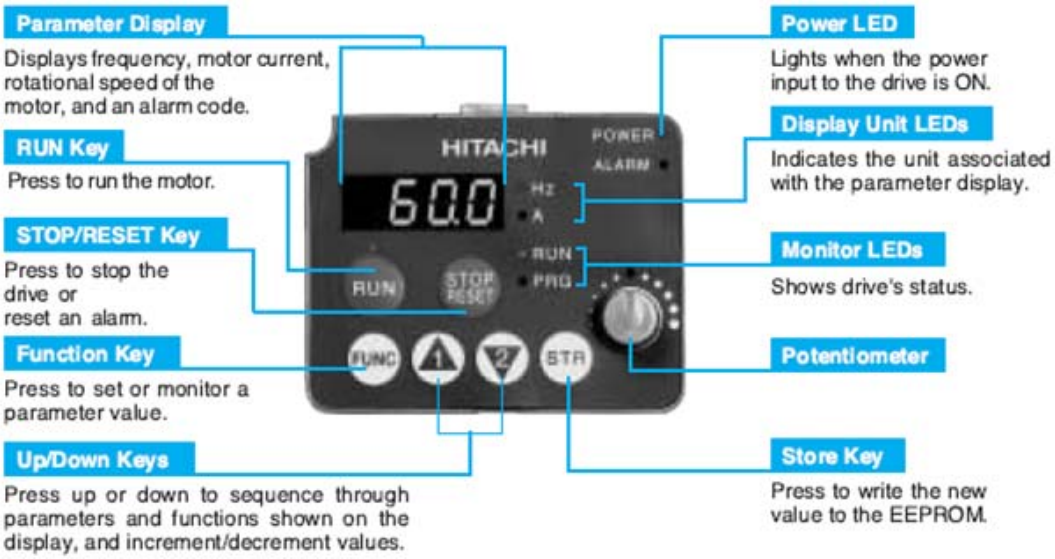
⚠ DANGER ⚠

To avoid a shock hazard, **DO NOT** perform **ANY** mechanical or electrical maintenance on the dual speed (VFD Control) trolley or hoist within 5 minutes of de-energizing (disconnecting) the trolley or hoist. This time allows the interval VFD capacitor to safely discharge.

⚠ WARNING ⚠

DO NOT remove power to the dual speed VFD Control hoist or trolley during operation.

- Some dual speed hoists could be equipped with VFD. The VFD is used to control the high and low lifting speeds. The speeds come preset from the factory (Speed Ratio: 6:1). Speed (frequency) can be customized.
- Some trolleys could be equipped with a VFD. The VFD will be set up for infinitely speed control.
- The VFD is controlled by a Keypad/Display Interface. Refer to *Figure 5-5* for Keypad/Display Interface functions and descriptions.



5.6: PREOPERATIONAL CHECKS & TRIAL OPERATION

- Confirm the adequacy of the rated capacity for all slings, chains, wire ropes and all other lifting attachments before use. Inspect all load suspension members for damage prior to use and replace or repair all damaged parts.
- Verify and correct all chain irregularities prior to operating the hoist.
- Record the hoist's Model Number & Serial Number from the tag plate on the hoist, in the space provided in this manual under: Ordering Spare Parts
- Ensure that the hoist is properly installed to either a fixed point, or trolley, whichever applies.
- If hoist is installed on a trolley, ensure that:
  - Trolley is properly installed on the beam, and
  - Stops for the trolley are correctly positioned and securely installed on the beam.
- Ensure that all nuts, bolts and split pins (cotter pins) are sufficiently fastened.
- Pull down the Pendant and ensure that the Strain Relief Cable take the force, not the Pendant Cord.
- Check supply voltage before everyday use. If the voltage varies more than 10% of the rated value, electrical devices may not function normally.
- Confirm proper operation:
  - Before operating ensure that the hoist (and trolley) meets the Inspection, Testing and Maintenance requirements of ANSI/ASME B30.16.
  - Before operating, ensure that nothing will interfere will the full range of the hoist's (and trolley's) operation.
- The hoist MUST be connected to the power source such that its direction of operation corresponds to the up-and-down commands issued from the pendant control; i.e. pushing the up button must cause the hoist to rise. If the hoist does not operate correctly, shut off and lockout/tag out the main power source to correct the hoist's motor phasing.

6.0: OPERATION

6.1: GENERAL

The operation of an overhead hoist involves more than activating the hoist's controls. The use of an overhead hoist is subject to certain hazards that cannot be lessened by engineered features, but only with intelligence, care, common sense, and experience in anticipating the effects and results of activating the hoist's controls; refer to ANSI/ASME B30. Use this guidance in conjunction with other warnings, cautions, and notices in this manual to run the operation and use your hoist.

⚠ DANGER ⚠

DO NOT WALK UNDER A SUSPENDED LOAD

⚠ WARNING ⚠

Hoist operators shall be required to read the operation section of this manual, the warnings contained in this manual, instruction and warning labels on the hoist or lifting system, and the operation sections of ANSI/ASME B30.16 and ANSI/ASME B30.10. The operator shall also be required to be familiar with the hoist and hoist controls before being authorized to operate the hoist or lifting system.

Hoist operators should be trained in proper rigging procedures for the attachment of loads to the hoist hook.

Hoist operators should be trained to be aware of potential malfunctions of the equipment that require adjustment or repair, and to be instructed to stop operation if such malfunctions occur, and to immediately advise their supervisor so corrective action be taken.

Hoist operators should have normal depth perception, field of vision, reaction time, manual dexterity, and coordination.

Hoist operators should not have a history of or be prone to seizures, loss of physical control, physical defects, or emotional instability that could result in actions of the operator being a hazard to the operator or to others.

Hoist operators should not operate a hoist or lifting system when under the influence of alcohol, drugs, or medication.

Note: Overhead hoists are intended only for vertical lifting service of freely suspended unguided loads, do not use hoist for loads that are not lifted vertically, loads that are not freely suspended, or loads that are guided.

NOTICE

Read ANSI/ASME B30.16 and ANSI/ASME B30.10.
Read the hoist manufacturer's operating and maintenance instructions.
Read all labels attached to equipment.

6.2: DO'S AND DO NOT'S FOR OPERATION

⚠ WARNING ⚠

Improper operation of a hoist and/or trolley can create a potentially hazardous situation which, if not avoided, could result in death or serious injury, and substantial property damage, to avoid such a potentially hazardous situation THE OPERATOR SHALL:

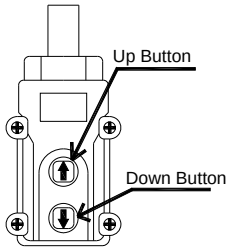
- NOT lift more than rated load for the hoist and trolley.
- NOT operate unless load is centered under hoist and trolley.
- NOT use damaged hoist or trolley that is not working properly.
- NOT use hoist with twisted, kinked, damaged, or worn chain.
- NOT use hoist if the bottom hook is capsized.
- NOT use the hoist to lift, support, or transport people.
- NOT lift loads over people.
- NOT apply load unless load chain is properly seated in the load sheave (and idle sheave for hoist with two chain falls).
- NOT use the hoist or trolley in such a way that could result in shock or impact loads being applied to the hoist or trolley.
- NOT attempt to lengthen the load chain or repair damaged load chain.
- NOT operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
- NOT use load chain as a sling or wrap load chain around load.
- NOT operate a hoist or trolley on which the safety placards or decals are missing or illegible.
- NOT apply the load to the tip of the hook or to the hook latch.
- NOT apply load if binding prevents equal loading on all load-supporting chains.
- NOT operate beyond the limits of the load chain travel.
- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Make sure hook travel is in the same direction as shown on controls.
- Make sure the hook latches are closed and not supporting any parts of the load.
- Make sure the load is free to move and will clear all obstructions.
- Use the hoist manufacture's recommended parts when repairing the unit.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- NOT operate hoist with missing/damaged chain spring, cushion rubber, stoppers or striker plates.
- NOT leave load supported by the hoist unattended unless specific precautions have been taken.
- NOT allow the chain, or hook to be used as an electrical or welding ground.
- NOT allow the chain, or hook to be touched by a live welding electrode.
- NOT remove or obscure the warnings on the hoist or trolley.
- Be familiar with operating controls, procedures, and warning.
- Make sure the unit is securely attached to a suitable support before applying load.
- Take up slack carefully – make sure load is balanced and load-holding action is secure before continuing.
- Anticipate the stopping point and allow trolley to coast to a smooth stop. Reversing or plugging to stop trolley causes overheating of motor and swaying of the load.
- Make sure all persons stay clear of the supported load.
- Protect the hoist's load chain from weld splatter or other damaging contaminants.
- Report malfunctions or unusual performances (including unusual noises) of the hoist/trolley and remove the hoist/trolley from service until the malfunction or unusual performance is resolved.
- Make sure hoist limit switches function properly.
- Warn personnel before lifting or moving a load.
- Warn personnel of an approaching load.
- Inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
- Avoid swinging the load or hook.
- Lubricate load chain per hoist manufacturer's recommendations.
- NOT use limit switches as routine operating stops. They are emergency devices only.
- NOT use the hoist load limiting or warning device to measure load.
- NOT allow your attention to be diverted to sharp contact with other hoists, structures, or objects through misuse.
- NOT adjust or repair the hoist and/or trolley unless qualified to perform such adjustments or repairs.

⚠ CAUTION ⚠

IMPROPER OPERATION OF A HOIST CAN CREATE A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.

6.3: HOIST CONTROLS

- For hoists mounted to motorized trolleys follow the control instructions.
- *Single Speed Pendant Contro*l- When using the pendant control depresses the up button to raise the hoist or the down button to lower the hoist as shown in the Figure below. To stop motion, release the buttons.
- *Dual Speed Control*- Pendant controls supplied with dual speed hoists have two-step control buttons. For low speed depress the button to the first step and for high speed depress the button fully to the second step. Use the up button to raise the hoist or the down button to lower the hoist as shown in the Figure below. To stop motion release the buttons.



Push Button Pendant Control

7.0: INSPECTION

7.1: GENERAL

The inspection procedure herein is based on ANSI/ASME B30.16. The following definitions are from ANSI/ASME B30.16 and pertain to the inspection procedure below.

- *Designated Person* – a person selected or assigned as being competent to perform the specific duties to which he/she is assigned.
- *Qualified Person* – a person who, by possession of recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.
- *Normal Service* – Service which involves operating at less than a certain percentage of rated load and less than an unspecified frequency. Refer to the ANSI/ASME 30 volume for the specific definition of your application.
- *Heavy Service* – Service which involves operation within the rated load limit which exceeds normal service.
- *Severe Service* – Service which involves normal to heavy service with abnormal operating conditions.

7.2: INSPECTION CLASSIFICATION

Initial Inspection: prior to initial use, all new, altered, or modified hoists shall be inspected by a designated person to ensure compliance with the applicable provisions of this manual.

Inspection Classification: the inspection procedure for hoists in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependant upon the nature of the critical components of the hoist and degree of their exposure to wear, deterioration, or malfunction.

The two general classifications are herein designated as FREQUENT and PERIODIC, with respective intervals between inspections as defined below.

7.2.2: FREQUENT INSPECTIONS

Frequent/Daily inspections are visual examinations by the operator or other designated personnel with interval per the following criteria.

- Normal Service – Monthly
- Heavy Service – Weekly to Monthly
- Severe Service – Daily to Weekly
- Special or Infrequent Service – As recommended by a qualified person before and after each occurrence.

7.2.3: PERIODIC INSPECTIONS

Periodic Inspections are visual inspection by a designated person with intervals per the following criteria:

- Normal Service – Yearly
- Heavy Service – Semiannually
- Severe Service – Quarterly
- Special or Infrequent Service – As recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.

7.3: FREQUENT INSPECTION

Frequency Inspection: Inspection should be made on a frequent basis in accordance with *Table 7.3* "Frequent Inspection". Included in these frequent inspections are observations made during operation for any defects or damage that might appear between periodic inspections. Evaluation and resolution of the results of frequent inspections shall be made a designated person such that the crane is maintained in safe working condition.

Table 7.3: Frequent Inspection
All functional operating mechanisms for maladjustment, and unusual sounds.
Operation of limit switch and associate components
Hoist braking system for proper operation
Hoist(s) in accordance with ANSI/ASME B30.10
Hook latch operation
Load chain in accordance with the Inspection Methods and Criteria Chart
Load chain reeving for compliance

7.4: PERIODIC INSPECTION

Periodic Inspection: Inspection should be made on periodic basis in accordance with *Table 7.4* "Periodic Inspections". Evaluations and the result of the result of periodic inspection shall be made by a certified person such that the crane is maintained in safe working condition. For inspection where load suspension parts of the hoists are disassembled, a load test per ANSI/ASME B30.16 must be performed on the hoist after it is re-assembled and prior to its return to service.

Table 7.4: Periodic Inspection
Requirement of frequent inspection.
Evidence of loose bolts, nuts, or rivets
Evidence of worn, corroded, cracked, or distorted part such as load blocks, suspension housing, chain attachments, devises, yokes, suspension bolts, shafts, gears, bearings, pins, and rollers.
Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining members.
Evidence of damage or excessive wear of load and idler sheaves.
Evidence of excessive wear on motor or load brake
Electrical apparatus for signs of pitting or any deterioration of visible controller contacts.
Evidence of damage of supporting structure or trolley, is used.
Function labels on pedant control station for legibility.
Warning label properly attached to the hoist and legible.
End connections of load chain.

7.5: DAILY INSPECTION

DAILY INSPECTION	
INSPECTION ITEM	**DESCRIPTION OF INSPECTION CHECK POINTS**
Tagged Hoist/Trolley	Check that hoist/trolley is not tagged with an out of order sign.
Control Devices	Check that all travel motions agree with control device markings. When checking hoist travel motion, always use the lifting or up control first.
Brakes	Check that all travel motions do not have excessive drift and that stopping distances are normal.
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twist.
Hook Latch	Check that hook latch, if provided, is not missing and that it operates properly.
Load Chain	Check for nicks gouges, and any type of deformation or damage to the chain. Check for lubrication of load chain.
Reeving	Check that load chain is properly reeved, that load chain is not kinked or twisted, and that load chain parts are not twisted about each other.
Limit Devices	Check that primary upper limit device stops lifting motion of the hoist load block at the upper limit of travel.
Oil or Grease Leakage	Check for any sign of oil or grease leakage on the hoist and on the floor area beneath the hoist.
Unusual Sounds	Check for any unusual sounds from the hoist and hoist mechanism while operating the hoist.
Capacity, Warning and Safety	Check the capacity, warning and other safety labels are not missing and safety labels that they are legible.

7.6: OCCASIONALLY USED HOISTS

Hoists that are used frequently shall be inspected as follows prior to placing in service:

- *Hoist Idle more than 1 month, less than 1 year*: Inspect per FREQUENT inspection criteria.
- *Hoist Idle more than 1 year*: Inspect per PERIODIC Inspection criteria.

7.7: INSPECTION RECORDS

Dated inspection reports and records should be maintained at time intervals corresponding to those that apply for the hoist's PERIODIC interval. These records should be stored where they are available to personnel involved with the inspection, maintenance, or operation of the hoist.

A long-range chain inspection program should be established and should include records of examination of chains removed from service so a connection can be established between visual observation and actual condition of the chain.

7.8: INSPECTION METHODS & CRITERIA

This section covers the inspection of specific items. The list of items in this section is based on those listed in ANSI/ASME B30.16 for the Frequent and Periodic Inspection. In accordance with ANSI/ASME B30.16, these inspections are not intended to involve disassembly of the hoist. Rather, disassembly for further inspection would be required if frequent or periodic inspection results indicated to do so. A qualified person, trained in the disassembly and re-assembly of the hoist, should only perform such disassembly and further inspection.

Hoist Inspection Methods and Criteria			
Item	**Method**	**Criteria**	**Action**
Functional operating mechanisms.	Visual, Auditory	Mechanisms should be properly adjusted when operated and should not produce unusual sounds	Repair or replace as required.
Limit Switch	Function	Proper operation. Actuation of limit switch should stop hoist.	Repair or replace as required
Limit Lever Assembly	Visual, Function	Lever should not be bent or significantly worn and should be able to move freely.	Replace
Braking System Operation	Function	Braking distance with rated capacity exceed 3% of the lifting speed (approximately two chain links)	Repair or replace as required.
Hooks - Surface Condition	Visual	Should be free of significant rust; weld splatter, deep nicks, or gouges.	Replace.
Hooks – Fretting wear	Measure	The "U" and “T” dimensions should not be less than discard value listed in Table 5-4	Replace
Hooks - Stretch	Measure	The "K" dimension should not be greater than 1.15 times that measured and recorded at the time of purchase (See Table 5-4)	Replace.
Hooks - Bent Shank or Neck	Visual	Shank and neck portions of hook should be free of deformations.	Replace.
Hooks - Yoke Assembly	Visual	Should be free of significant rust; weld splatter, nicks, gouges. Holes should not be elongated. Fasteners should not be loose, and there should be no gap between mating parts.	Tighten or replace as required
Hooks- Swivel Bearing	Visual, Function	Bearing parts and surfaces should not show significant wear, and should be free of dirt, grime and deformations. Hook should rotate freely with no roughness.	Clean/ lubricate, or replace as required
Hooks - Idle Sheave and Axle (Bottom Hook on Double Fall Hoist)	Visual, Function	Pockets of idle sheave should be free of significant wear. Idle sheave surfaces should be free of nicks, gouges, dirt and grime. Bearing parts and surfaces of idle sheave and axle should not show significant wear. Idle sheave should rotate freely with no roughness or significant free play.	Clean/ lubricate, or replace as required
Hooks – Hook latches	Visual, Function	Latch should not be deformed. Attachment of latch to hook should not be loose. Latch spring should not be missing and should not be weak. latch movement should not be stiff - when depressed and released latch should snap smartly to its closed position	Replace
Load Chain surface Condition	Visual	Chain should be free of rust, nicks, gouges, dents and weld splatter. Links should not be deformed and should not show signs of abrasion. Surfaces where links bear on one another should be free of significant wear	Replace

Hoist Inspection Methods and Criteria			
Item	**Method**	**Criteria**	**Action**
Load Chain- Pitch and Wire Diameter	Measure	The "P" dimension should not be greater *than* maximum value listed in Table 5-5. The dimension should not be less than minimum value listed in Table 5-5.	Replace. Inspect load Sheave and idle Sheave for double fall hoists
Load Chain Lubrication	Visual, Auditory	Entire surface of each chain link should be free of dirt and grime. Chain should not emit cracking noise when hoisting a load	Clean/ Lubricate (See Section 2.4)
Load Chain- Revving	Visual	Chain should be revved through load sheave (and idle sheave *for* double fall hoist. Chain, chain springs, cushion rubbers, striker plates and stoppers should be installed properly	Reeve/ Install chain properly
Housing and Mechanical Components	Visual, Auditory, Vibration Function	Hoist components including load blocks suspension housing, chain attachments, clevises, yokes, suspension bolts, shafts, gears bearings pins and rollers should be free of cracks, distortion, significant wear and or corrosion. Evidence of it can be detected visually or via detection of unusual sounds. Or vibration during operation	Replace
Bolts, Nuts Rivets	Visual, Check with Proper Tool	Bolts, nuts and rivets should not be loose.	Tighten and as required or replace
Motor Brake	Measure, Visual	Motor brake gap should be adjusted to the distance before measuring the brake wear. Brake lining dimension A should not be less than discard value listed. Procedures. Breaking surfaces should be clean, free of grease/oil and should not be glazed	Adjust, Repair or Replace as required.
Contactor Contacts	Visual	Contacts should be free of significant pitting or deterioration.	Replace.
Load Sheave	Visual	Pockets of Load Sheave should be free of significant wear.	Replace.
Cushion Rubber	Visual	Should be free of significant deformation	Replace.
Chain Springs	Visual	Chain springs should not be deformed or compressed.	Replace.
Pendant - Switches	Function	Depressing and releasing push buttons should make and break contacts in switch contact block and result in corresponding electrical continuity or open circuit. Push buttons should be interlocked either mechanically or electrically to prevent simultaneous energizing of circuits for opposing motions (e.g. up and down).	Repair or replace as necessary.
Pendant - Housing	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps	Replace.
Pendant - Wiring	Visual	Wire connections to switches in pendant should not be loose or damaged.	Tighten or repair
Pendant - Cord	Visual, Electrical Continuity	Surface of cord should be free from nicks, gouges, and abrasions. Each conductor in cord should have 100% electrical continuity even when cord is flexed back-and-forth. Pendant Cord Strain Relief Cable should absorb the entire load associated with forces applied to the pendant.	Replace.
Pendant - Labels	Visual	Labels denoting functions should be legible	Replace.
Warning Labels	Visual	Warning Labels should be affixed to the hoist and they should be legible.	Replace.

Hoist Inspection Methods and Criteria			
Item	**Method**	**Criteria**	**Action**
Hoist Capacity Label	Visual	The label that indicates the capacity of the hoist should be legible and securely attached to the hoist.	Replace.

8.0: MAINTENANCE & HANDLING

8.1: LUBRICATION

Whenever the hoist shows evidence of an oil leak, the oil level must be checked and brought to proper level. The cause of the leak should also be investigated and resolved.

Lubrication Chart		
Description	*Lubrication*	*How Often*
Trolley Motor Reducing Gearbox	Lubricate with Cosmo No. 3 grease (equivalent to: Shell Unedo 3, Exxon Eastan 3, Mobil Cup Grease 3) for good maintenance. **Note:** Change after first 100 hours of operation.	Change every 6 months or 2500 hours.
Trolley Track Wheel and Pinion	Lubricate track wheel gear and pinion with grease or graphite grease.	Once a month
Load Chain	Lubricate lightly with Lubriplate Bar and Chain Oil 10-R. **Note:** Do not use grease to lubricate the chain.	Weekly or more frequently depending on severity of service.
Hoist Motor Gearbox	Fill with SAE 80W/90W lubricating oil. **Note:** Change after first 500 hours of operation. Do not fill above oil level hole as this will cause leakage.	Check oil level and top off every 6 months. Change oil at least every 3 years.

8.1.1: LOAD CHAIN

- For a longer life, the load chain should be lubricated.
- The load chain lubrication should be accomplished after cleaning the load chain with an acid free cleaning solution.
- Apply industrial general lithium grease, NLGI No. 0, to the bearing surfaces of the load chain links. Also apply the grease to the areas of the load chain that contact the load sheave. Insure that the grease is applied to the contact areas in the load sheave pockets.
- Machine or gear oil may be used as an alternative lubricant but must be applied more frequently.
- The chain should be lubricated every 3 months (more frequently for heavier usage or severe conditions).
- For dusty environments, it is acceptable to substitute a dry lubricant.

8.1.2: HOOKS AND SUSPENSION COMPONENTS

- *Hooks* – Bearings should be cleaned and lubricate at least once per year for normal usage. Clean and lubricate more frequently for heavier usage or severe conditions.

- *Suspension Pins* – Lubricate at least twice per year for normal usage; more frequently for heavier usage or severe conditions.

8.1.3: GEAR BOX

- Using an incorrect type/grade of gearbox oil or wrong quantity of oil may prevent the friction clutch from working properly and may affect the ability of the hoist to hold the load.
- The oil level hole is in the side of the casing. The oil drain plug is the bolt in the underside of the gearbox casing. The oil plug is the eye bolt in the upper side of the gearbox casing. Do not fill above oil level hole, as this will cause oil leakage.
- Change the oil after the first 500 operating hours. Thereafter, check oil level every six months and top up as necessary. The oil should be changed at least every 3 years.
- The oil should be changed more frequently depending on the hoist's usage and operating environment.
- Replace the drain plug and refill the gear case with the correct quantity of new oil or unit the oil.
- Dispose of the used oil in accordance with local regulations.

8.2: MOTOR BRAKE

8.2.1 HOIST MOTOR BRAKE

To keep your hoist working in optimum condition and prevent possible down time, it is recommended to check your motor brake lining and adjustment at regular intervals.

Inspection and adjustment of the motor brake requires removal of the motor brake unit from the hoist as an assembly. But first, be sure the power is off, the hoist is unloaded and the load chain is secured.

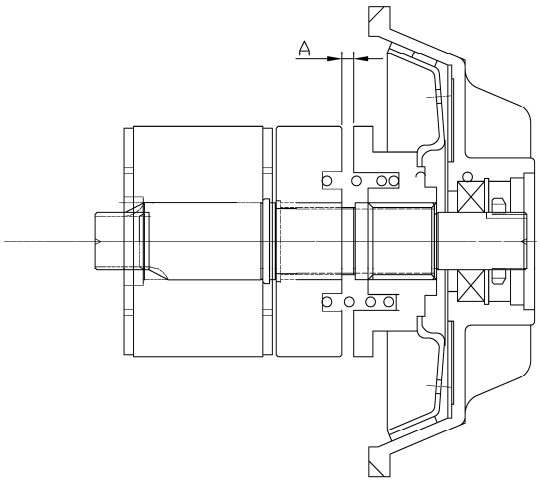
⚠ CAUTION ⚠

Before proceeding disconnect the power supply and make sure the hoist is unloaded. To keep the load chain from moving, secure it by tying together the load and no-load sides directly under the hoist using a cord or wire.

- *Motor Brake Unit Removal*: Adjustment and inspection of the motor brake requires removal of the motor brake unit from the hoist as an assembly.
    - Remove the four Fan Cover Bolts, Fan Cover, Fan snap ring and Fan washer.
    - Pull the Fan off the motor shaft off the motor shaft using a wheel puller is necessary.
    - Remove the four Motor Cover Assembly bolts and carefully pull the motor brake unit out of the hoist.

- *Brake Gap*: The brake gap should be measured between the Brake Drum and Pull Rotor. Adjustment of the Brake Gap is accomplished by turning the Adjustment Nut in the center of the Motor Cover.

Motor Brake Gap (Hoist Motor)

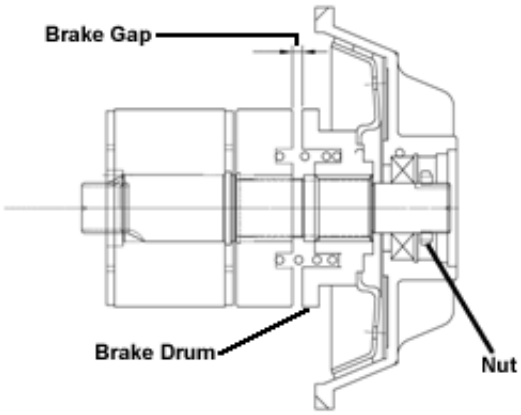


Brake must be properly adjusted the gap "A"

Hp	"A" Dimension – (In) Adjustment Range	Brake Disc Thickness	
		Nominal	Replace
1.3	0.03-0.05	0.14	0.09
2.0		0.23	0.19
4.0		0.23	0.19

- Remove the four Fan Cover Bolts, Fan Cover, Fan snap ring and Fan washer.
- Bend the tab of the Lock Washer away from the Adjusting Nut so that the Adjusting Nut can be rotated.
- Using a spanner wrench and a feeler gauge, rotate the Adjusting Nut to attain the proper Brake Gap.
- After Brake Gap is set, secure the Adjusting Nut by bending one of the tabs of the Lock Washer into a slot in the Adjusting Nut. If necessary rotate the Adjusting Nut clockwise (tightening) to line up the tab with the slot.
- If the proper brake adjustment cannot be achieved, disassemble the motor brake and inspect all motor brake parts. Replace the Brake Drum and/or Motor Cover if necessary.

Figure 8.2.-B: **Brake Gap**



- *Brake Lining inspection*: the brake lining is designed for a long life and should provide years of trouble-free service. If the brake lining is being inspected due to excessive load chain drift during operation, disassemble the motor brake and inspect all motor brake parts. Braking surfaces should be clean, free of grease/oil and should not be glazed. Replace the Brake Drum and/or Motor cover if necessary. For normal inspections, the Brake Lining and Motor Cover wear should be measured.

- *Motor Brake Unit Installation*: After the brake is properly adjusted and inspected, carefully replace the motor brake unit back into the hoist. Be sure to reseal the motor Cover to motor frame surface using a small bead of liquid (hi-temperature) sealant or use a gasket.

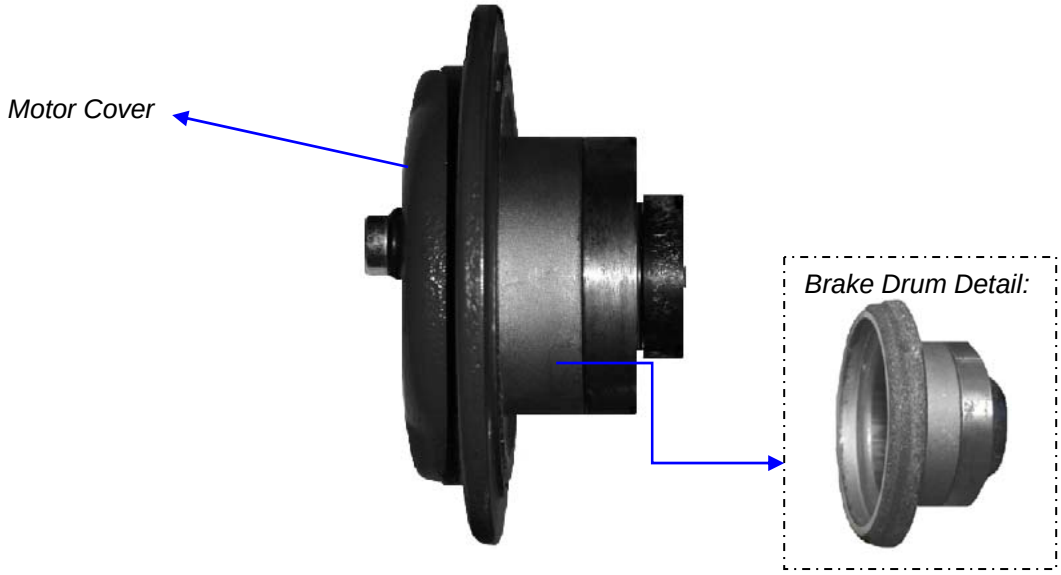
8.2.2 TROLLEY MOTOR BRAKE

⚠ CAUTION ⚠

Before proceeding disconnect the power supply and make sure the hoist/trolley is unloaded. To keep the load chain from moving, secure it by tying together the load and no-load sides directly under the hoist using a cord or wire.

- *Motor Brake Unit Removal*: Inspection of the motor brake requires removal of the motor brake unit from the trolley as an assembly.
  - Remove the four bolts that attach the motor cover to the motor frame.
  - Remove the Motor Cover, brake components and stator.

- Brake *Lining Inspection*: The brake lining is designed for a long life and should provide years of trouble-free service. If the brake lining is being inspected due to excessive trolley drift during operation, disassemble the motor brake and inspect all motor brake parts. Braking surfaces should be clean, free of grease/oil and should not be glazed. Replace the brake drum and/or motor cover if necessary. For normal inspection, the brake lining and motor cover wear should be measure as follows
  - Refer to following table

Motor Brake Gap		
		
Hp	**Trolley Motor**	
	Brake Lining Thickness (inches)	
	Standard	**Discard**
0.5 Hp	0.115	0.100
1.0 Hp	0.124	0.091

- Measure the distance “A” using caliper and a straight edge. Make sure the brake drum is square against the motor cover. Place the straight edge of the brake drum and measure from the straight edge to the mounting face of the Remove the Motor Cover
- Compare the measurement with the values listed in above table. Replace the brake drum and/or motor cover if “A” is smaller than the discard limit.
- Trolley brake is not adjustable

- *Motor brake installation:* After the brake is inspected, carefully place the stator and brake components into the motor frame. Be sure to put back the gasket. Install the motor cover attachment bolts.

8.3: LOAD CHAIN REPLACEMENT

⚠ CAUTION ⚠

The hoist must be properly installed and operational in order to perform the following procedures.

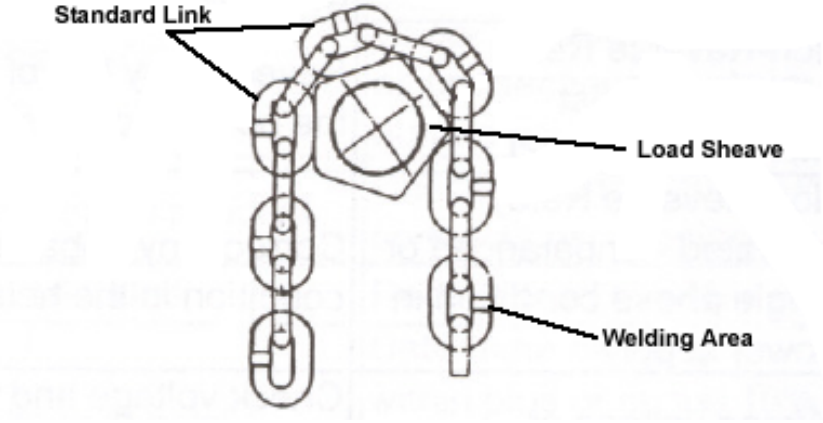
- Load chain and hand chain should be kept clean. Clean the chain with acid-free cleaning solution.
- Lubrication- for normal use coat load chain lightly with machine oil or gear oil. Under dusty or abrasive conditions, use a dry lubricant.

⚠ WARNING ⚠

Be certain that the replacement chain is obtained from ACI Hoist & Crane and is exact size, grade, and construction as the original chain. The new load chain must have an odd number of links so that both its end links have the same orientation. If the load chain is being replaced due to damage or wear our, destroy the old chain to prevent its reuse.

- When replacing the load chain, check for wear on mating parts, i.e. Load Sheave, Chain Guides and Idle Sheave, and replace parts if necessary.
- Remove all chain components including the Bottom Hook Assembly, Stoppers, Cushion Rubbers, Chain Springs, Striker Plates, Chain pin and End Wire from the chain for reuse on new chain. Inspect and replace any damaged or worn parts.
- Attach the new chain to the end link of the old chain on the no-load side. The end link of the new load chain should be connected so that the welded portions of the load chain's standing links are oriented to the outside as they pass over the sheave.
- Operate the hoist down to move the chain though the hoist body. Stop when a sufficient amount of new chain is accumulated on the load side.
- Single fall hoists: Attach the chain components to the chain.
- Double falls: Feed the end link on the load side of the new chain through the required chain components and the bottom hook's Idle Sheave. Attach the remaining chain components to the chain. Connect the end link to the top connection yoke with the chain pin, slotted nut and cotter pin. Ensure that chain remains free of twists.
- Threading the load chain on to the hoist's load sheave is made easier by using a short length of chain with an open link on one end. This short length of chain (pilot chain) is first placed on the hoist's load sheave during reassembly of the hoist. It must be oriented so that the open link id NOT a standing link (see *Figure 8.3-A*). The load chain must have an odd number of links so that both its end links have the same orientation. After the hoist reassembly is complete the pilot chain can be used to thread the load chain on to the load sheave. The end link of the load chain is connected to the open link of the pilot chain so that the welded portions of the load chain's standing link are oriented to the outside as they pass over the sheave-refer to *Figure 8.3-A*. The pilot chain is then used to pull the load chain through the hoist and on to the hoist's load sheave. The pilot chain is then disconnected from the load chain and discarded.

Figure 8.3-A: **Threading Chain through Hoist's Load Sheave**



⚠ WARNING ⚠

Make sure Stoppers, springs and Plates are properly installed.

- After installation has been completed, perform steps outlined in "Pre-Operational Checks".

8.4: FRICTION CLUTCH

Friction Clutch: If abnormal operation or slippage occurs do NOT attempt to disassemble or adjust the Friction Clutch. Replace the worn or malfunctioning Friction Clutch as an assembly with a new, factory adjusted part.

8.5: STORAGE

The storage location should be clean and dry.

8.6: OUTDOOR INSTALLATION

- For hoist installations that are outdoors, the hoist should be covered when not in use. Rain covers, sealed (Nema 4) push button and zinc plated load chain could be recommended for specific cases. Consult ACI for further information.
- Possibility of corrosion on components of the hoist increases for installations where salt air and high humidity are present. Make frequent and regular inspections of the unit's condition and operation.

9.0: TROUBLESHOOTING

⚠ DANGER ⚠

Before proceeding, ensure that the electrical supply for the hoist or trolley has been de-energized (disconnected) and locked and tagged. Refer to ANSI Z244.1, Personal Protection- Lockout/Tag out of Energy Sources. Only qualified electrician should perform these steps.

Troubleshooting and Remedial Action		
SITUATION	**CAUSE**	**REMEDY**
Hoist will not operate	☐ Blown power fuses or tripped power circuit breaker. ☐ Blown control circuit fuses. ☐ Broken/disconnected power or control circuit wire. ☐ Low supply voltage. ☐ Motor hums but does not rotate. ☐ Faulty contactor. ☐ Faulty VFD (dual speed, if applicable)	☐ Check supply requirements and refuse/reset breaker to meet requirements. ☐ Check fuses for correct rating and replace ☐ Locate and repair/reconnect. ☐ Check if 10% reduction in voltage has mains supply checked. ☐ Check phases to motor- insulate and repair. ☐ Operate manually if hoist runs then control circuit/coil is faulty- locate fault and repair. If hoist does not run then check main supply. If input supply is correct but there is a faulty output supply then replace the contactor. ☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Hoist will not stop	☐ Welded contacts in contactor ☐ Faulty VFD (dual speed, if applicable)	☐ Replace contactor ☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Brake slips	Brake needs adjustment	See table 4-6
Hoist runs but does not lift	☐ Clutch slipping ☐ Faulty VFD (dual speed, if applicable)	☐ Contact ACI Hoist & Crane; this adjustment needs to be carried out on a test rig. ☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Trolley does not operate in either direction	☐ Power failure at trolley ☐ Phase error (single phase) ☐ Control circuit ☐ Wrong voltage or frequency ☐ Low voltage ☐ Excessive load ☐ Faulty VFD (infinitely speed setup, if applicable)	☐ Main line or branch circuit fuses blown or tripped. Check for ground or connect supply lines or current collectors. Replace or reset. ☐ Grounded or connected one line of supply system (collectors, trolley wiring, reversing contactor, motor leads or windings). Check for electrical continuity. ☐ Check for shorted windings in transformer or reversing contactor coil. A loose connection or broken wire in circuit. Mechanical binding in contactor. The control station switch contacts not making contact. Check continuity and repair or replace defective parts. ☐ Check that the voltage and frequency are the same as shown on the trolley control box. ☐ Check the control power supply. Standard not to exceed ±10% can cause damage to the motor. ☐ Prevent overloading the rated load of the trolley. ☐ Check fault codes (see Section 12: Appendix A). Replace as needed.

Troubleshooting and Remedial Action		
SITUATION	**CAUSE**	**REMEDY**
Trolley operates in one direction only	☐ Control circuit	☐ Check for shorted windings in transformer or reversing contactor coil. A loose connection or broken wire in circuit. Mechanical binding in contactor. The control station switch contacts not making contact. Check continuity and repair or replace defective parts.
	☐ Faulty VFD (infinitely speed setup, if applicable)	☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Trolley operates sluggishly	☐ Excessive load	☐ Prevent overloading the rated load of the trolley.
	☐ Low voltage	☐ Check the control power supply. Standard not to exceed ±10% can cause damage to the motor.
	☐ Worn or dirty rail	☐ Clean rails and inspect for worn spots.
	☐ Faulty VFD (infinitely speed setup, if applicable)	☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Trolley motor overheats	☐ Excessive load	☐ Prevent overloading the rated load of the trolley.
	☐ Low voltage	☐ Check the control power supply. Standard not to exceed ±10% can cause damage to the motor.
	☐ Extreme external heating	☐ Keep above an ambient temperature of 40ºC. Check to ensure proper space ventilation and shield the trolley from heat radiation.
	☐ Frequent starting or reversing	☐ Avoid excessive inching, jogging or plugging.
	☐ Phase error	☐ Grounded or connected one line of supply system (collectors, trolley wiring, reversing contactor, motor leads or windings). Check for electrical continuity.
	☐ Faulty VFD (infinitely speed setup, if applicable)	☐ Check fault codes (see Section 12: Appendix A). Replace as needed.
Electric shock	☐ Poor earth connection	☐ Provide correct earth connection.
	☐ Accumulated foreign matter/moisture on electrical parts	☐ Remove matter/dry electrical parts.
Abnormal sound on load chain/chain sprocket	☐ Chain dry	☐ Lubricate.
	☐ Worn chain sprocket	☐ Replace load chain and chain sprocket.
Oil leak	☐ No oil plug	☐ Attach the normal oil plug.
	☐ Loose lifting of oil plug	☐ Fasten the plug tightly.
	☐ No plug packing	☐ Attach normal packing.
	☐ Worn or deteriorated oil packing	☐ Attach the new packing.

10.0: WARRANTY

Every hoist is thoroughly inspected and tested before it is shipped from the factory. If any problem develops within one-year return the complete hoist prepaid to the factory. If an inspection reveals that the problem is caused by defective workmanship or material, repairs will be made without charge and the hoist will be returned, transportation prepaid.

This warranty does not cover: (a) deterioration caused by normal wear, abuse, eccentric or side loading, overloading, chemical or abrasive actions, improper maintenance or excessive heat; (b) problems resulting from repairs, modifications or alterations made by people other than factory or ACI representative; (c) the hoist has been abused or damaged due to an accident; (4) repair parts or accessories other than ACI equipment are used on the hoist. Equipment and accessories not of the seller's manufacture are warranted only to extent that they are warranted by the manufacturer.

EXCEPT AS STATED HERE, ACI MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES FOR A PARTICULAR PURPOSE.

⚠ WARNING ⚠
Alterations or modifications of equipment and use of non-factory repair parts can lead to dangerous operation and injury.
To avoid injury: **Do not** alter or modify equipment. **Do not** use equipment to lift, support or otherwise transport people. **Do not** suspend unattended loads over people.

11.0: SPARE PARTS LIST

11.1: HOW TO ORDER

This parts and instruction manual contains information required to install and maintain your Hoist and Trolley. To ensure prompt service, each repair parts order should be placed with ACI Hoist & Crane, and must contain the following information:

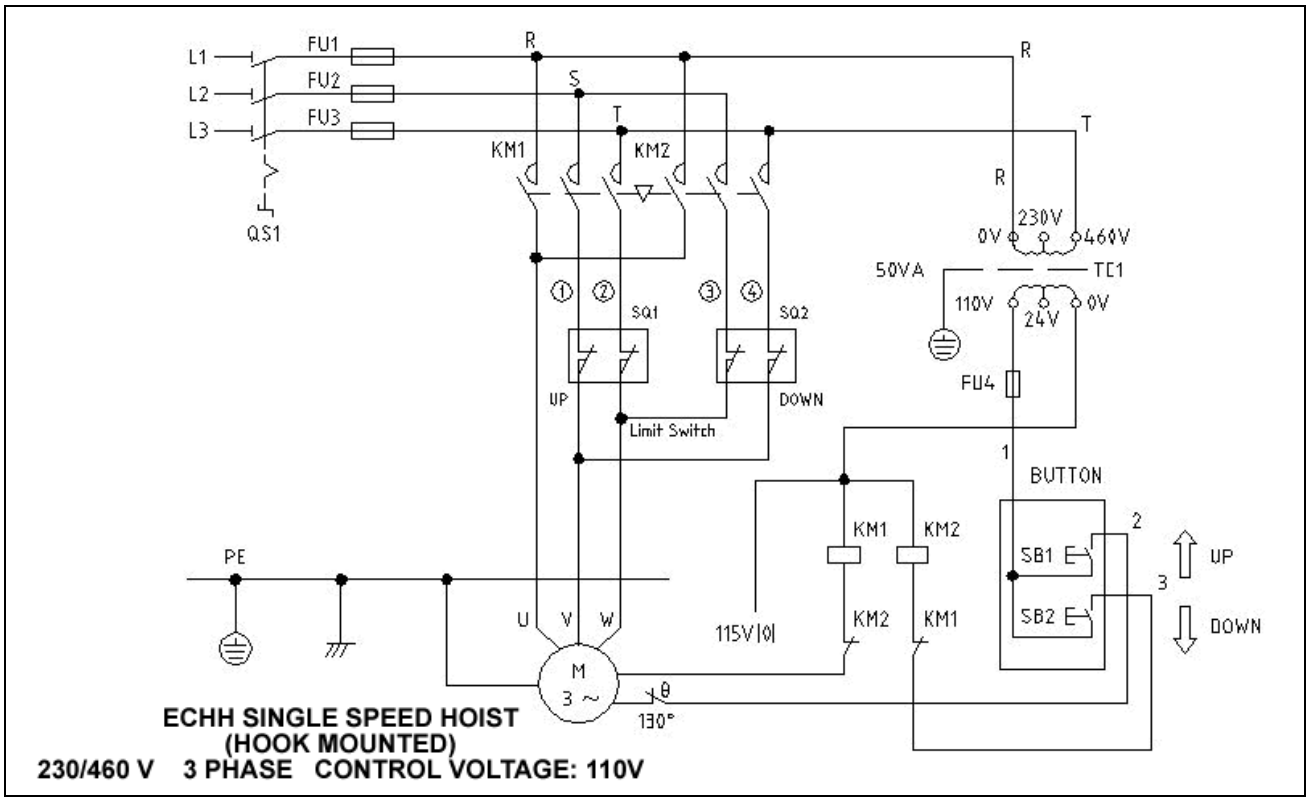
When ordering Parts, please provide the following:

1. Give complete data from Hoist/Trolley nameplate, including Hoist/Trolley serial number, model number, voltage, frequency and hertz.
2. Give part numbers, description and quantity of parts required.
3. Give correct shipping destination.
4. For ordering motor repair parts, give all data on the Hoist/Trolley motor nameplates.

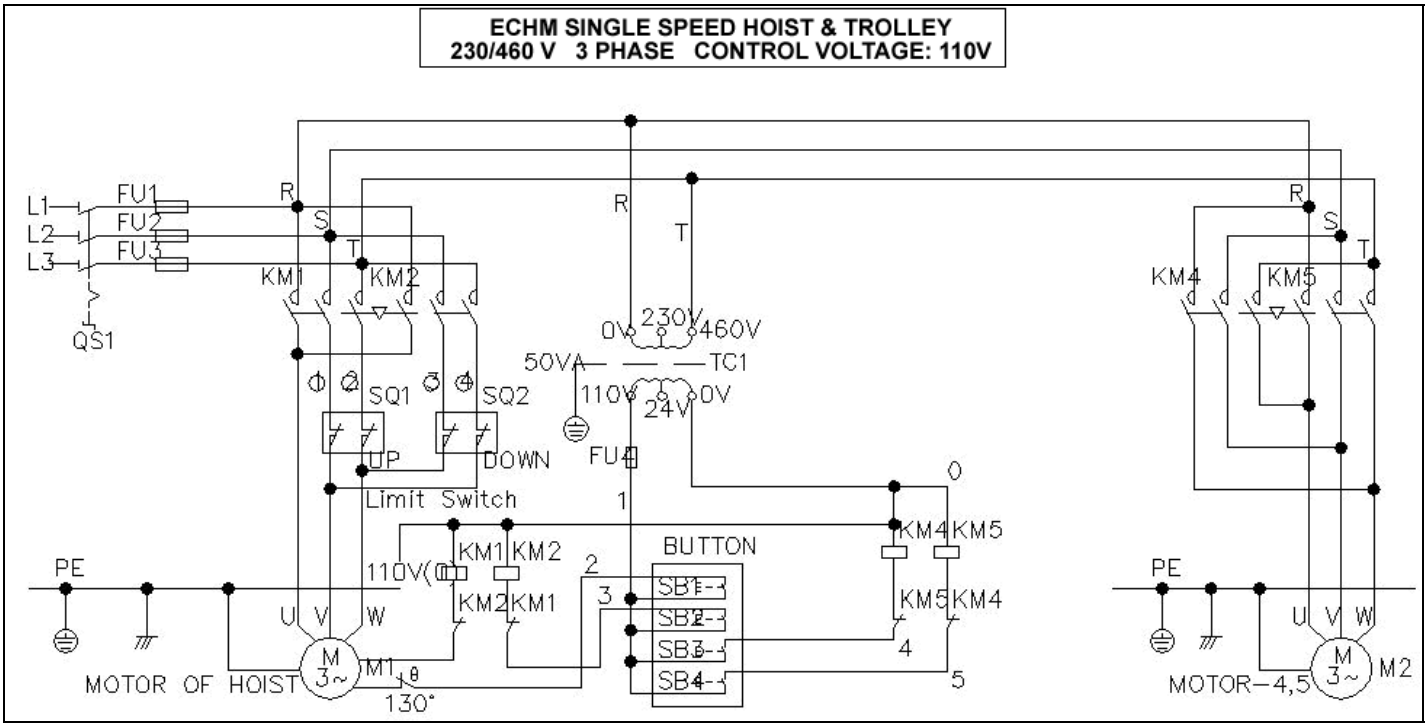
Reminder: Record the Hoist Model & Serial Number in the space provided in Section 3.1 “Installation” of this manual.

11.2: WIRING DIAGRAMS

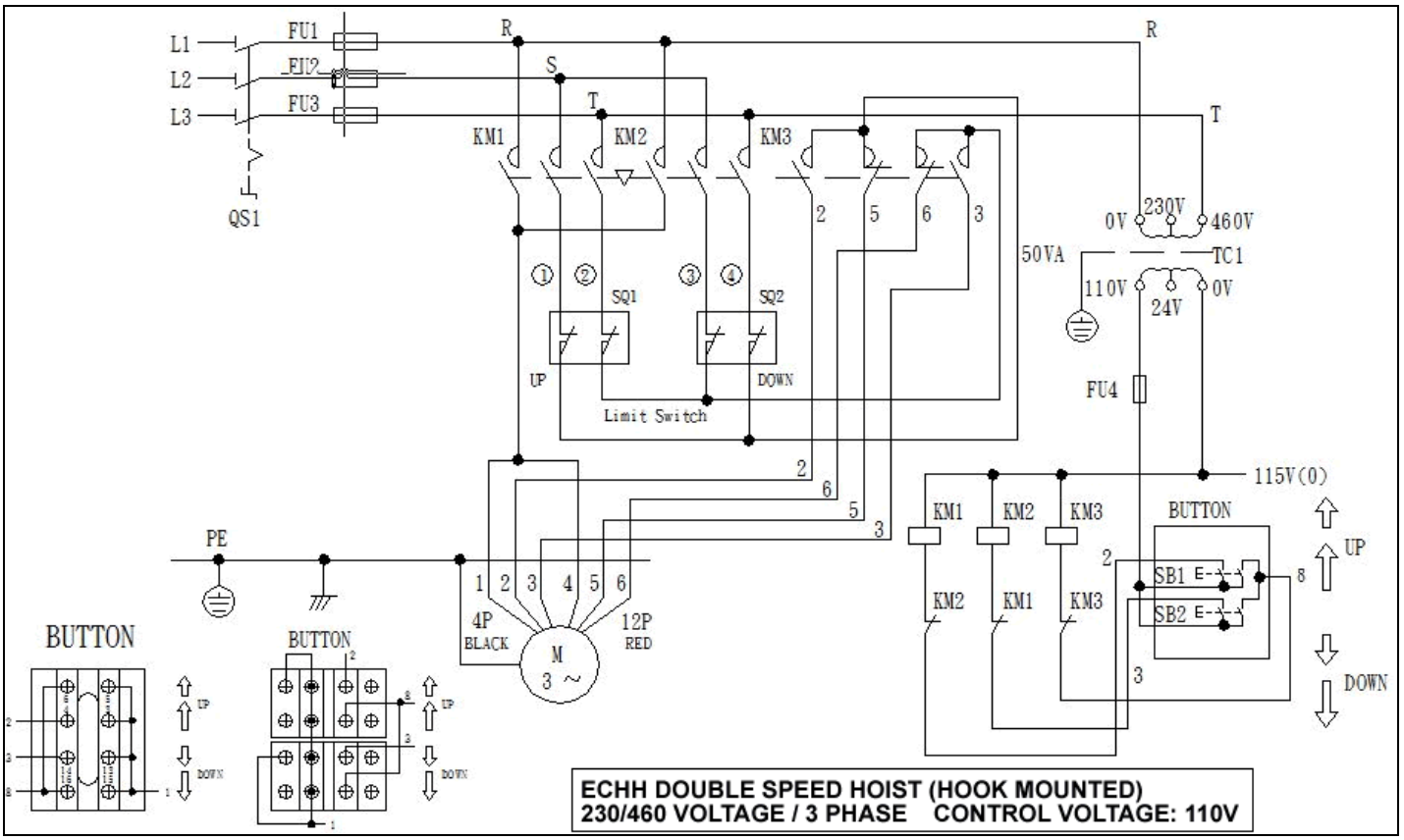
ECHH: ELECTRIC CHAIN HOIST, HOOK MOUNTED (SINGLE SPEED)



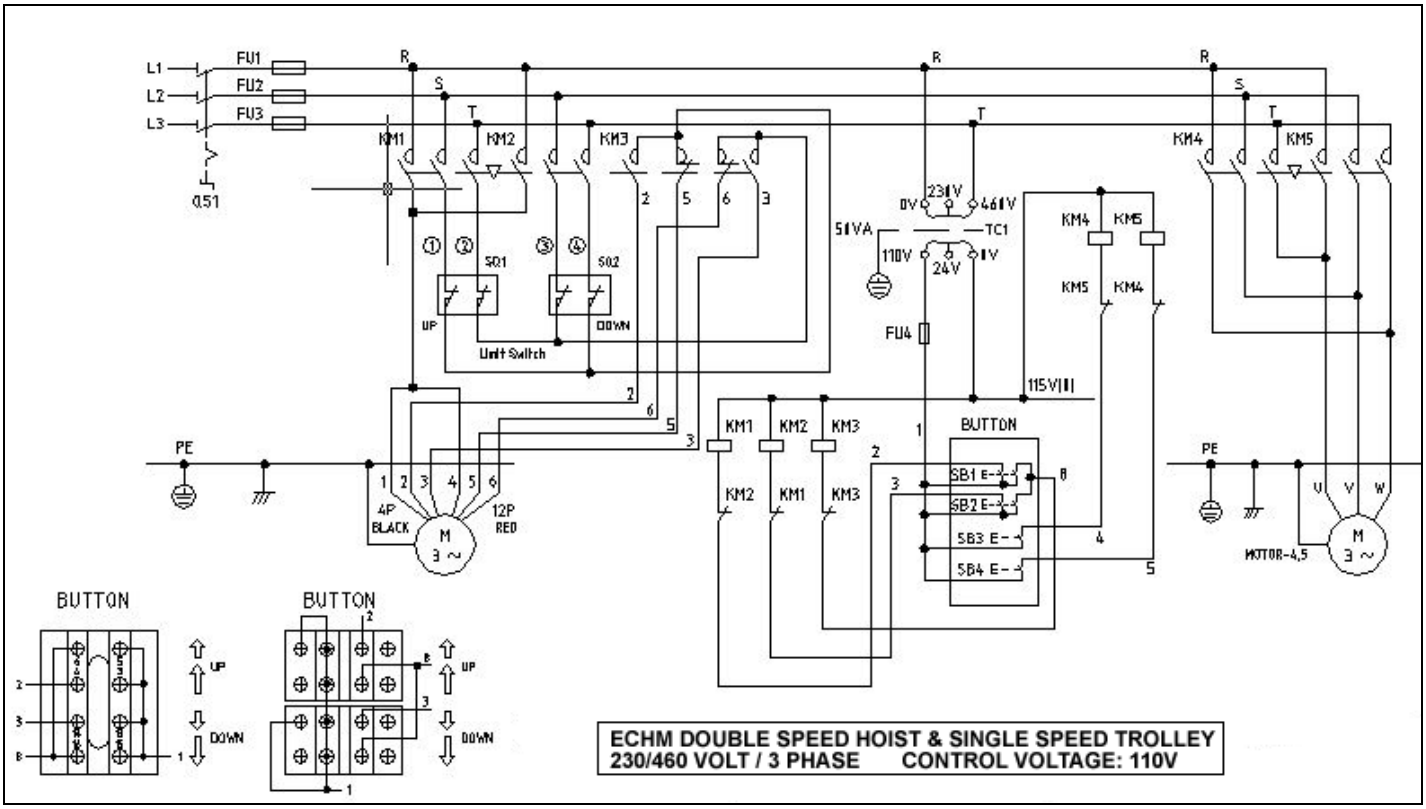
ECHM: ELECTRIC CHAIN HOIST WITH TROLLEY (SINGLE SPEED)



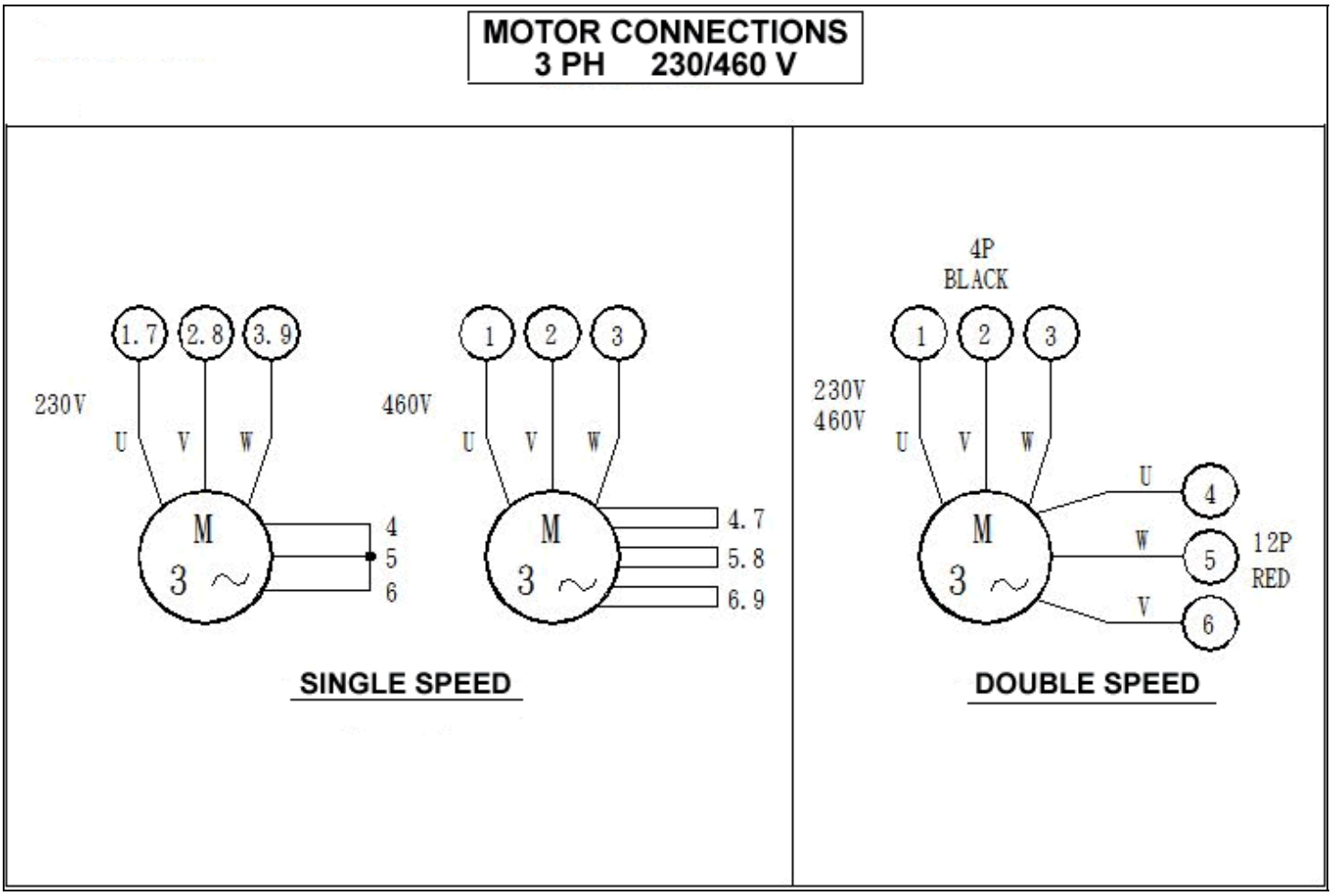
ECHH: ELECTRIC CHIAN HOIST, HOOK MOUNTED (DOUBLE SPEED)



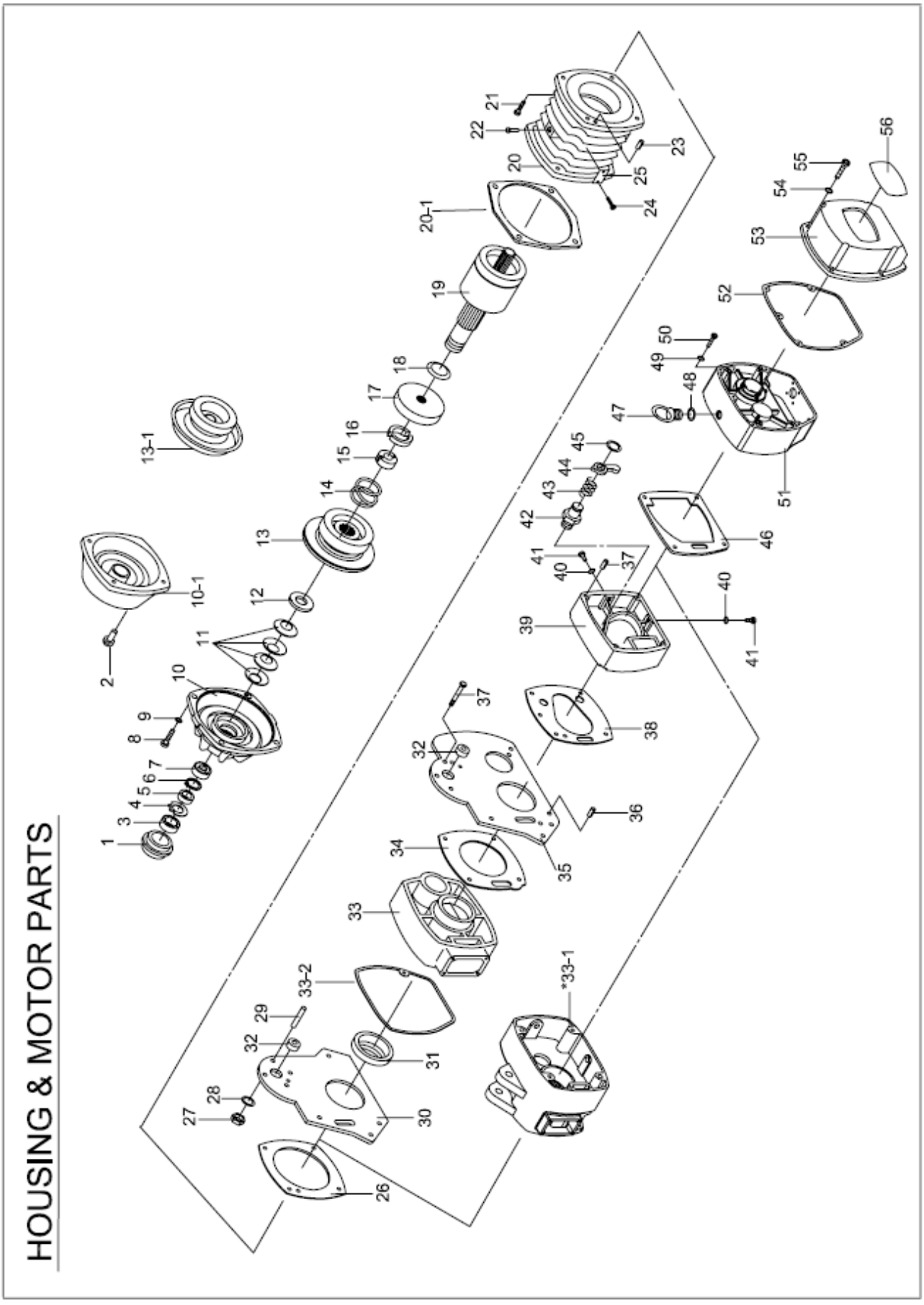
ECHM: ELECTRIC CHAIN HOIST WITH MOTORIZED TROLLEY (DOUBLE SPEED)



MOTOR CONNECTIONS



11.3: EXPLODED VIEW OF THE HOIST

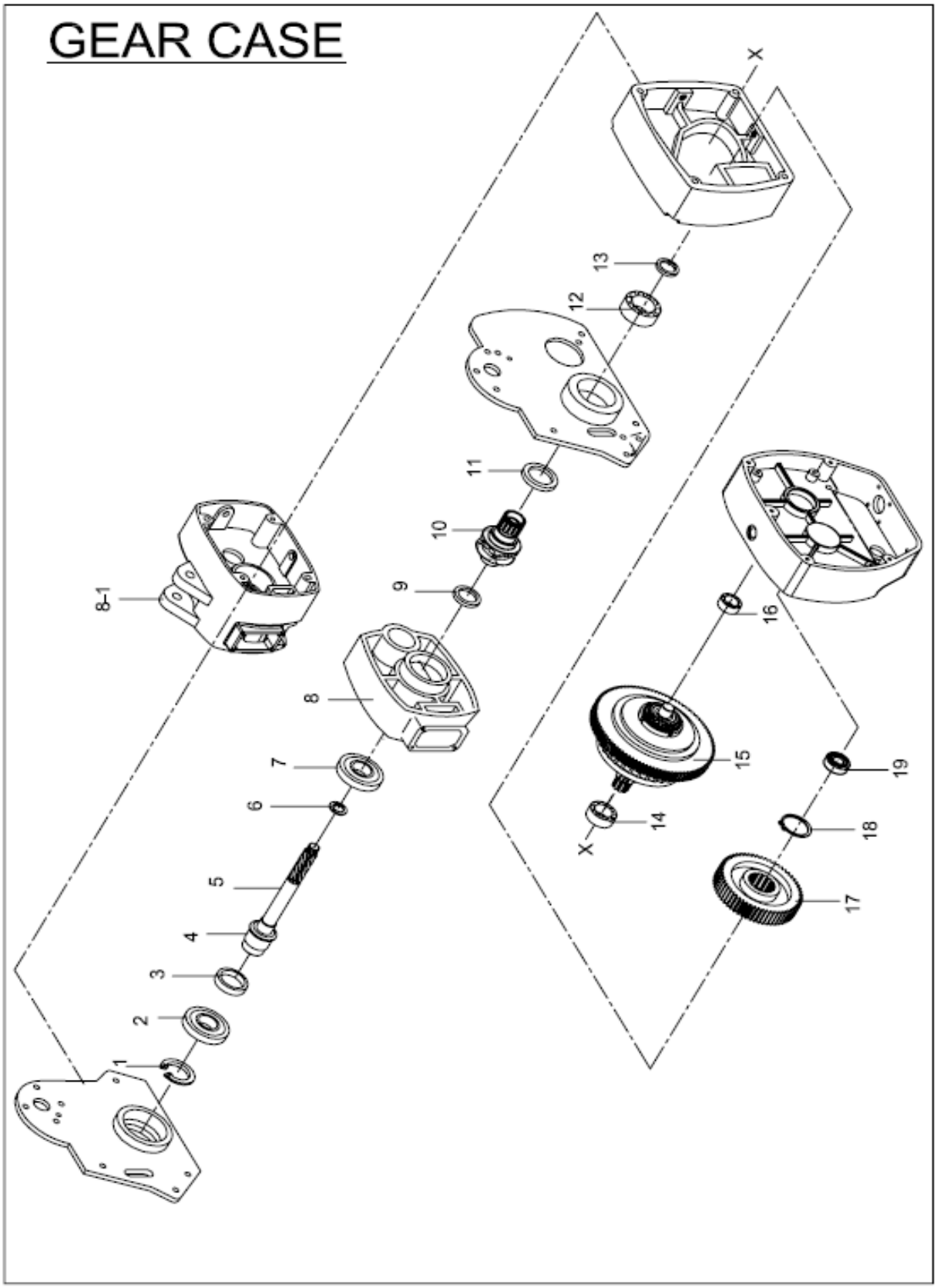


Housing and Case		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Dust cover	101SKA										101SKB	101SKA	101SKB			101SKB*2
2	Dust cap	102SKA										102SKB	102SKA	102SKB			102SKB*2
3	Bearing nut	103SKA										103SKB	103SKA	103SKB			103SKB*2
4	External toothed washer	104SKA										104SKB	104SKA	104SKB			104SKB*2
5	Bush	105SKA										105SKB	105SKA	105SKB			105SKB*2
6	Cir clip	106SKA										106SKB	106SKA	106SKB			106SKB*2
7	Ball bearing	107SKA										107SKB	107SKA	107SKB			107SKB*2
8	Hex socket cap bolt	108SKA*4										108SKB*4	108SKA*4	108SKB*4			108SKB*8
9	Spring washer	109SKA*4										109SKB*4	109SKA*4	109SKB*4			109SKB*8
10	Brake cover (cast iron)	508SKA										508SKB	508SKA	508SKB			508SKB*2
10-1	Brake cover (aluminum)	-	D110SL	D110SH	-	D110SL	D110SH	D110SL	D110SH	D110SL	D110SH	D110SB	D110SH	D110SB			D110SB*2
11	Cone springs	113SKA*4										113SKB*4	113SKA*4	113SKB*4			113SKB*8
12	Thrust washer	114SKA										114SKB	114SKA	114SKB			114SKB*2
13	Brake drum cast iron	507SKA										507SKB	507SKA	507SKB			507SKB*2
13-1	Brake drum aluminum	-	D115SA		-	D115SA						D115SB	D115SA	D115SB			D115SB*2
14	Brake spring	116SKA										116SKB	116SKA	116SKB			116SKB*2
15	Brake magnet locking sleeve	117SKA										117SKB	117SKA	117SKB			117SKB*2
16	Brake magnet split ring	118SKA*2										118SKB*2	118SKA*2	118SKB*2			118SKB*2
17	Brake magnet coil	119SKA										119SKB	119SKA	119SKB			119SKB*2
18	Cone spring	120SKA										120SKB	120SKA	120SKB			120SKB*2
19	Motor rotor and primary shaft	121SKA										121SKB	121SKA	121SKB			121SKB*2
20	Motor casing and stator	122SKC	122SAL	122SAH	122SKC	122SAL	122SAH	122SAL	122SAH	122SAL	122SAH	122SKB	122SAH	122SKB			122SKB*2
			D122SL	D122SH		D122SL	D122SH	D122SL	D122SH	D122SL	D122SH	D122SB	D122SH	D122SB			D122SB*2
20-1	Gasket	500SKA										500SKB					
21	Hex socket cap bolt	123SKA*4										123SKB*4	123SKA*4	123SKB*4			123SKB*8
22	Spring pin	124SKA										124SKB	124SKA	124SKB			124SKB*2
23	Locating spring pin	125SKA*2										125SKB*2	125SKA*2	125SKB*2			125SKB*4
24	Name plate rivet	126SKA*2										126SKB*2	126SKA*2	126SKB*2			126SKB*4
25	Motor name plate rivet	127SKA										127SKB	127SKA	127SKB			127SKB*2
26	Gasket B	131SKA										131SKB	131SKA	131SKB			131SKB*2
27	Hex nut	-										132SKB*4	-	132SKB*4			132SKB*8
28	Spring washer	-										133SKB*4	-	133SKB*4			133SKB*8
29	Sleeve	-										134SKB*4	-	134SKB*4			134SKB*8
30	Yoke plate B	-										135SKB	-	135SKB			135SKB*2
31	Bearing seat B	-										136SKB	-	136SKB			136SKB*2
32	Upper hook bearing bush	-										137SKB*2	-	137SKB*2			137SKB*4
33	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
33-1	Chain wheel case	506SKA										-	506SKA	-			-
33-2	Gasket	600SKB															
34	Gasket C	-										139SKB	-	139SKB			139SKB*2
35	Yoke plate A	-										140SKB	-	140SKB			140SKB*2
36	Locating spring pin	-										125SKB*2	-	125SKB*2			125SKB*4
37	Hex head bolt	-										143SKB*6	-	143SKB*6			143SKB*12
38	Gasket D	-										144SKB	-	144SKB			144SKB*2
39	Gear case B	-										145SKB	-	145SKB			145SKB*2

Housing and Case		Model No. (Dual Speed Hoist)															
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Dust cover	101SKA										101SKB	101SKA	101SKB			101SKB*2
2	Dust cap	102SKA										102SKB	102SKA	102SKB			102SKB*2
3	Bearing nut	103SKA										103SKB	103SKA	103SKB			103SKB*2
4	External toothed washer	104SKA										104SKB	104SKA	104SKB			104SKB*2
5	Bush	105SKA										105SKB	105SKA	105SKB			105SKB*2
6	Cir clip	106SKA										106SKB	106SKA	106SKB			106SKB*2
7	Ball bearing	107SKA										107SKB	107SKA	107SKB			107SKB*2
8	Hex socket cap bolt	108SKA*4										108SKB*4	108SKA*4	108SKB*4			108SKB*8
9	Spring washer	109SKA*4										109SKB*4	109SKA*4	109SKB*4			109SKB*8
10	Brake cover (cast iron)	508SKA										508SKB	508SKA	508SKB			508SKB*2
10-1	Brake cover (aluminum)	-	D110SL	D110SH	-	D110SL	D110SH	D110SL	D110SH	D110SL	D110SH	D110SB	D110SH	D110SB			D110SB*2
11	Cone springs	113SKA*4										113SKB*4	113SKA*4	113SKB*4			113SKB*8
12	Thrust washer	114SKA										114SKB	114SKA	114SKB			114SKB*2
13	Brake drum cast iron	507SKA										507SKB	507SKA	507SKB			507SKB*2
13-1	Brake drum aluminum	-	D115SA		-	D115SA						D115SB	D115SA	D115SB			D115SB*2
14	Brake spring	116SKA										116SKB	116SKA	116SKB			116SKB*2
15	Brake magnet locking sleeve	117SKA										117SKB	117SKA	117SKB			117SKB*2
16	Brake magnet split ring	118SKA*2										118SKB*2	118SKA*2	118SKB*2			118SKB*2
17	Brake magnet coil	119SKA										119SKB	119SKA	119SKB			119SKB*2
18	Cone spring	120SKA										120SKB	120SKA	120SKB			120SKB*2
19	Motor rotor and primary shaft	121SKA										121SKB	121SKA	121SKB			121SKB*2
20	Motor casing and stator	122SKC	122SAL	122SAH	122SKC	122SAL	122SAH	122SAL	122SAH	122SAL	122SAH	122SKB	122SAH	122SKB			122SKB*2
			D122SL	D122SH		D122SL	D122SH	D122SL	D122SH	D122SL	D122SH	D122SB	D122SH	D122SB			D122SB*2
20-1	Gasket	500SKA										500SKB					
21	Hex socket cap bolt	123SKA*4										123SKB*4	123SKA*4	123SKB*4			123SKB*8
22	Spring pin	124SKA										124SKB	124SKA	124SKB			124SKB*2
23	Locating spring pin	125SKA*2										125SKB*2	125SKA*2	125SKB*2			125SKB*4
24	Name plate rivet	126SKA*2										126SKB*2	126SKA*2	126SKB*2			126SKB*4
25	Motor name plate rivet	127SKA										127SKB	127SKA	127SKB			127SKB*2
26	Gasket B	131SKA										131SKB	131SKA	131SKB			131SKB*2
27	Hex nut	-										132SKB*4	-	132SKB*4			132SKB*8
28	Spring washer	-										133SKB*4	-	133SKB*4			133SKB*8
29	Sleeve	-										134SKB*4	-	134SKB*4			134SKB*8
30	Yoke plate B	-										135SKB	-	135SKB			135SKB*2
31	Bearing seat B	-										136SKB	-	136SKB			136SKB*2
32	Upper hook bearing bush	-										137SKB*2	-	137SKB*2			137SKB*4
33	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
33-1	Chain wheel case	506SKA										-	506SKA	-			-
33-2	Gasket	600SKB															
34	Gasket C	-										139SKB	-	139SKB			139SKB*2
35	Yoke plate A	-										140SKB	-	140SKB			140SKB*2
36	Locating spring pin	-										125SKB*2	-	125SKB*2			125SKB*4
37	Hex head bolt	-										143SKB*6	-	143SKB*6			143SKB*12
38	Gasket D	-										144SKB	-	144SKB			144SKB*2
39	Gear case B	-										145SKB	-	145SKB			145SKB*2

Housing and Case		Model No. (Dual Speed Hoist)														
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
40	O-ring	146SKA*2														146SKA*4
41	Oil plug (slotted head)	147SKA*2														147SKA*4
42	Ratchet pawl spindle	150SKA										150SKB	150SKA	150SKB		150SKB*2
43	Torsion spring	151SKA										151SKB	151SKA	151SKB		151SKB*2
44	Ratchet pawl	152SKA										152SKB	152SKA	152SKB		152SKB*2
45	Cir clip	153SKA										153SKB	153SKA	153SKB		153SKB*2
46	Gasket E	154SKA										154SKB	154SKA	154SKB		154SKB*2
47	Eye bolt & pressure vale	155SKA										155SKB	155SKA	155SKB		155SKB*2
48	O-ring	157SKA										157SKB	157SKA	157SKB		157SKB*2
49	External toothed washer	158SKA*4										158SKB*4	158SKA*4	158SKB*4		158SKB*8
50	Hex socket cap bolt	159SKA*4										159SKB*4	159SKA*4	159SKB*4		159SKB*8
51	Gear case A	510SKA										510SKB	510SKA	510SKB		510SKB*2
52	Gasket F	161SKA										161SKB	161SKA	161SKB		161SKB*2
53	Electrical section cover	162SKA										162SKB	162SKA	162SKB		162SKB*2
54	Spring washer	163SKA*4										163SKB*4	163SKA*4	163SKB*4		163SKB*8
55	Hex socket cap bolt	164SKA*4										164SKB*4	164SKA*4	164SKB*4		164SKB*8
56	Hoist name plate	165SKA										165SKB	165SKA	165SKB		165SKB*2

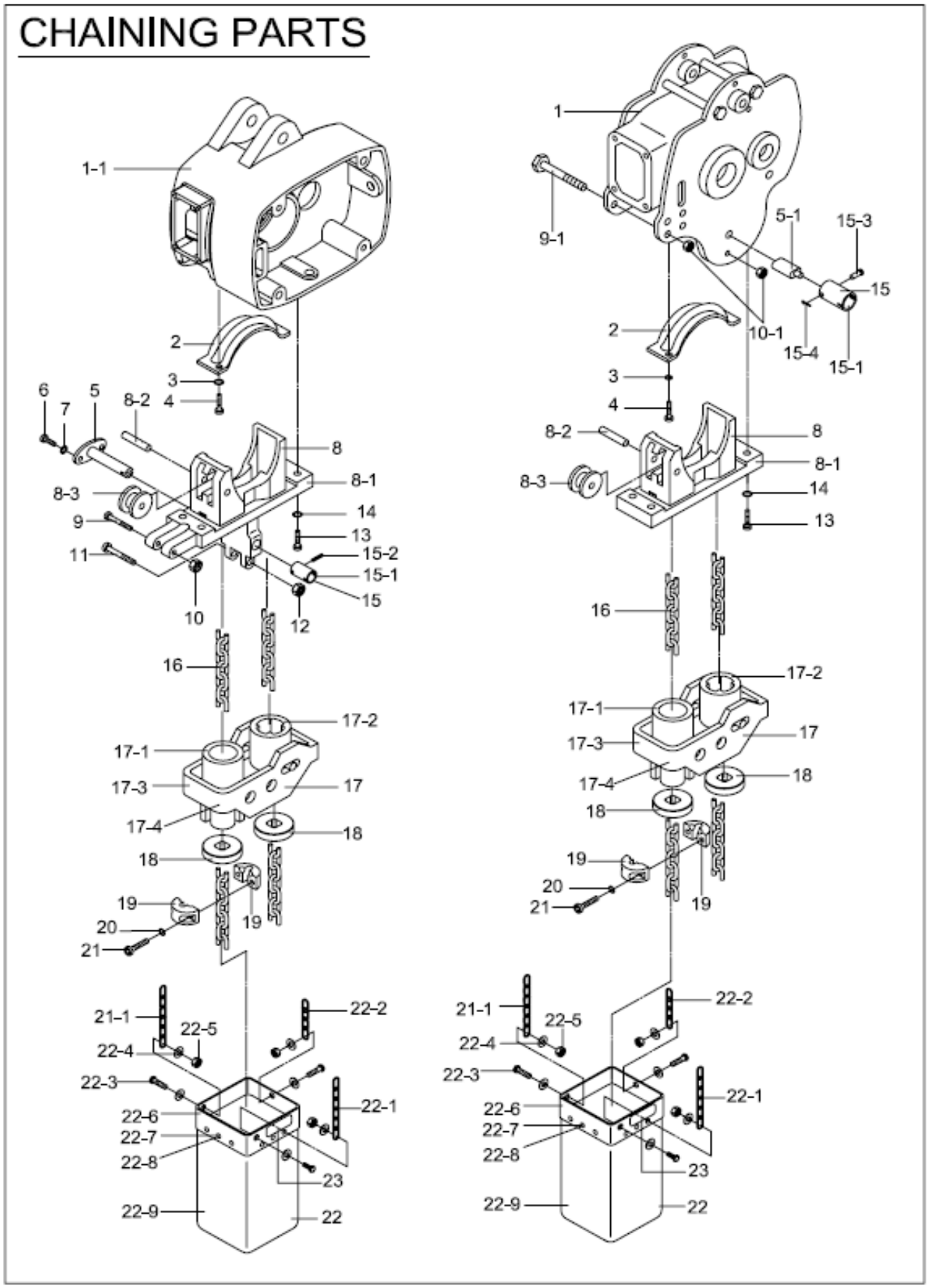
11.4: GEAR CASE



Gear Case		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Cir clip	166SKA										166SKB	166SKA	166SKB			166SKB*2
2	Ball bearing	167SKA										167SKB	167SKA	167SKB			167SKB*2
3	Spacer	502SKA										502SKB	502SKA	502SKB			502SKB*2
4	Connecting sleeve	168SKA										168SKB	168SKA	168SKB			168SKB*2
5	Secondary shaft	169SKA										169SKB	169SKA	169SKB			169SKB*2
6	O-ring	170SKA										170SKB	170SKA	170SKB			170SKB*2
7	Ball bearing	171SKA										171SKB	171SKA	171SKB			171SKB*2
8	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
8-1	Chain wheel case	506SKA										-	506SKA	-			-
9	Oil seal	172SKA										172SKB	172SKA	172SKB			172SKB*2
10	Load chain wheel	173SKA										173SKB	173SKA	173SKB			173SKB*2
11	Oil seal	174SKA										174SKB	174SKA	174SKB			174SKB*2
12	Ball bearing	175SKA										175SKB	175SKA	175SKB			175SKB*2
13	Oil seal	176SKA										176SKB	176SKA	176SKB			176SKB*2
14	Ball bearing	177SKA										177SKB	177SKA	177SKB			177SKB*2
15	Load brake & clutch Assembly	178SAH	178SAL	178SAH	178SAH	178SAL	178SAH	178SAL	178SAH	178SAL	178SAH	178SKB	178SAH	178SKB			178SKB*2
16	Ball bearing	501SKA										501SKB	501SKA	501SKB			501SKB*2
17	Main drive gear	186SAH	186SAL	186SAH	186SAH	186SAL	186SAH	186SAL	186SAH	186SAL	186SAH	168SKB	168SAH	168SKB			168SKB*2
18	Cir clip	187SKA										187SKB	187SKA	187SKB			187SKB*2
19	Ball bearing	188SKA										188SKB	188SKA	188SKB			188SKB*2

Gear Case		Model No. (Dual Speed Hoist)															
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Cir clip	166SKA										166SKB	166SKA	166SKB			166SKB*2
2	Ball bearing	167SKA										167SKB	167SKA	167SKB			167SKB*2
3	Spacer	502SKA										502SKB	502SKA	502SKB			502SKB*2
4	Connecting sleeve	168SKA										168SKB	168SKA	168SKB			168SKB*2
5	Secondary shaft	169SKA										169SKB	169SKA	169SKB			169SKB*2
6	O-ring	170SKA										170SKB	170SKA	170SKB			170SKB*2
7	Ball bearing	171SKA										171SKB	171SKA	171SKB			171SKB*2
8	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
8-1	Chain wheel case	506SKA										-	506SKA	-			-
9	Oil seal	172SKA										172SKB	172SKA	172SKB			172SKB*2
10	Load chain wheel	173SKA										173SKB	173SKA	173SKB			173SKB*2
11	Oil seal	174SKA										174SKB	174SKA	174SKB			174SKB*2
12	Ball bearing	175SKA										175SKB	175SKA	175SKB			175SKB*2
13	Oil seal	176SKA										176SKB	176SKA	176SKB			176SKB*2
14	Ball bearing	177SKA										177SKB	177SKA	177SKB			177SKB*2
15	Load brake & clutch Assembly	178SAH	178SAL	178SAH	178SAH	178SAL	178SAH	178SAL	178SAH	178SAL	178SAH	178SKB	178SAH	178SKB			178SKB*2
16	Ball bearing	501SKA										501SKB	501SKA	501SKB			501SKB*2
17	Main drive gear	186SAH	186SAL	186SAH	186SAH	186SAL	186SAH	186SAL	186SAH	186SAL	186SAH	168SKB	168SAH	168SKB			168SKB*2
18	Cir clip	187SKA										187SKB	187SKA	187SKB			187SKB*2
19	Ball bearing	188SKA										188SKB	188SKA	188SKB			188SKB*2

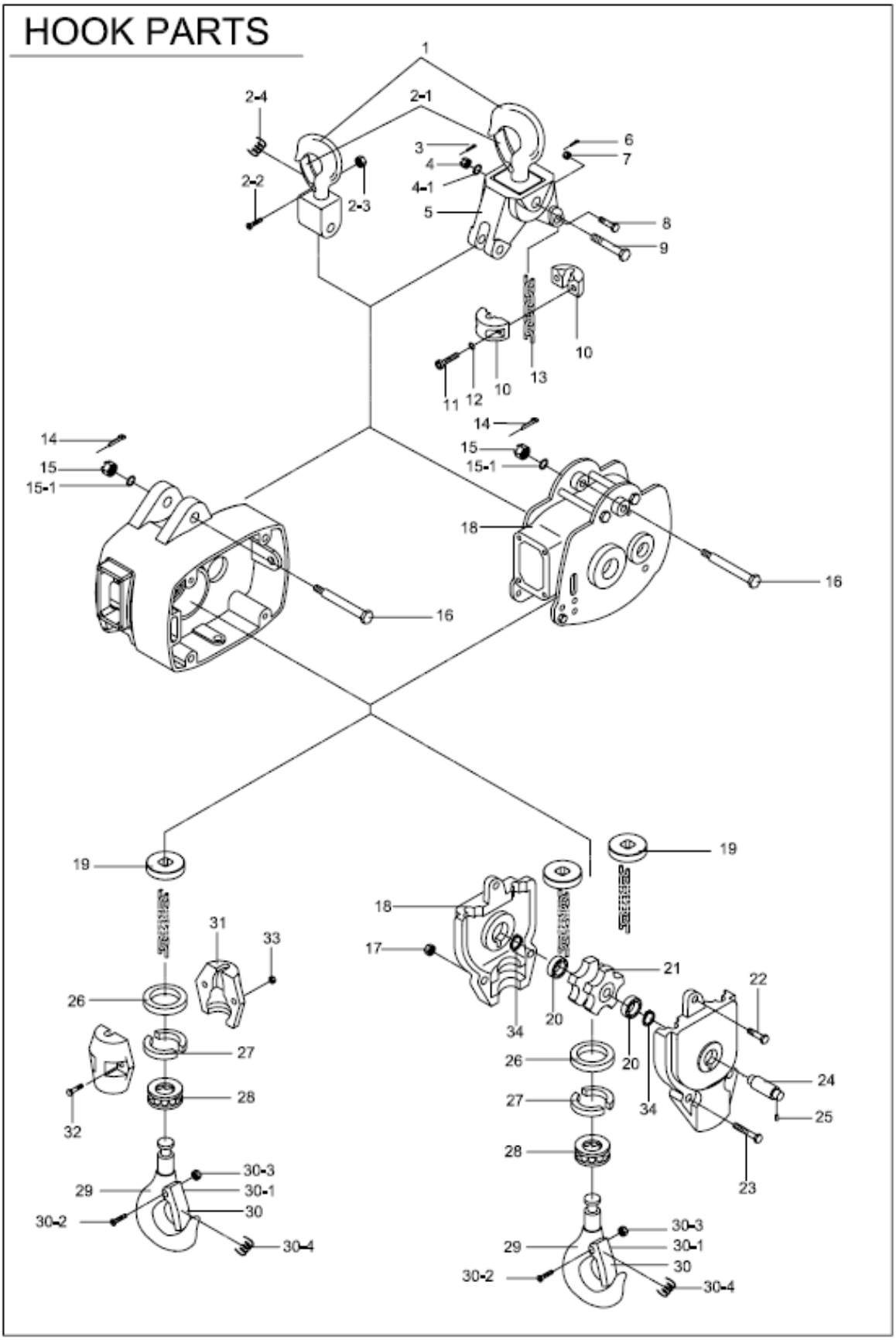
11.5: CHAINING PARTS



Chaining Parts		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
1-1	Chain wheel case	506SKA										-	506SKA	-			-
2	Chain guide cover	189SKA										189SKB	189SKA	189SKB	189SKC		189SKC*2
3	Spring washer	237SKA*2										237SKB*2	237SKA*2	237SKB*2			237SKB*4
4	Cross slot round head bolt	190SKA*2										190SKB*2	190SKA*2	190SKB*2			190SKB*4
5	Limit switch actuator assembly B	191SKA										232SKB	191SKA	232SKB			232SKB*2
6	Hex socket cap bolt	194SKA*2										-	194SKA*2	-			-
7	Spring washer	195SKA*2										-	195SKA*2	-			-
8	Chain limit plate assembly	196SKA										196SKB	196SKA	196SKB	196SKC		196SKC*2
8-1	Chain limit plate	197SKA										197SKB	197SKA	197SKB	197SKC		197SKC*2
8-2	Guide wheel spindle	198SKA										198SKB	198SKA	198SKB	198SKC		198SKC*2
8-3	Guide wheel	199SKA										199SKB	199SKA	199SKB	199SKC		199SKC*2
9	Hex head bolt	200SKA										-	200SKA	-			-
9-1	Hex head bolt	-										230SKB*2		230SKB*2			230SKB*4
10	Nylon nut	201SKA										-	201SKA	-			-
10-1	Nylon nut	-										231SKB*2	-	231SKB*2			231SKB*4
11	Hex head bolt	202SKA										-	202SKA	-			-
12	Nylon nut	203SKA										-	203SKA	-			-
13	Hex socket cap bolt	204SKA*4										204SKB*4	204SKA*4	204SKB*4			204SKB*8
14	Spring washer	205SKA*4										205SKB*4	205SKA*4	205SKB*4			205SKB*8
15	Limit switch actuator assembly A (*)	206SKA										206SKB	206SKA	206SKB			206SKB*2
16	Chain	209SKA										209SKB	209SKA	209SKB	209SKC		
17	Chain guide assembly (*)	210SKA										210SKB	210SKA	210SKB	210SKC		210SKC*2
18	Rubber stopper	472SKA*2										472SKB*2	472SKA*2	472SKB*2	472SKC*2		472SKC*4
19	Chain end-stop block	216SKA*2								216SKA*4		216SKB*2	216SKA*2	216SKB*4	216SKB*2		216SKB*4
20	Spring washer	217SKA*2								217SKA*4		217SKB*2	217SKA*2	217SKB*4	217SKB*2		217SKB*4
21	Hex socket cap bolt	218SKA*2								218SKA*4		218SKB*2	218SKA*2	218SKB*4	218SKB*2		218SKB*4
22	Chain bag assembly (*)	219SKA															219SKA*2
23	Chain bag name plate	254SKA															254SKA*2

Chaining Parts		Model No. (Dual Speed Hoist)														
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Chain wheel case	-										138SKB	-	138SKB			138SKB*2
1-1	Chain wheel case	506SKA										-	506SKA	-			-
2	Chain guide cover	189SKA										189SKB	189SKA	189SKB	189SKC		189SKC*2
3	Spring washer	237SKA*2										237SKB*2	237SKA*2	237SKB*2			237SKB*4
4	Cross slot round head bolt	190SKA*2										190SKB*2	190SKA*2	190SKB*2			190SKB*4
5	Limit switch actuator assembly B	191SKA										232SKB	191SKA	232SKB			232SKB*2
6	Hex socket cap bolt	194SKA*2										-	194SKA*2	-			-
7	Spring washer	195SKA*2										-	195SKA*2	-			-
8	Chain limit plate assembly	196SKA										196SKB	196SKA	196SKB	196SKC		196SKC*2
8-1	Chain limit plate	197SKA										197SKB	197SKA	197SKB	197SKC		197SKC*2
8-2	Guide wheel spindle	198SKA										198SKB	198SKA	198SKB	198SKC		198SKC*2
8-3	Guide wheel	199SKA										199SKB	199SKA	199SKB	199SKC		199SKC*2
9	Hex head bolt	200SKA										-	200SKA	-			-
9-1	Hex head bolt	-										230SKB*2		230SKB*2			230SKB*4
10	Nylon nut	201SKA										-	201SKA	-			-
10-1	Nylon nut	-										231SKB*2	-	231SKB*2			231SKB*4
11	Hex head bolt	202SKA										-	202SKA	-			-
12	Nylon nut	203SKA										-	203SKA	-			-
13	Hex socket cap bolt	204SKA*4										204SKB*4	204SKA*4	204SKB*4			204SKB*8
14	Spring washer	205SKA*4										205SKB*4	205SKA*4	205SKB*4			205SKB*8
15	Limit switch actuator assembly A (*)	206SKA										206SKB	206SKA	206SKB			206SKB*2
16	Chain	209SKA										209SKB	209SKA	209SKB	209SKC		
17	Chain guide assembly (*)	210SKA										210SKB	210SKA	210SKB	210SKC		210SKC*2
18	Rubber stopper	472SKA*2										472SKB*2	472SKA*2	472SKB*2	472SKC*2		472SKC*4
19	Chain end-stop block	216SKA*2								216SKA*4		216SKB*2	216SKA*2	216SKB*4	216SKB*2		216SKB*4
20	Spring washer	217SKA*2								217SKA*4		217SKB*2	217SKA*2	217SKB*4	217SKB*2		217SKB*4
21	Hex socket cap bolt	218SKA*2								218SKA*4		218SKB*2	218SKA*2	218SKB*4	218SKB*2		218SKB*4
22	Chain bag assembly (*)	219SKA															219SKA*2
23	Chain bag name plate	254SKA															254SKA*2

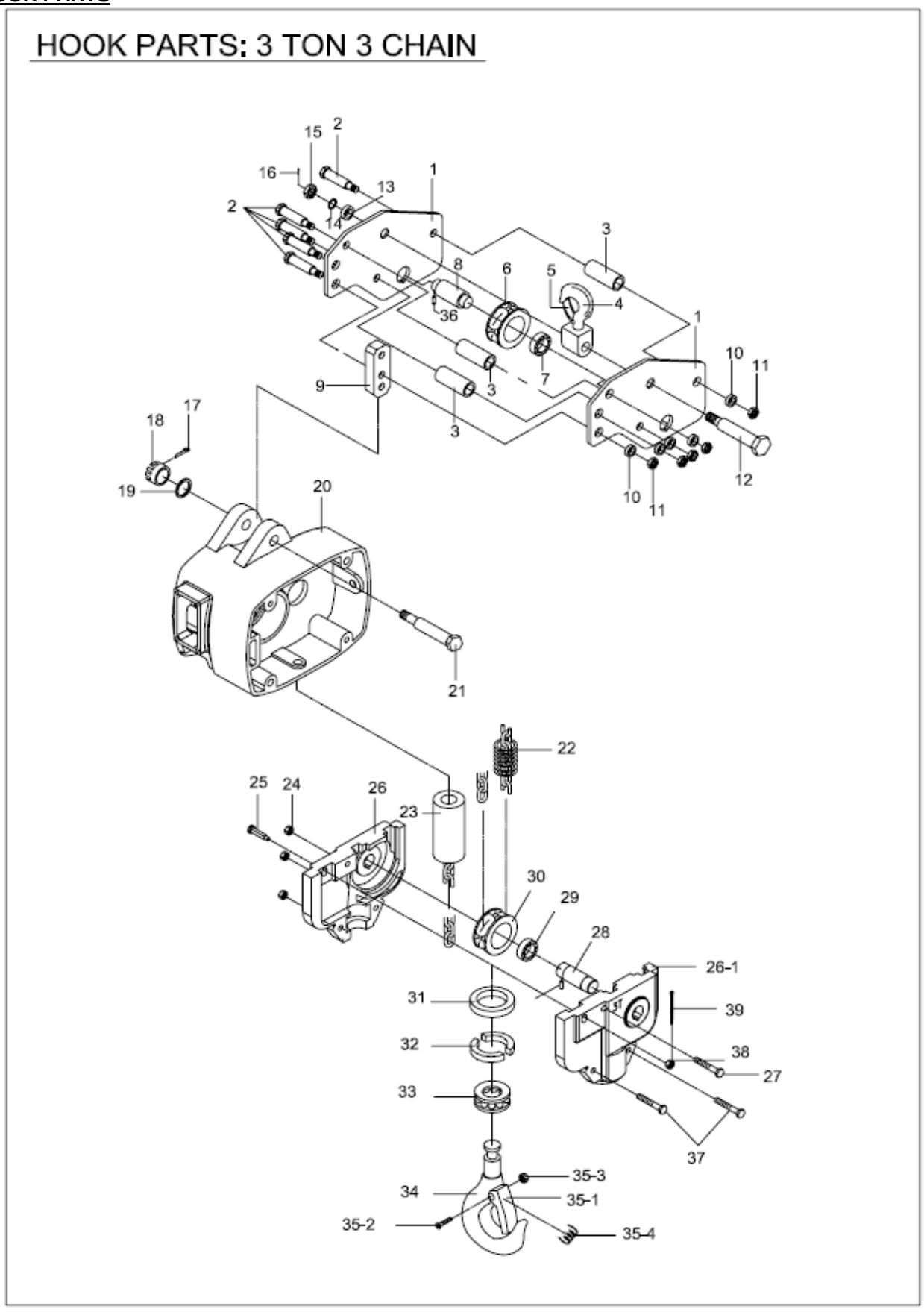
11.6: HOOK PARTS



Load Block		Model No. (Single Speed Hoist)												
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06017	ECH-10010
1	Upper hook	270SKA								270SKB		270SKC	270SKD	270SKE
2-1	Safety latch	272SKA								272SKB		272SKC	272SKD	272SKE
2-2	Philip round head bolt	273SKA								273SKB		273SKC	273SKD	273SKE
2-3	Nylon nut	274SKA								274SKB		274SKC	274SKD	274SKE
2-4	Torsion spring	275SKA								275SKB		275SKC	275SKD	275SKE
3	Split pin	276SKA										276SKB	276SKB	
4	Slotted nut	277SKA										277SKB		
4-1	Spring washer	475SKA										475SKB		
5	Upper hook yoke	278SKA										278SKB		
6	Split pin	279SKA										279SKB		
7	Slotted nut	480SKA										480SKB		
8	Upper hook yoke leg bolt	281SKA										281SKB		
9	Upper hook yoke cross bolt	282SKA										282SKB		
10	Chain end-stop block	216SKA*2								216SKA*4		216SKB*2	216SKB*4	
11	Hex socket cap bolt	218SKA*2								218SKA*4		218SKB*2	218SKB*4	
12	Spring washer	217SKA*2								217SKA*4		217SKB*2	217SKB*4	
13	Chain	209SKA										209SKB	209SKB	209SKC
14	Split pin	287SKA										287SKB	287SKB	
15	Slotted nut	288SKA										288SKB	288SKB	
15-1	Spring washer	475SKA										475SKB	475SKB	
16	Upper hook cross bolt	289SKA										289SKB	289SKB	
17	Nylon nut	290SKA										290SKB	290SKB	
18	Lower hook block shell	291SKA*2								291SKB*2		291SKC*2	291SKD*2	291SKE*2
19	Rubber stopper	472SKA										472SKB*2	472SKB*2	472SKC*2
20	Needle bearing	-										-	293SKB	293SKC
21	Lower hook block chain wheel	-										-	294SKB	294SKC
22	Hex socket cap bolt	-										-	295SKB	295SKC
23	Hex socket cap bolt	-										-	296SKB	296SKC
24	Lower hook block chain wheel spindle	-										-	297SKB*2	297SKC*2
25	Spring pin	-										-	298SKB	298SKC
26	Lower hook locking sleeve	299SKA										299SKB	299SKC	299SKD
27	Lower hook split ring	300SKA										300SKB	300SKC	300SKD
28	Thrust ball bearing	301SKA										301SKB	301SKC	301SKD
29	Lower hook	302SKA										302SKB	302SKC	302SKD
30	Safety latch assembly	303SKA										303SKB	303SKC	303SKD
30-1	Safety latch	304SKA										304SKB	304SKC	304SKD
30-2	Hex socket round head bolt	305SKA										305SKB	305SKC	305SKD
30-3	Nylon nut	306SKA										306SKB	306SKC	306SKD
30-4	Torsion spring	307SKA										307SKB	307SKC	307SKD
31	Lower hook block shell	291SKA*2								291SKB*2		291SKC*2	291SKD*2	291SKE*2
32	Hex socket cap bolt	309SKA*2										-	-	-
33	Nylon nut	310SKA*2										-	-	-
34	Cir clip	-										-	505SKB*2	505SKC*2

Load Block		Model No. (Dual Speed Hoist)												
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06017D	ECH-10010D
1	Upper hook	270SKA								270SKB		270SKC	270SKD	270SKE
2-1	Safety latch	272SKA								272SKB		272SKC	272SKD	272SKE
2-2	Philip round head bolt	273SKA								273SKB		273SKC	273SKD	273SKE
2-3	Nylon nut	274SKA								274SKB		274SKC	274SKD	274SKE
2-4	Torsion spring	275SKA								275SKB		275SKC	275SKD	275SKE
3	Split pin	276SKA										276SKB	276SKB	
4	Slotted nut	277SKA										277SKB		
4-1	Spring washer	475SKA										475SKB		
5	Upper hook yoke	278SKA										278SKB		
6	Split pin	279SKA										279SKB		
7	Slotted nut	480SKA										480SKB		
8	Upper hook yoke leg bolt	281SKA										281SKB		
9	Upper hook yoke cross bolt	282SKA										282SKB		
10	Chain end-stop block	216SKA*2								216SKA*4		216SKB*2	216SKB*4	
11	Hex socket cap bolt	218SKA*2								218SKA*4		218SKB*2	218SKB*4	
12	Spring washer	217SKA*2								217SKA*4		217SKB*2	217SKB*4	
13	Chain	209SKA										209SKB	209SKB	209SKC
14	Split pin	287SKA										287SKB	287SKB	
15	Slotted nut	288SKA										288SKB	288SKB	
15-1	Spring washer	475SKA										475SKB	475SKB	
16	Upper hook cross bolt	289SKA										289SKB	289SKB	
17	Nylon nut	290SKA										290SKB	290SKB	
18	Lower hook block shell	291SKA*2								291SKB*2		291SKC*2	291SKD*2	291SKE*2
19	Rubber stopper	472SKA										472SKB*2	472SKB*2	472SKC*2
20	Needle bearing	-										-	293SKB	293SKC
21	Lower hook block chain wheel	-										-	294SKB	294SKC
22	Hex socket cap bolt	-										-	295SKB	295SKC
23	Hex socket cap bolt	-										-	296SKB	296SKC
24	Lower hook block chain wheel spindle	-										-	297SKB*2	297SKC*2
25	Spring pin	-										-	298SKB	298SKC
26	Lower hook locking sleeve	299SKA										299SKB	299SKC	299SKD
27	Lower hook split ring	300SKA										300SKB	300SKC	300SKD
28	Thrust ball bearing	301SKA										301SKB	301SKC	301SKD
29	Lower hook	302SKA										302SKB	302SKC	302SKD
30	Safety latch assembly	303SKA										303SKB	303SKC	303SKD
30-1	Safety latch	304SKA										304SKB	304SKC	304SKD
30-2	Hex socket round head bolt	305SKA										305SKB	305SKC	305SKD
30-3	Nylon nut	306SKA										306SKB	306SKC	306SKD
30-4	Torsion spring	307SKA										307SKB	307SKC	307SKD
31	Lower hook block shell	291SKA*2								291SKB*2		291SKC*2	291SKD*2	291SKE*2
32	Hex socket cap bolt	309SKA*2										-	-	-
33	Nylon nut	310SKA*2										-	-	-
34	Cir clip	-										-	505SKB*2	505SKC*2

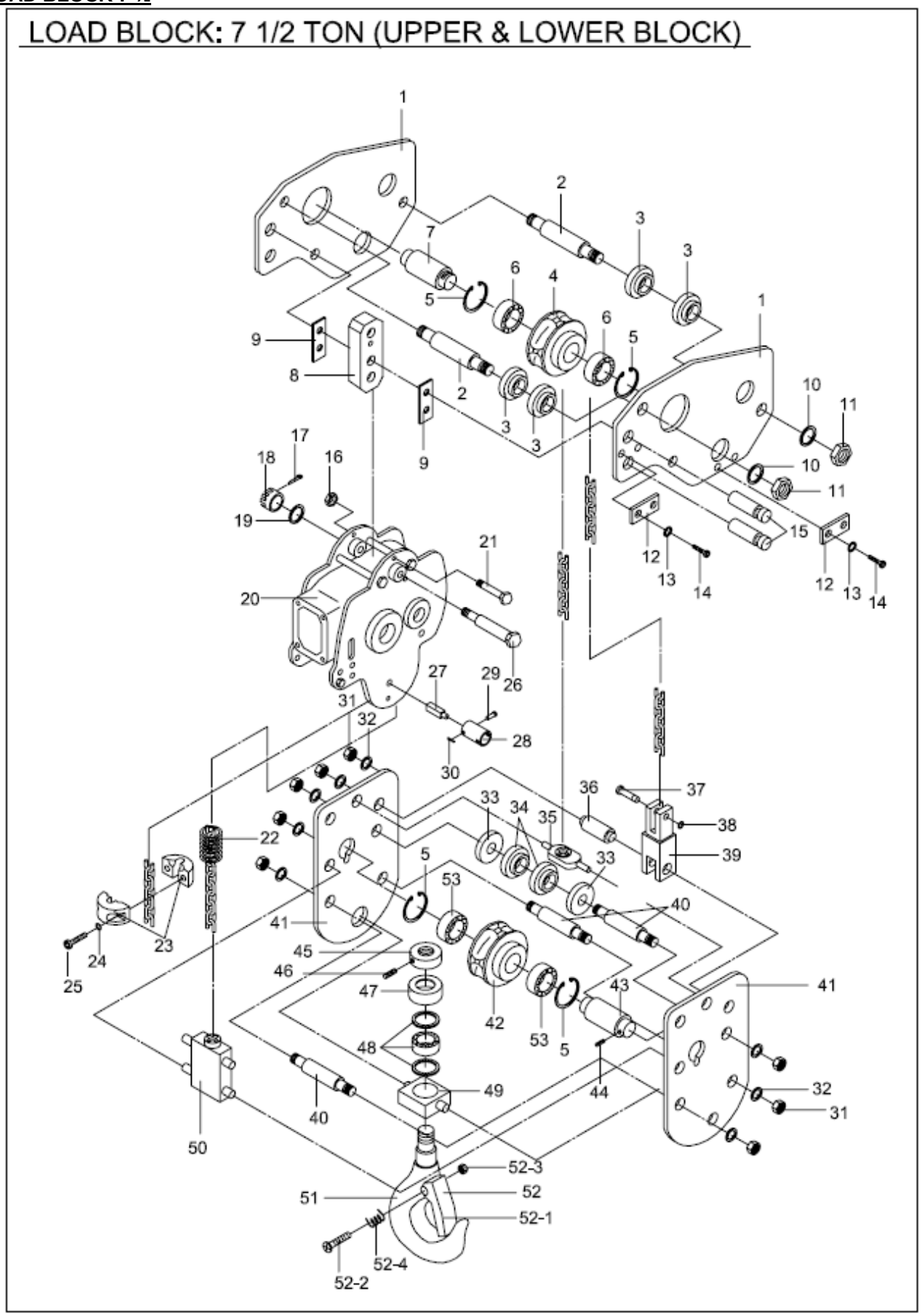
11.7: HOOK PARTS



3Ton U/L Hook Block		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Upper hook block side plate	-											243SKA*2	-			
2	Stay bolt	-											244SKA*5	-			
3	Upper hook block spacer	-											245SKA*3	-			
4	Upper hook	-											240SKA	-			
5	Safety latch	-											487SKA	-			
6	Upper hook block chain wheel	-											250SKA	-			
7	Needle bearing	-											477SKA	-			
8	Upper chain wheel spindle	-											251SKA	-			
9	Hook block attachment piece	-											246SKA	-			
10	Washer B	-											440SKA*5	-			
11	Nylon nut	-											441SKA*5	-			
12	Upper hook block cross bolt	-											478SKA	-			
13	Washer A	-											242SKA	-			
14	Spring washer	-											479SKA	-			
15	Slotted nut	-											480SKA	-			
16	Split pin	-											276SKA	-			
17	Split pin	-											287SKA	-			
18	Slotted nut	-											481SKA	-			
19	Spring washer	-											442SKA	-			
20	Chain wheel case	-											506SKA	-			
21	Upper hook cross bolt	-											289SKA	-			
22	Rubber stopper	-											472SKA*3	-			
23	Spacer tube	-											247SKA	-			
24	Nylon nut	-											482SKA*3	-			
25	Lower hook block swivel shell side bolt	-											446SKA	-			
26	Lower hook block swivel shell (left)	-											248SKA	-			
26-1	Lower hook block swivel shell (right)	-											249SKA	-			
27	Hex socket cap bolt	-											444SKA	-			
28	Lower chain wheel spindle	-											251SKA	-			
29	Needle bearing	-											477SKA	-			
30	Lower hook block chain wheel	-											250SKA	-			
31	Lower hook locking sleeve	-											483SKA	-			
32	Lower hook split ring	-											484SKA*2	-			
33	Thrust ball bearing	-											485SKA	-			
34	Lower hook	-											486SKA	-			
35	Safety latch assembly	-											487SKA	-			
35-1	Safety latch	-											488SKA	-			
35-2	Cross slot round head bolt	-											489SKA	-			
35-3	Nylon nut	-											490SKA	-			
35-4	Torsion spring	-											491SKA	-			
36	Spring pin	-											492SKA*2	-			
37	Hex socket cap bolt	-											445SKA*2	-			
38	Slotted nut	-											480SKA	-			

3Ton U/L Hook Block		Model No. (Dual Speed Hoist)															
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Upper hook block side plate	-											243SKA*2	-			
2	Stay bolt	-											244SKA*5	-			
3	Upper hook block spacer	-											245SKA*3	-			
4	Upper hook	-											240SKA	-			
5	Safety latch	-											487SKA	-			
6	Upper hook block chain wheel	-											250SKA	-			
7	Needle bearing	-											477SKA	-			
8	Upper chain wheel spindle	-											251SKA	-			
9	Hook block attachment piece	-											246SKA	-			
10	Washer B	-											440SKA*5	-			
11	Nylon nut	-											441SKA*5	-			
12	Upper hook block cross bolt	-											478SKA	-			
13	Washer A	-											242SKA	-			
14	Spring washer	-											479SKA	-			
15	Slotted nut	-											480SKA	-			
16	Split pin	-											276SKA	-			
17	Split pin	-											287SKA	-			
18	Slotted nut	-											481SKA	-			
19	Spring washer	-											442SKA	-			
20	Chain wheel case	-											506SKA	-			
21	Upper hook cross bolt	-											289SKA	-			
22	Rubber stopper	-											472SKA*3	-			
23	Spacer tube	-											247SKA	-			
24	Nylon nut	-											482SKA*3	-			
25	Lower hook block swivel shell side bolt	-											446SKA	-			
26	Lower hook block swivel shell (left)	-											248SKA	-			
26-1	Lower hook block swivel shell (right)	-											249SKA	-			
27	Hex socket cap bolt	-											444SKA	-			
28	Lower chain wheel spindle	-											251SKA	-			
29	Needle bearing	-											477SKA	-			
30	Lower hook block chain wheel	-											250SKA	-			
31	Lower hook locking sleeve	-											483SKA	-			
32	Lower hook split ring	-											484SKA*2	-			
33	Thrust ball bearing	-											485SKA	-			
34	Lower hook	-											486SKA	-			
35	Safety latch assembly	-											487SKA	-			
35-1	Safety latch	-											488SKA	-			
35-2	Cross slot round head bolt	-											489SKA	-			
35-3	Nylon nut	-											490SKA	-			
35-4	Torsion spring	-											491SKA	-			
36	Spring pin	-											492SKA*2	-			
37	Hex socket cap bolt	-											445SKA*2	-			
38	Slotted nut	-											480SKA	-			

11.8: LOAD BLOCK 7 ½



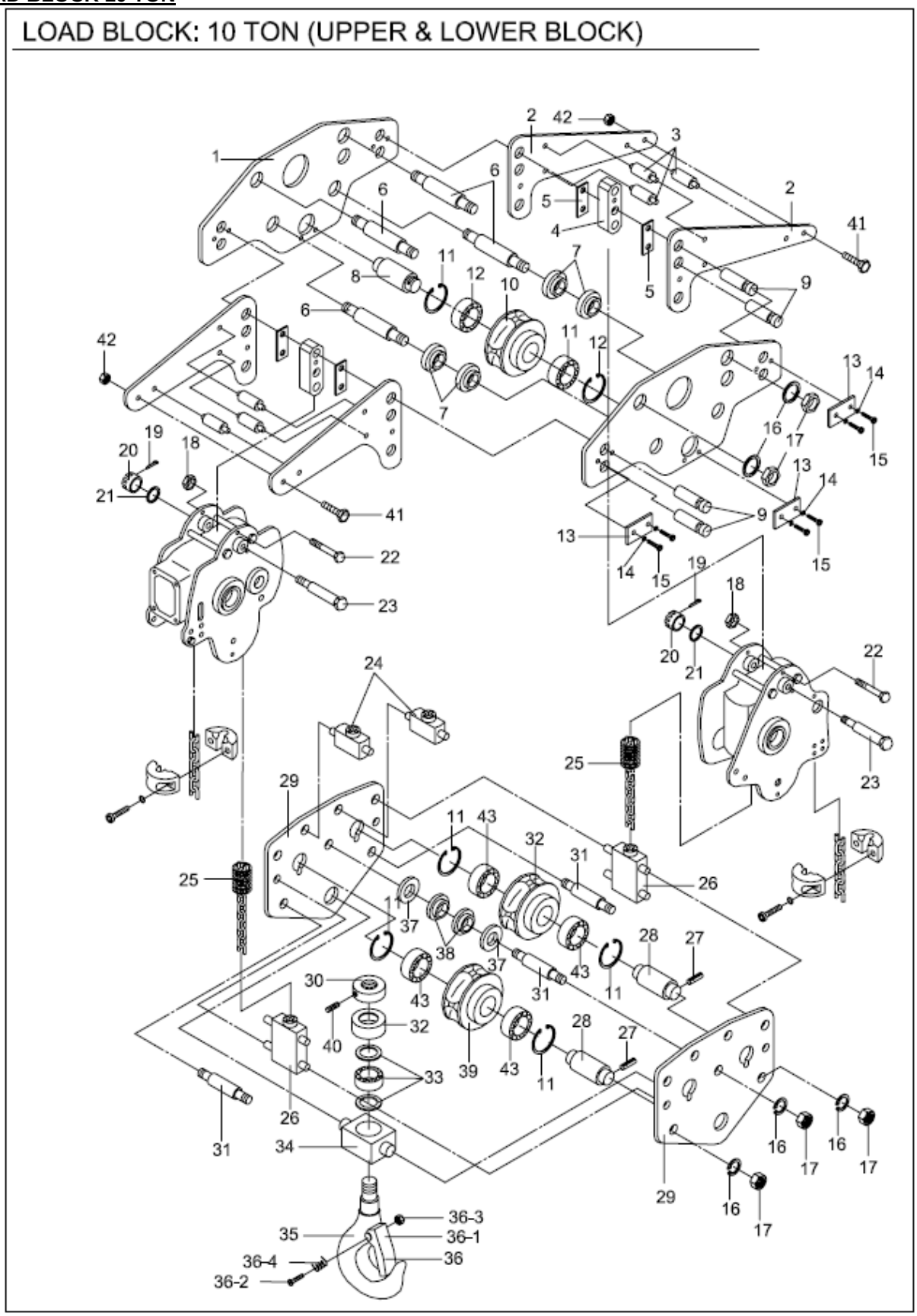
7-1/2Ton U/L Hook Block		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Upper load block side plate	-														311SKB*2	-
2	Stay bolt	-														312SKB*3	-
3	Flanged guide wheel	-														313SKB*4	-
4	Upper load block chain wheel	-														314SKB	-
5	C-retaining ring	-														315SKB*4	-
6	Needle bearing	-														316SKB*2	-
7	Upper chain wheel spindle	-														317SKB	-
8	Load block attachment piece	-														318SKB	-
9	Attachment piece spacer	-														319SKB*2	-
10	Spring washer	-														320SKB*6	-
11	Nut	-														321SKB*6	-
12	Lock plate	-														322SKB*2	-
13	Spring washer	-														323SKB*4	-
14	Hex socket cap bolt	-														324SKB*4	-
15	Attachment piece cross pin	-														325SKB*2	-
16	Nylon nut	-														326SKB	-
17	Split pin	-														327SKB	-
18	Slotted nut	-														328SKB	-
19	Spring washer	-														329SKB	-
20	Chain wheel case	-														138SKB	-
21	Hex head bolt	-														330SKB	-
22	Rubber stopper	-														472SKB*2	-
23	Chain end-stop block	-														332SKB*2	-
24	Spring washer	-														333SKB*2	-
25	Hex socket cap bolt	-														334SKB*2	-
26	Upper load block cross bolt	-														289SKB	-
27	Limit switch actuator B	-														232SKB	-
28	Limit switch actuator A	-														207SKB	-
29	Hex socket cap bolt	-														234SKB	-
30	Nylon nut	-														235SKB	-
31	Nut	-														335SKB*6	-
32	Spring washer	-														336SKB*6	-
33	Guide wheel thrust washer	-														337SKB*4	-
34	Flanged guide wheel	-														338SKB*4	-
35	Chain guide piece	-														339SKB	-
36	Clevis pin	-														340SKB	-
37	Chain attachment pin	-														341SKB	-
38	Cir clip	-														342SKB	-
39	Chain attachment clevis	-														343SKB	-
40	Side plate stay bolt	-														344SKB*3	-
41	Lower hook block side plate	-														345SKB*2	-
42	Lower hook block chain wheel	-														346SKB	-
43	Lower chain wheel spindle	-														347SKB	-
44	Spring pin	-														348SKB	-
45	Lower hook retaining nut	-														349SKB	-

7-1/2Ton U/L Hook Block		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
46	Set screw	-														350SKB	-
47	Bearing cover	-														351SKB	-
48	Thrust ball bearing	-														352SKB	-
49	Lower hook mounting block	-														353SKB	-
50	Chain guide block	-														354SKB	-
51	Lower hook	-														355SKB	-
52	Safety latch assembly	-														356SKB	-
52-1	Safety latch	-														357SKB	-
52-2	Cross slot round head bolt	-														358SKB	-
52-3	Nylon nut	-														359SKB	-
52-4	Torsion spring	-														360SKB	-
53	Needle bearing	-														447SKB*2	-

7-1/2Ton U/L Hook Block		Model No. (Dual Speed Hoist)															
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Upper load block side plate	-														311SKB*2	-
2	Stay bolt	-														312SKB*3	-
3	Flanged guide wheel	-														313SKB*4	-
4	Upper load block chain wheel	-														314SKB	-
5	C-retaining ring	-														315SKB*4	-
6	Needle bearing	-														316SKB*2	-
7	Upper chain wheel spindle	-														317SKB	-
8	Load block attachment piece	-														318SKB	-
9	Attachment piece spacer	-														319SKB*2	-
10	Spring washer	-														320SKB*6	-
11	Nut	-														321SKB*6	-
12	Lock plate	-														322SKB*2	-
13	Spring washer	-														323SKB*4	-
14	Hex socket cap bolt	-														324SKB*4	-
15	Attachment piece cross pin	-														325SKB*2	-
16	Nylon nut	-														326SKB	-
17	Split pin	-														327SKB	-
18	Slotted nut	-														328SKB	-
19	Spring washer	-														329SKB	-
20	Chain wheel case	-														138SKB	-
21	Hex head bolt	-														330SKB	-
22	Rubber stopper	-														472SKB*2	-
23	Chain end-stop block	-														332SKB*2	-
24	Spring washer	-														333SKB*2	-
25	Hex socket cap bolt	-														334SKB*2	-
26	Upper load block cross bolt	-														289SKB	-
27	Limit switch actuator B	-														232SKB	-
28	Limit switch actuator A	-														207SKB	-
29	Hex socket cap bolt	-														234SKB	-
30	Nylon nut	-														235SKB	-
31	Nut	-														335SKB*6	-
32	Spring washer	-														336SKB*6	-
33	Guide wheel thrust washer	-														337SKB*4	-
34	Flanged guide wheel	-														338SKB*4	-
35	Chain guide piece	-														339SKB	-
36	Clevis pin	-														340SKB	-
37	Chain attachment pin	-														341SKB	-
38	Cir clip	-														342SKB	-
39	Chain attachment clevis	-														343SKB	-
40	Side plate stay bolt	-														344SKB*3	-
41	Lower hook block side plate	-														345SKB*2	-
42	Lower hook block chain wheel	-														346SKB	-
43	Lower chain wheel spindle	-														347SKB	-
44	Spring pin	-														348SKB	-
45	Lower hook retaining nut	-														349SKB	-

7-1/2Ton U/L Hook Block		Model No. (Dual Speed Hoist)															
		ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-
No.	00518D	00526D	00544D	01018D	01026D	01044D	02018D	02026D	04009D	04013D	04026D	06009D	06017D	10010D	15007D	20010D	20010D
46	Set screw	-														350SKB	-
47	Bearing cover	-														351SKB	-
48	Thrust ball bearing	-														352SKB	-
49	Lower hook mounting block	-														353SKB	-
50	Chain guide block	-														354SKB	-
51	Lower hook	-														355SKB	-
52	Safety latch assembly	-														356SKB	-
52-1	Safety latch	-														357SKB	-
52-2	Cross slot round head bolt	-														358SKB	-
52-3	Nylon nut	-														359SKB	-
52-4	Torsion spring	-														360SKB	-
53	Needle bearing	-														447SKB*2	-

11.9: LOAD BLOCK 10 TON

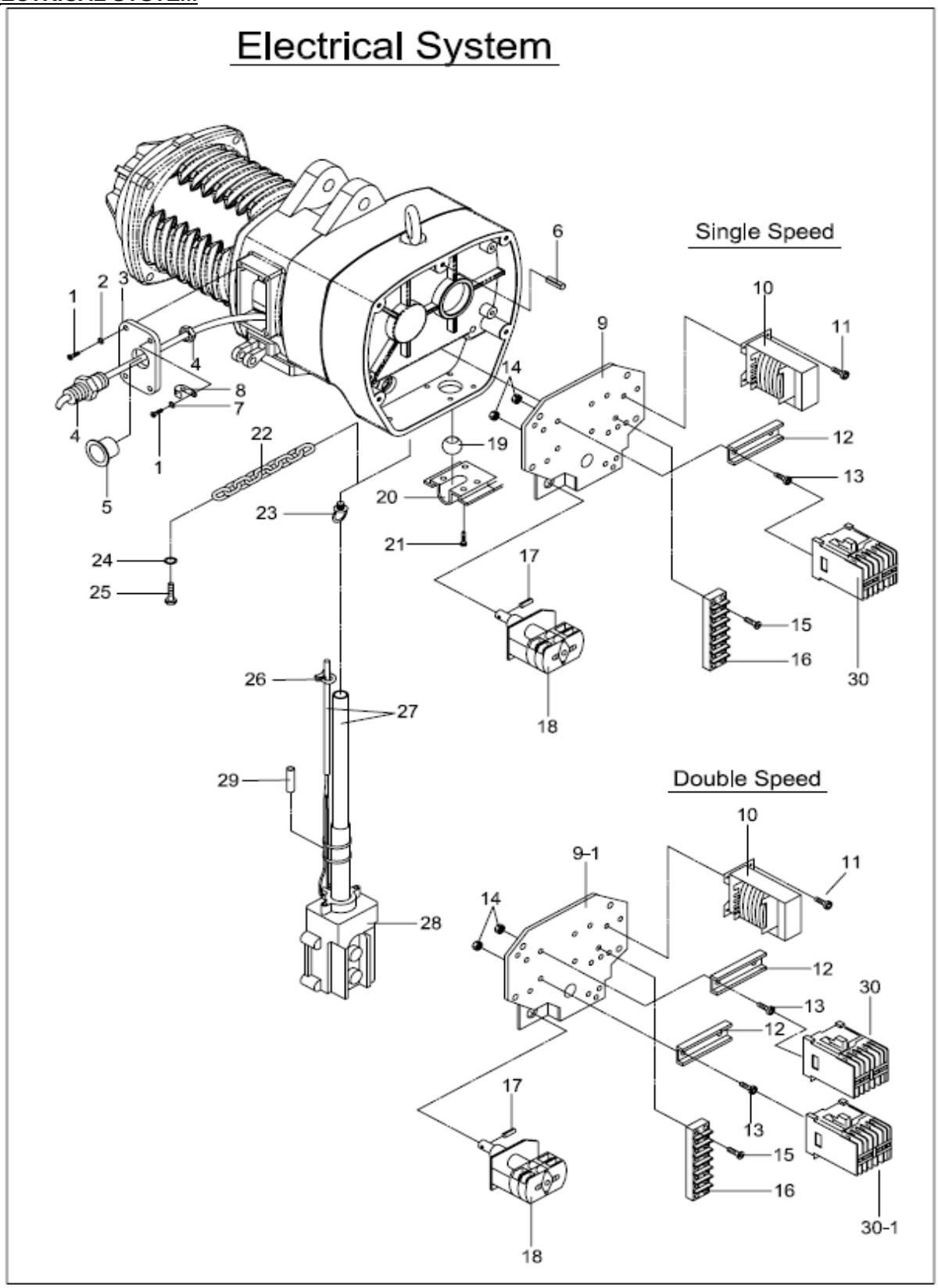


10Ton U/L Hook Block		Model No. (Single Speed Hoist)															
No.	Description	ECH-00518	ECH-00526	ECH-00544	ECH-01018	ECH-01026	ECH-01044	ECH-02018	ECH-02026	ECH-04009	ECH-04013	ECH-04026	ECH-06009	ECH-06017	ECH-10010	ECH-15007	ECH-20010
1	Upper load block side plate	-															361SKB*2
2	Chain bag hanger arm	-															362SKB*4
3	Hanger arm stay pin	-															363SKB*6
4	Upper block attachment piece	-															318SKB*2
5	Attachment piece spacer	-															319SKB*4
6	Side plate stay bolt	-															312SKB*4
7	Flanged guide wheel	-															313SKB*4
8	Upper chain wheel spindle	-															317SKB
9	Attachment piece cross pin	-															325SKB*4
10	Upper load block chain wheel	-															314SKB
11	Cir clip	-															315SKB*6
12	Needle bearing	-															316SKB*2
13	Lock plate	-															322SKB*3
14	Spring washer	-															323SKB*6
15	Hex socket cap bolt	-															324SKB*6
16	Spring washer	-															320SKB*14
17	Nut	-															321SKB*14
18	Nylon nut	-															326SKB*2
19	Split pin	-															327SKB*2
20	Slotted nut	-															328SKB*2
21	Spring washer	-															329SKB*2
22	Hex socket cap bolt	-															330SKB*2
23	Upper load block cross bolt	-															289SKB*2
24	Chain guide piece	-															339SKB*2
25	Robber stopper	-															472SKB*4
26	Chain guide block	-															354SKB*2
27	Spring pin	-															348SKB*2
28	Lower chain wheel spindle	-															347SKB*2
29	Lower hook block side plate	-															364SKB*2
30	Lower hook retaining nut	-															365SKB
31	Side plate stay bolt	-															344SKB*3
32	Bearing cover	-															351SKB
33	Thrust ball bearing	-															352SKB
34	Lower hook mounting block	-															353SKB
35	Lower hook	-															366SKB
36-1	Safety latch	-															368SKB
36-2	Cross slot round head bolt	-															369SKB
36-3	Nylon nut	-															370SKB
36-4	Torsion spring	-															371SKB
37	Guide wheel thrust washer	-															337SKB*6
38	Flanged guide wheel	-															338SKB*6
39	Lower hook block chain wheel	-															346SKB*2
40	Set screw	-															350SKB
41	Hex head bolt	-															513SKB*2
42	Nylon nut	-															231SKB*2
43	Needle bearing	-															447SKB*4

10Ton U/L Hook Block		Model No. (Dual Speed Hoist)															
No.	Description	ECH-00518D	ECH-00526D	ECH-00544D	ECH-01018D	ECH-01026D	ECH-01044D	ECH-02018D	ECH-02026D	ECH-04009D	ECH-04013D	ECH-04026D	ECH-06009D	ECH-06017D	ECH-10010D	ECH-15007D	ECH-20010D
1	Upper load block side plate	-															361SKB*2
2	Chain bag hanger arm	-															362SKB*4
3	Hanger arm stay pin	-															363SKB*6
4	Upper block attachment piece	-															318SKB*2
5	Attachment piece spacer	-															319SKB*4
6	Side plate stay bolt	-															312SKB*4
7	Flanged guide wheel	-															313SKB*4
8	Upper chain wheel spindle	-															317SKB
9	Attachment piece cross pin	-															325SKB*4
10	Upper load block chain wheel	-															314SKB
11	Cir clip	-															315SKB*6
12	Needle bearing	-															316SKB*2
13	Lock plate	-															322SKB*3
14	Spring washer	-															323SKB*6
15	Hex socket cap bolt	-															324SKB*6
16	Spring washer	-															320SKB*14
17	Nut	-															321SKB*14
18	Nylon nut	-															326SKB*2
19	Split pin	-															327SKB*2
20	Slotted nut	-															328SKB*2
21	Spring washer	-															329SKB*2
22	Hex socket cap bolt	-															330SKB*2
23	Upper load block cross bolt	-															289SKB*2
24	Chain guide piece	-															339SKB*2
25	Robber stopper	-															472SKB*4
26	Chain guide block	-															354SKB*2
27	Spring pin	-															348SKB*2
28	Lower chain wheel spindle	-															347SKB*2
29	Lower hook block side plate	-															364SKB*2
30	Lower hook retaining nut	-															365SKB
31	Side plate stay bolt	-															344SKB*3
32	Bearing cover	-															351SKB
33	Thrust ball bearing	-															352SKB
34	Lower hook mounting block	-															353SKB
35	Lower hook	-															366SKB
36-1	Safety latch	-															368SKB
36-2	Cross slot round head bolt	-															369SKB
36-3	Nylon nut	-															370SKB
36-4	Torsion spring	-															371SKB
37	Guide wheel thrust washer	-															337SKB*6
38	Flanged guide wheel	-															338SKB*6
39	Lower hook block chain wheel	-															346SKB*2
40	Set screw	-															350SKB
41	Hex head bolt	-															513SKB*2
42	Nylon nut	-															231SKB*2

43	Needle bearing	-	447SKB*4

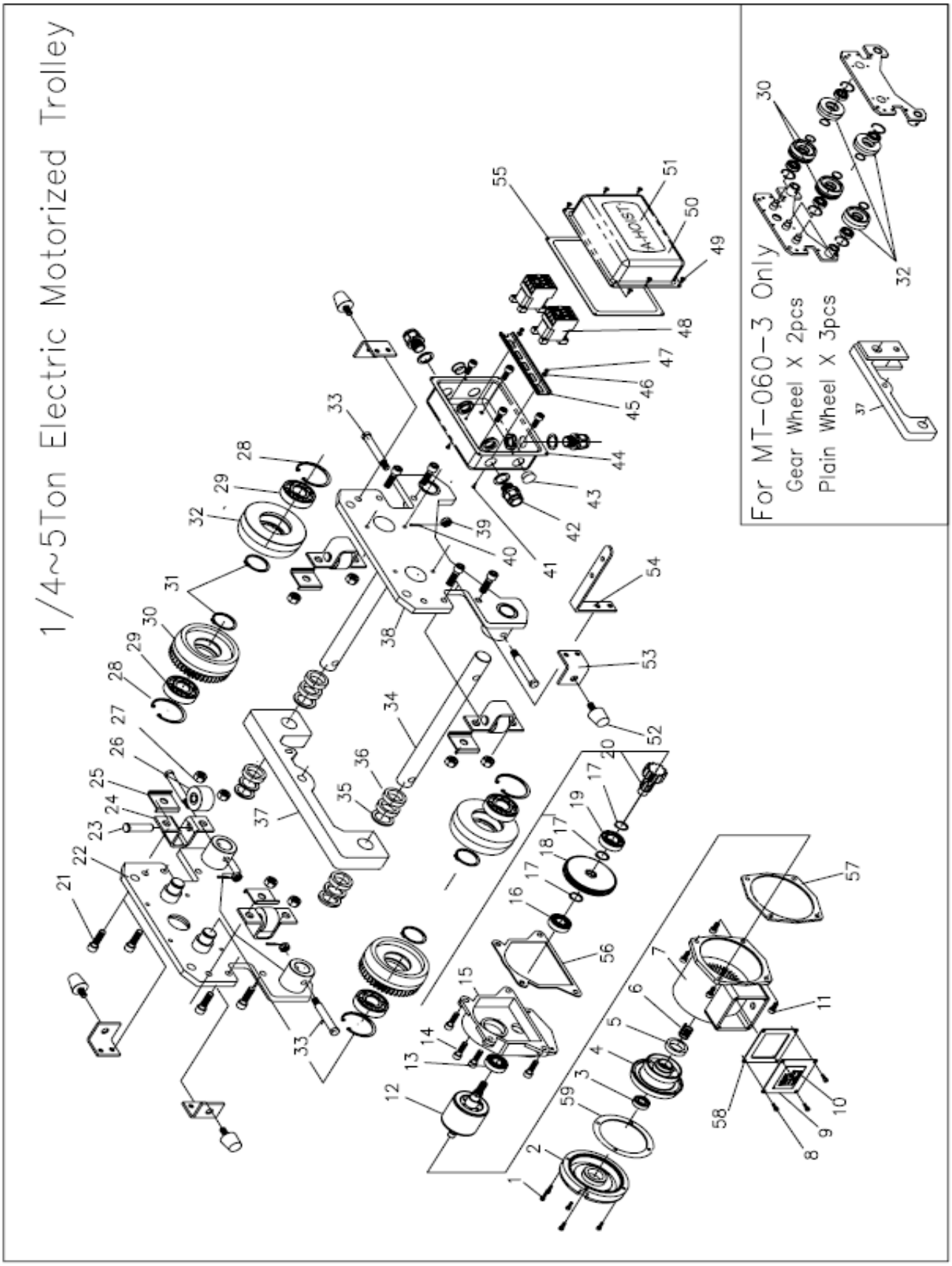
11.10: ELECTRICAL SYSTEM



Electrical System		Model No. (Single Speed Hoist)															
		ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-
No.	Description	00518	00526	00544	01018	01026	01044	02018	02026	04009	04013	04026	06009	06017	10010	15007	20010
1	Philip round head bolt	372SKA*4															372SKA*8
2	Spring washer	373SKA*4															373SKA*8
3	Power cable inlet cover	374SKA															374SKA*2
4	Cable gland	375SKA															375SKA*2
5	Hole plug	376SKA															376SKA*2
6	Spring pin	377SKA															377SKA*2
7	Plain washer	378SKA															378SKA*2
8	Cable clamp	379SKA															379SKA*2
9	Mounting panel	380SKA										380SKB	380SKA	380SKB			380SKB*2
10	Transformer	381SKA															381SKA*2
11	Philip round head bolt	382SKA*4															382SKA*8
12	Mounting rail	383SKA															383SKA*2
13	Philip pan head bolt	384SKA*2															384SKA*4
14	Nylon nut	385SKA*2															385SKA*4
15	Philip round head bolt	386SKA*2															386SKA*4
16	Terminal block	387SKA															387SKA*2
17	Spring pin	392SKA															392SKA*2
18	Limit switch	393SKA															393SKA*2
19	PG32 Cable gland nut	394SKA															394SKA*2
20	Cable gland rubble washer	395SKA															395SKA*2
21	PG32 Cable gland body	372SKA															372SKA*2
22	Connecting chain	396SKA															396SKA*2
23	Hex socket cap bolt	399SKA															399SKA*2
24	Plain washer	398SKA*2															398SK*4
25	Hex socket cap bolt	399SKA															399SK*2
26	Pendant control support wire clamp	400SKA															400SK
27	Electric cable and support wire	401SKA															401SK
28	Pendant control unit	402SKA															402SK
29	Sleeve	403SKA															403SK
30	Relay block	404SKA*2															404SK*4
30-1	Relay block	D404SKA*3															404SK*6

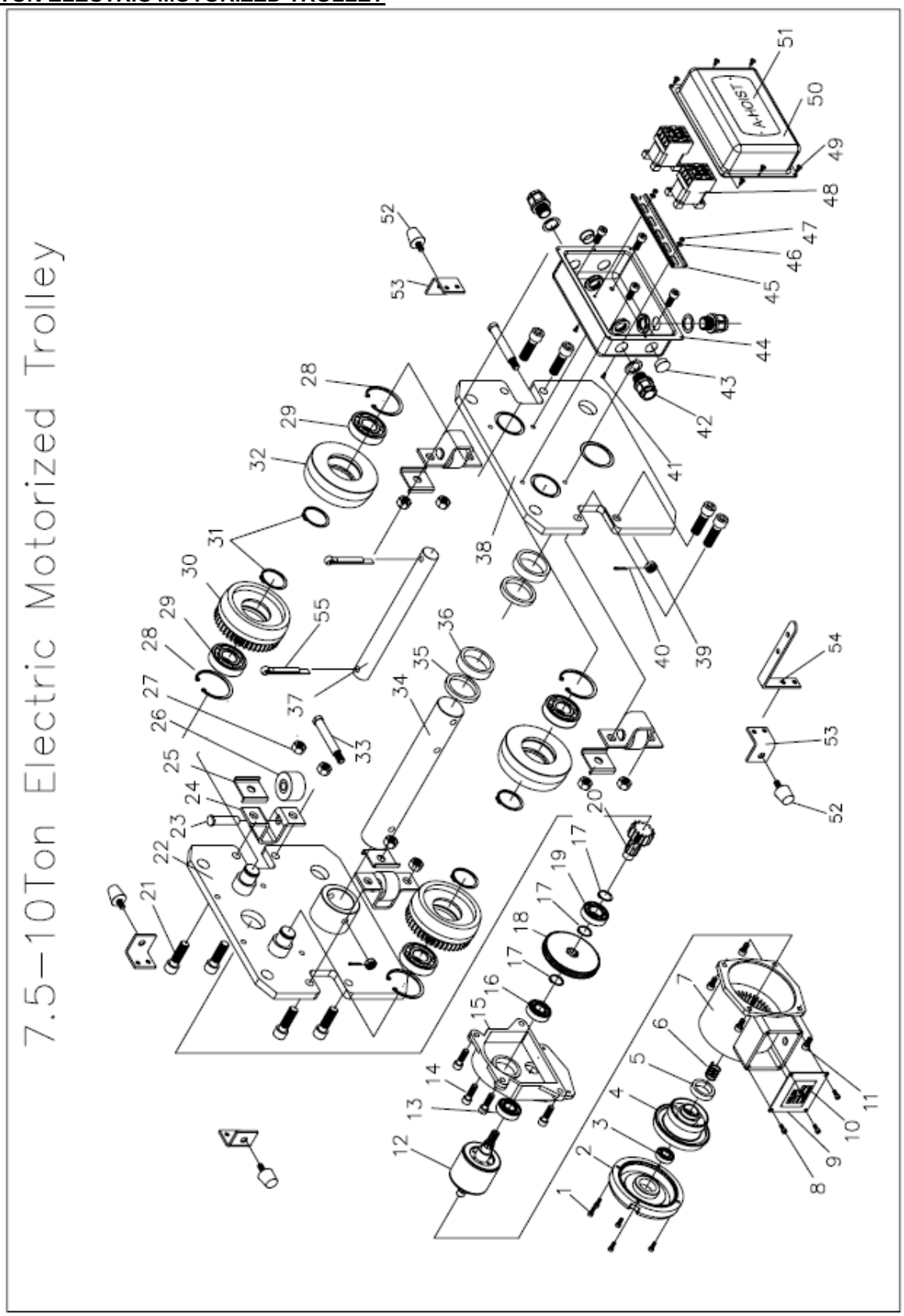
Electrical System		Model No. (Dual Speed Hoist)															
		ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-	ECH-
No.	Description	00518D	00526D	00544D	01018D	01026D	01044D	02018D	02026D	04009D	04013D	04026D	06009D	06017D	10010D	15007D	20010D
1	Philip round head bolt	372SKA*4															372SKA*8
2	Spring washer	373SKA*4															373SKA*8
3	Power cable inlet cover	374SKA															374SKA*2
4	Cable gland	375SKA															375SKA*2
5	Hole plug	376SKA															376SKA*2
6	Spring pin	377SKA															377SKA*2
7	Plain washer	378SKA															378SKA*2
8	Cable clamp	379SKA															379SKA*2
9	Mounting panel	380SKA											380SKB	380SKA	380SKB		380SKB*2
10	Transformer	381SKA															381SKA*2
11	Philip round head bolt	382SKA*4															382SKA*8
12	Mounting rail	383SKA															383SKA*2
13	Philip pan head bolt	384SKA*2															384SKA*4
14	Nylon nut	385SKA*2															385SKA*4
15	Philip round head bolt	386SKA*2															386SKA*4
16	Terminal block	387SKA															387SKA*2
17	Spring pin	392SKA															392SKA*2
18	Limit switch	393SKA															393SKA*2
19	PG32 Cable gland nut	394SKA															394SKA*2
20	Cable gland rubble washer	395SKA															395SKA*2
21	PG32 Cable gland body	372SKA															372SKA*2
22	Connecting chain	396SKA															396SKA*2
23	Hex socket cap bolt	399SKA															399SKA*2
24	Plain washer	398SKA*2															398SK*4
25	Hex socket cap bolt	399SKA															399SK*2
26	Pendant control support wire clamp	400SKA															400SK
27	Electric cable and support wire	401SKA															401SK
28	Pendant control unit	402SKA															402SK
29	Sleeve	403SKA															403SK
30	Relay block	404SKA*2															404SK*4
30-1	Relay block	D404SKA*3															404SK*6

11.11: ¼ - 5 TON ELECTRIC MOTORIZED TROLLEY



Electric Motorized Trolley Parts List									
No.	**Description**	**Model No.**							
		MT-005	**MT-010**	**MT-020**	**MT-040-1**	**MT-040-2**	**MT-060-2**	**MT-060-3**	**MT-100**
1	Hex Socket Cap Bolt	T107A							
2	Brake Cover	T106A							
3	Ball Bearing	T105A							
4	Brake Disk Assembly	T104A							
5	Rubber Collar	T103A							
6	Brake Spring	T102A							
7	Motor Casing and Stator	T101A							
8	Hex Socket Cap Bolt	T109A*4							
9	Power Cable Inlet Cover	T108A							
10	Motor Name Plate	T171A							
11	Hex Socket Cap Bolt	T110A*4							
12	Motor Rotor & Primary Shaft	T111A					T111B		
13	Ball Bearing	T113A							
14	Hex Socket Cap Bolt	T112A*4							
15	Gear Reducer Case	T114A							
16	Ball Bearing	T115A							
17	C Retaining Ring	T116A*3							
18	Driving Gear	T117A							
19	Ball Bearing	T118A							T118B
20	Pinion	T119A							T119B
21	Hex Socket Cap Bolt	T128A*8							T128B*8
22	Side Plate A	T159A					T159B		T159C
23	Guide Wheel Shaft	T135A*4							T135B*4
24	Guide Wheel Seat	T136A*4							T136B*4
25	Guide Wheel Press Plate	T133A*4							T133B*4
26	Guide Wheel	T137A*4							T137B*4
27	Hex Nut	T134A*8							T134B*8
28	C Retaining Ring	T120A*4					T120B*5		T120B*4
29	Ball Bearing	T121A*4					T121B*5		T121B*4
30	Gear Wheel	T125A*2					T125B*2		T125B*2
31	C Retaining Ring	T123A*4					T123B*5		T123B*4
32	Plain Wheel	T122A*2					T122B*3		T122B*2
33	Position Bolt	T126A*2							
34	Suspension Shaft	T158A*2					T158B*2		
35	Thin Spacer	T148A*16					T148B*16		
36	Thick Spacer	T149A*16					T149B*16		
37	Support Yoke	T161A			T161B	T161C	T161D	T161E	T161F
38	Side Plate B	T160A					T160B		T160C
39	Castle Nut	T130A*2							
40	Cotter Pin	T139A*2							
41	Phil Round Hd Screw	T140A*4							
42	Cable Gland	T143A*3							
43	Plastic Cap	T145A*3							
44	Electric Case	T144A							
45	Rail	T153A							
46	Washer	T154A*2							
47	Hex Socket Cap Bolt	T132A*2							
48	Magnetic Contactor	T156A*2							
49	Hex Socket Cap Bolt	T152A*4							
50	Electric Case Cover	T146A							
51	Trolley Name Plate	T127A	T127B	T127C	T127D	T127E	T127F	T127G	T127I
52	Rubber Bumper	T172A*4							
53	Anti-Drop Fin	T173A*4							
54	Cable Arm	T174A							
55	Gasket Mt-01	T175							
56	Gasket Mt-02	T176							
57	Gasket Mt-03	T177							
58	Gasket Mt-04	T178							
59	Gasket	T179							

11.12: 7 ½ TON ELECTRIC MOTORIZED TROLLEY



Electric Motorized Trolley Parts List			
No.	Description	Model No.	
		MT-150	MT-200
1	Hex Socket Cap Bolt	T107A	
2	Brake Cover	T106A	
3	Ball Bearing	T105A	
4	Brake Disk Assembly	T104A	
5	Rubber Collar	T103A	
6	Brake Spring	T102A	
7	Motor Casing and Stator	T101A	
8	Hex Socket Cap Bolt	T109A*4	
9	Power Cable Inlet Cover	T108A	
10	Motor Name Plate	T171A	
11	Hex Socket Cap Bolt	T110A*4	
12	Motor Rotor & Primary Shaft	T111B	
13	Ball Bearing	T113A	
14	Hex Socket Cap Bolt	T112A*4	
15	Gear Reducer Case	T114A	
16	Ball Bearing	T115A	
17	C Retaining Ring	T116A*3	
18	Driving Gear	T117A	
19	Ball Bearing	T118B	
20	Pinion	T119B	
21	Hex Socket Cap Bolt	T128B*8	
22	Side Plate A	T159D	T159E
23	Guide Wheel Shaft	T135B*4	
24	Guide Wheel Seat	T136B*4	
25	Guide Wheel Press Plate	T133B*4	
26	Guide Wheel	T137B*4	
27	Hex Nut	T134B*8	
28	C Retaining Ring	T120C*4	T120D*4
29	Ball Bearing	T121C*2	T121D*2
30	Gear Wheel	T125C*4	T125D*4
31	C Retaining Ring	T123C*4	T123D*4
32	Plain Wheel	T122C*2	T122D*2
33	Position Bolt	T126B*2	
34	Suspension Shaft-A	T158C	
35	Thin Spacer	T148C*16	
36	Thick Spacer	T149C*16	
37	Suspension Shaft-B	T158D	
38	Side Plate B	T160D	T160E
39	Castle Nut	T130B*2	
40	Cotter Pin	T139B*2	
41	Phil Round Hd Screw	T140A*4	
42	Cable Gland	T143A*3	
43	Plastic Cap	T145A*3	
44	Electric Case	T144A	
45	Rail	T153A	
46	Washer	T154A*2	
47	Hex Socket Cap Bolt	T132A*2	
48	Magnetic Contactor	T156A*2	
49	Hex Socket Cap Bolt	T152A*4	
50	Electric Case Cover	T146A	
51	Trolley Name Plate	T127H	T127J
52	Rubber Bumper	T172A*4	
53	Anti-Drop Fin	T173A*4	
54	Cable Arm	T174A	
55	Cotter Pin	T175A*2	

12.0 Appendix A: Variable Frequency Drive (VFD) Inverter Quick Reference

APPENDIX A
(attached)

HITACHI
Inspire the Next

SJ200 Series Inverter Quick Reference Guide

- Single-phase Input 200V Class
- Three-phase Input 200V Class
- Three-phase Input 400V Class

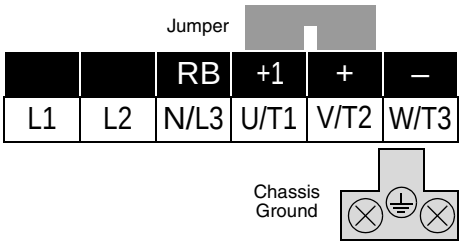
Hitachi Industrial Equipment Systems Co., Ltd.

Manual No. NB6501XA • March 2004

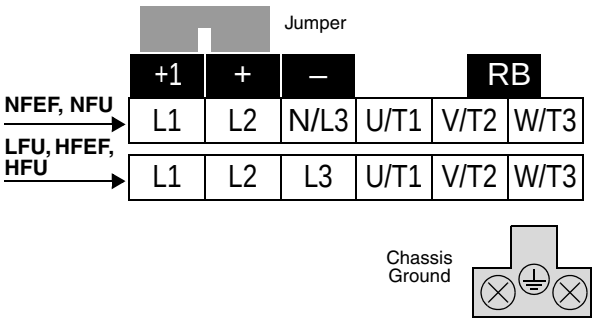
Caution: *Be sure to read the SJ200 Inverter Manual and follow its Cautions and Warnings for the initial product installation. This Quick Reference Guide is intended for reference use by experienced users in servicing existing installations.*

Power Circuit Terminals

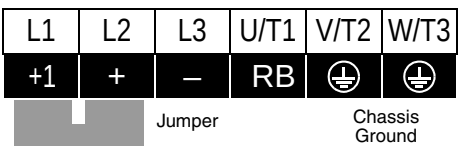
Inverter models SJ200–002NFEF/NFU to –005NFEF/NFU



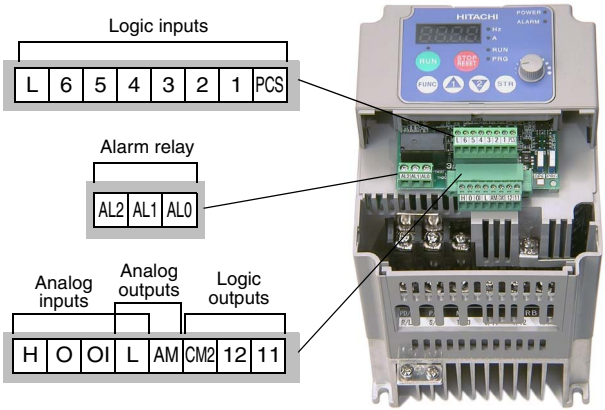
Inverter models SJ200–007NFEF to –022NFEF, –007NFU to –037LFU, –004HFEF/HFU to –040HFEF/HFU



Inverter models –055HFEF/HFU, 075HFEF/HFU



Control Circuit Terminals

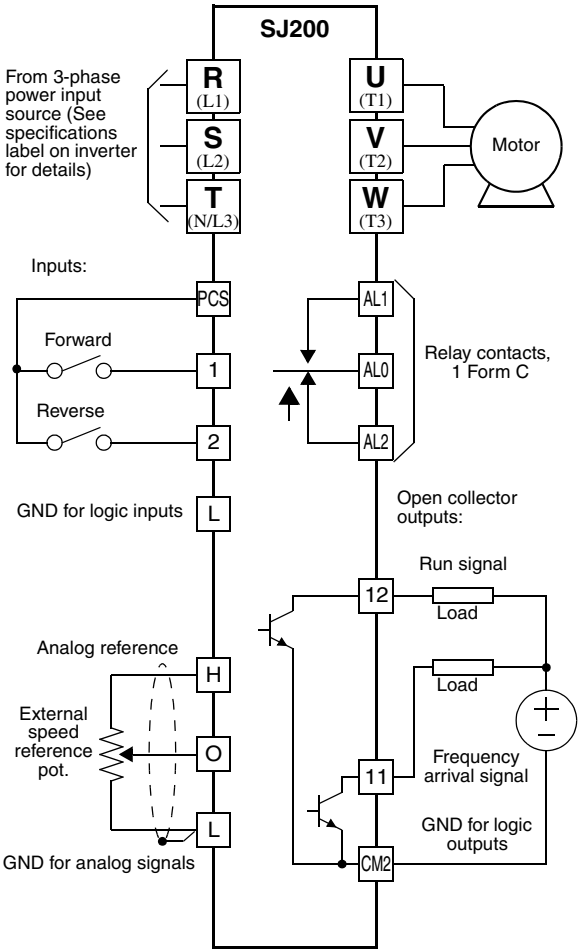


Terminal Name	Description	Ratings and Notes
PCS	+24V for logic inputs	24VDC supply, 30 mA max. (Notes: Do not use for network power Do not short to terminal L)
1, 2, 3, 4, 5, 6	Intelligent (programmable) discrete logic inputs	27VDC max. (use P24 or an external supply referenced to terminal L), 4.7kΩ input impedance
L (top row)	GND for logic inputs	Sum of input 1 to 6 currents (Note: Do not ground)
11, 12	Discrete logic outputs	50 mA max. ON current, 27 VDC max. OFF voltage
CM2	GND for logic outputs	100 mA max for sum of terminals 11 and 12 currents
AM	Analog voltage output	0 to 10VDC, 1 mA max., 50% duty cycle
L (bottom row)	GND for analog signals	Sum of OI, O, H, and AM currents (return)
OI	Analog input, current	4 to 19.6 mA range, 20 mA nominal

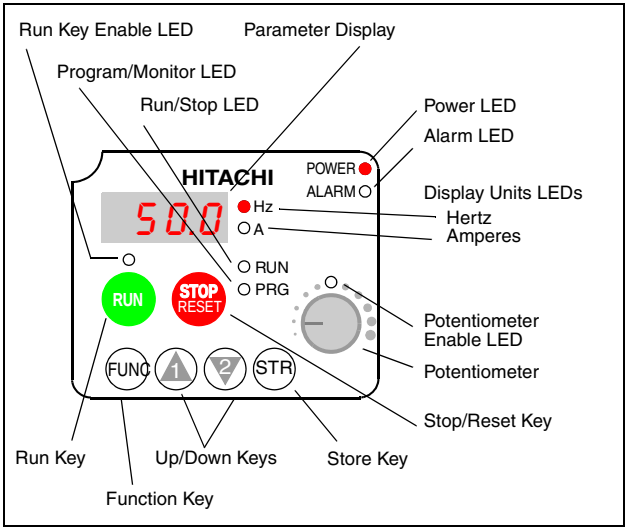
Terminal Name	Description	Ratings and Notes
O	Analog input, voltage	0 to 9.6 VDC range, 10VDC nominal, 12VDC max., input impedance 10 kΩ
H	+10V analog reference	10VDC nominal, 10 mA max.
AL0	Relay common contact	Contact rating Max resistive load = 250VAC, 2.5A; 30VDC 3A; Max inductive load = 250VAC, 0.2A; 30VDC 0.7A Minimum load = 5VDC 100mA, 100VAC 10mA
AL1	Relay contact, normally closed during RUN	
AL2	Relay contact, normally open during RUN	

Basic Wiring Diagram

The following wiring diagram shows the power and motor connections for basic operation. The optional signal input wiring supports external Fwd and Rev Run command, and a speed potentiometer.



Inverter Keypad Operation

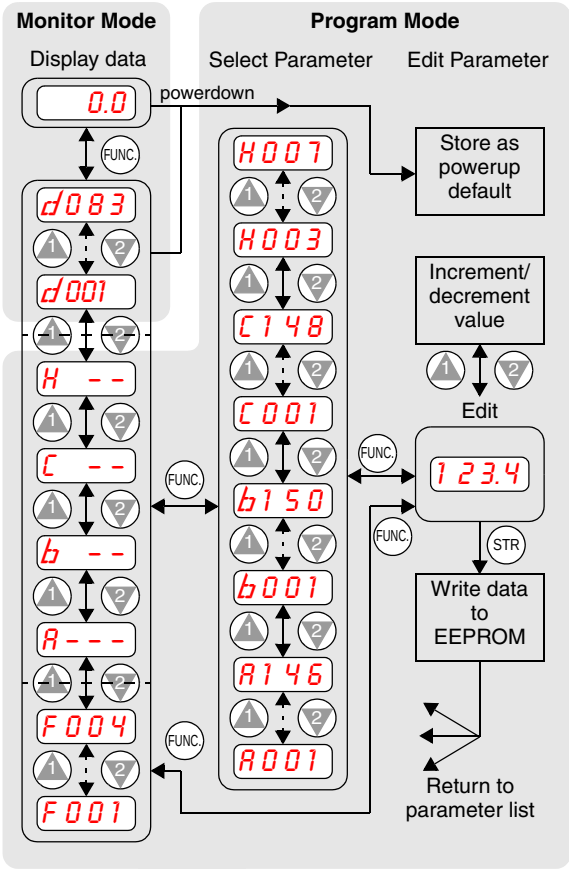


- **Run/Stop LED** – ON when the inverter output is ON and the motor is developing torque, and OFF when the inverter output is OFF (Stop Mode).
- **Program/Monitor LED** – ON when the inverter is ready for parameter editing (Program Mode). It is OFF when the parameter display is monitoring data (Monitor Mode).
- **Run Key Enable LED** – ON when the inverter is ready to respond to the Run key, OFF when the Run key is disabled.
- **Run Key** – Press this key to run the motor (the Run Enable LED must be ON first). Parameter F004, Keypad Run Key Routing, determines whether the Run key generates a Run FWD or Run REV command.
- **Stop/Reset Key** – Press this key to stop the motor when it is running (uses the programmed deceleration rate). This key will also reset an alarm which has tripped.
- **Potentiometer** – Allows an operator to directly set the motor speed when the potentiometer is enabled for output frequency control.
- **Potentiometer Enable LED** – ON when the potentiometer is enabled for value entry.

(continued, next page...)

- **Parameter Display** – A 4-digit, 7-segment display for parameters and function codes.
- **Display Units: Hertz/Amperes** – One of these LEDs will be ON to indicate the units associated with the parameter display.
- **Power LED** – ON when the power input to the inverter is ON.
- **Alarm LED** – ON when the inverter in Trip Mode.
- **Function Key** – This key is used to navigate through the lists of parameters and functions for setting and monitoring parameter values.
- **Up/Down Keys** – Use these keys alternately to move up or down the lists of parameter and functions shown in the display, and to increment/decrement values.
- **Store Key** – When the unit is in Program Mode and the operator has edited a parameter value, press the Store key to write the new value to the EEPROM.

Keypad Navigation Map



Powerup Test

The Powerup Test procedure uses minimal parameter settings to run the motor. The procedure describes two alternative methods for commanding the inverter: *via the inverter keypad*, or *via the logic terminals*.

- Check power input and motor output wiring (see page 4 diagram).
- If using logic terminals for testing, verify correct wiring on [PCS], [FW], [H], [O], and [L] (bottom row) per the diagram on page 4.
- Reverse [RV] input wiring (defaults to terminal [2]) is optional.

Step	Description	Via Keypad	Via Logic Terminals
1	Set speed command source setting	A001 = 00 (keypad pot.)	A001 = 01, [H–O–L] input
2	Set Run FW command source	A002 = 02 (Run key)	A002 = 01, [FW] input
3	Set Run REV command source	—	C002 = 01, [RV] input
4	Set motor base freq.	A003 = 60	
5	Set motor poles (2 / 4 / 6 / 8)	H004 = 4 (default), change only if your motor is different	
6	Set keypad display to monitor freq.	Access D001, press Func. key, display will show 0.0	
	Perform safety check	Disconnect load from motor	
7		Turn keypad pot. to MIN position	Ensure voltage on [O]—[L] terminals= 0V
8	Run Forward command	Press Run key	Turn ON the [FW] terminal
9	Increase speed	Rotate keypad pot. CW dir.	Increase voltage at [O]
10	Decrease speed	Rotate keypad pot. CCW dir.	Decrease voltage at [O]
11	Stop motor	Press Stop key	Turn OFF the [FW] terminal
12	Run Reverse command (optional)	—	Turn ON the [RV] terminal
13	Stop motor	—	Turn OFF the [RV] terminal

Error Codes

The SJ200 series inverters will trip on over-current, over-voltage, and under-voltage to protect the inverter. The motor output turns OFF, allowing the motor to free-run to a stop. Press the Stop/Reset key to reset the inverter and clear the error.

Basic Error Codes

Error Code	Name	Probable Cause(s)
E01	Over current event while at constant speed	• Inverter output was short-circuited • Motor shaft is locked • Load is too heavy • A dual-voltage motor is wired incorrectly Note: The SJ200 will over current trip at nominally 200% of rated current
E02	Over current event during deceleration	
E03	Over current event during acceleration	
E04	Over current event for other conditions	• DC braking power(A054) set too high • Current transformer / noise error
E05	Overload protection	• Motor overload is detected by the electronic thermal function
E06	Braking resistor overload	• Regenerative braking resistor exceeds the usage time or usage ratio
E07	Over voltage protection	• DC bus voltage exceeds a threshold, due to regenerative energy from motor
E08	EEPROM error	• Built-in EEPROM memory experienced noise, high temperature, etc.
E09	Under-voltage error	• DC bus voltage decreased enough to cause a control circuit fault
E11 E22	CPU error	• Built-in CPU had internal error
E12	External trip	• [EXT] input signal detected
E13	USP (Unattended Start Protection)	• When (USP) was enabled, an error occurred when power was applied while a Run signal was present
E14	Ground fault	• A ground fault was detected between the inverter output and the motor. This feature protects the inverter, and does not protect humans.
E15	Input over-voltage	• Input voltage was higher than specified value, after 60 sec. in Stop Mode
E21	Inverter thermal trip	• Inverter internal temperature is above the threshold

Error Code	Name	Probable Cause(s)
E35	Thermistor	• Thermistor input, [THM] and [L], is over the temp. threshold
E60	Communications error	• The inverter's watchdog timer for the communications network has timed out.
---	Under-voltage (brownout) with output shutoff	• Low input voltage caused the inverter to turn OFF the motor output and try to restart. If unsuccessful, a trip occurs.

Error Trip Conditions

Use function code D081 to access the error trip conditions for the current error as shown in the table below. Use the Up and Down arrow keys to scroll through the trip condition parameters.

Step	Display
1. Access D081	d081
2. Press Function Key	If no error: — — —
	If error exists: EXX (error code)
3. Press Up/Dn key (if error exists)  	Output frequency at trip point: 10.0 Motor current at trip point: 2.5 DC bus voltage at trip point: 284.0 Cumulative Run time house at trip point: 15 Cumulation power-ON hours at trip point: 18

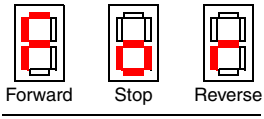
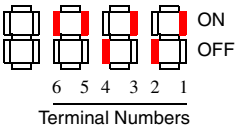
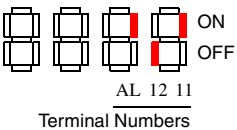
Restoring Factory Default Settings

Action	Display	Function/Parameter
Press FUNC., 1 or 2 as needed.	b - - -	"B" Group selected
Press FUNC.	b001	First "B" Group parameter
Press/hold 1 until...	b085	Country code for initialization selected
Press FUNC. If setting is correct, then skip next step.	02	00 = Japan 01 = Europe 02 = USA
To change country code, press 1 or 2 to set; STR to store.		
Press FUNC.	b085	Country code for initialization selected
Press 2.	b084	Initialization function selected
Press FUNC.	00	00 = disable initialization, clear trip history only
Press 1.	01	01 = enable initialization
Press STR.	b084	Initialization now enabled to restore all defaults
Press/hold FUNC., 1, 2, and STOP/RESET keys. Do not release yet.	b084	First part of key sequence
When your country code appears in the display, release all the keys.	EU USA JP	Default parameter country code shown during initialization
Initialization is complete.	d001	Function code for output frequency monitor shown

Note: *After initializing the inverter, use the Powerup Test on page 8 to get the motor running again.*

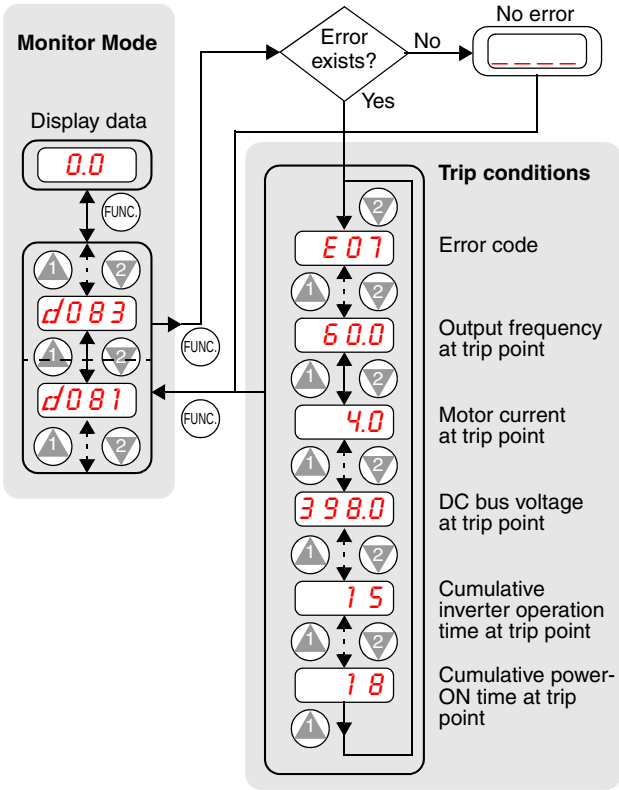
Parameter Tables

“D” Group: Monitoring Functions

Func. Code	Name / Description	Units
D001	Output frequency monitor	Hz
D002	Output current monitor	A
D003	Rotation direction monitor 	—
D004	Process variable (PV), PID feedback monitor	%
D005	Intelligent input terminal status 	—
D006	Intelligent output terminal status 	—
D007	Scaled output frequency monitor (output frequency x B086 scale factor)	User-defined
D013	Output voltage monitor	V
D016	Cumulative operation RUN tim monitor	hours
D017	Cumulative power-on time monitor	hours

Trip History and Inverter Status

Func. Code	Name / Description	Units
D080	Trip Counter	Hz
D081	Trip monitor 1 (most recent trip n)	—
D082	Trip monitor 2 (trip n-1)	—
D083	Trip monitor 3 (trip n-2)	—



Parameter tables for user-settable functions follow these conventions:

- Some parameters have 2nd motor equivalents, indicated by the x2xx parameter codes in the left-most column.
- Some parameters specify an option code. Where applicable, the options codes will be in a bulleted list in the Name/Description column.
- The default values apply to all models unless otherwise noted for each parameter... –FEF (Europe) / – FU (USA)
- Some parameters cannot be edited during Run Mode, and certain Software Lock settings (B031) can prohibit all edits. If in doubt, place the inverter in Stop Mode or consult the inverter manual for details.

"F" Group: Main Profile Parameters

Func. Code	Name / Description	Default Value	Set Value
F001	Output frequency setting	0.0	
F002	Acceleration (1) time setting	10.0	
F202	Acceleration (1) time setting, 2nd motor	10.0	
F003	Deceleration (1) time setting	10.0	
F203	Deceleration (1) time setting, 2nd motor	10.0	
F004	Keypad Run key routing • 00 Forward • 01 Reverse	00	

"A" Group: Standard Functions

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
A001	Frequency source setting • 00 Keypad potentiometer • 01 Control terminal • 02 Function F001 setting • 03 ModBus network input • 10 Calculate function input	01 / 00	
A002	Run command source setting • 01 Input terminal FW or RV (assignable) • 02 Run key on keypad, or digital operator • 03 ModBus network input	01 / 02	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
A003/ A203	Base frequency setting	50.0 / 60.0	
A004/ A204	Maximum frequency setting	50.0 / 60.0	
A005	[AT] selection • 00 Select between [O] and [OI] at [AT] • 01 [O]+[OI] ([AT] input is ignored) • 02 Select between [O] and keypad pot • 03 Select between [OI] and keypad pot	00	
A011	Pot./O–L input active range start frequency	0.0	
A012	Pot./O–L input active range end frequency	0.0	
A013	Pot./O–L input active range start voltage	0.	
A014	Pot./O–L input active range end voltage	100.	
A015	Pot./O–L input start frequency enable • 00 Use A011 starting value) • 01 Use 0 Hz	01	
A016	External frequency filter time constant	2. / 8.	
A020/ A220	Multi-speed frequency setting	0	
A021 A022 A023 A024 A025 A026 A027 A028 A029.. ..A035	Multi-speed frequency settings (for both motors)	0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 0.0 / 0.0 ..... 0.0 / 0.0	
A038	Jog frequency setting	1.00	
A039	Jog stop mode • 00 Free-run stop, jogging disabled during motor run • 01 Controlled deceleration, jogging disabled during motor run • 02 DC braking to stop, jogging disabled during motor run	00	
A042/ A242	Manual torque boost value	5.0(A042)/ 0.0 (A242)	
A043/ A243	Manual torque boost frequency adjustment	3.0/(A043) 0.0(A243)	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
A044/ A244	V/f characteristic curve selection • 00 V/f constant torque • 01 V/f variable torque • 02 Intelligent sensorless vector control	02	
A045	V/f gain setting	100.	
A046/ A246	Automatic torque boost voltage gain	100	
A047/ A247	Automatic torque boost slip gain	100	
A051	DC braking enable • 00 Disable • 01 Enable	00	
A052	DC braking frequency setting	0.5	
A053	DC braking wait time	0.0	
A054	DC braking force during deceleration	0.	
A055	DC braking time for deceleration	0.0	
A056	DC braking / edge or level detection for [DB] input	01	
A061	Frequency upper limit setting	0.0	
A062	Frequency lower limit setting	0.0	
A063 A065 A067	Jump (center) frequency setting	0.0	
A064 A066 A068	Jump (hysteresis) frequency width setting	0.5	
A071	PID Enable • 00 PID operation OFF • 01 PID operation ON	00	
A072	PID proportional gain	1.0	
A073	PID integral time constant	1.0	
A074	PID derivative time constant	0.0	
A075	PV scale conversion	1.00	
A076	PV source setting • 00 [OI] terminal (current input) • 01 [O] terminal (voltage input) • 02 ModBus network • 03 Calculate function output	00	
A077	Reverse PID action • 00 PID input = SP – PV • 01 PID input = –(SP – PV)	00	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
A078	PID output limit	0.0	
A081	AVR function select • 00 AVR enabled • 01 AVR disabled • 02 AVR enabled except during decel	00	
A082	AVR voltage select	230 / 230 400 / 460	
A092/ A292	Acceleration (2) time setting	15.0	
A093/ A293	Deceleration (2) time setting	15.0	
A094/ A294	Select method to switch to Acc2/Dec2 profile • 00 2CH input from terminal • 01 transition frequency	00	
A095/ A295	Acc1 to Acc2 frequency transition point	0.0	
A096/ A296	Dec1 to Dec2 frequency transition point	0.0	
A097	Acceleration curve selection • 00 Linear • 01 S-curve	00	
A098	Deceleration curve selection • 00 Linear • 01 S-curve	00	
A101	[OI]–[L] input active range start frequency	0.0	
A102	[OI]–[L] input active range end frequency	0.0	
A103	[OI]–[L] input active range start current	0.0	
A104	[OI]–[L] input active range end current	100.	
A105	[OI]–[L] input start frequency enable	01	
A141	A input select for calculate function • 00 Digital operator • 01 Keypad potentiometer • 02 [O] input • 03 [OI] input • 04 Network variable	02	
A142	B input select for calculate function • 00 Digital operator • 01 Keypad potentiometer • 02 [O] input • 03 [OI] input • 04 Network variable	03	
A143	Calculation symbol • 00 ADD (A input + B input) • 01 SUB (A input – B input) • 02 MUL (A input x B input)	00	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
A145	ADD frequency	0.0	
A146	ADD direction select • 00 Plus (adds A145 value to output frequency) • 01 Minus (subtracts A145 value from output frequency)	00	

"B" Group: Fine-tuning Functions

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
B001	Selection of automatic restart mode • 00 Alarm output after trip, automatic restart disabled • 01 Restart at 0Hz • 02 Resume operation after frequency matching • 03 Resume previous freq. after freq. matching, then decelerate to stop and display trip info	00	
B002	Allowable under-voltage power failure time	1.0	
B003	Retry wait time before motor restart	1.0	
B004	Instantaneous power failure / under-voltage trip alarm enable • 00 Disable • 01 Enable	00	
B005	Number of restarts on power failure / under-voltage trip event • 00 Restart 16 times • 01 Always restart	00	
B012/ B212	Level of electronic thermal setting	Rated current of each inverter	
B013/ B213	Electronic thermal characteristic • 00 Reduced torque • 01 Const. torque	01	
B021	Overload restriction operation mode • 00 Disabled • 01 Enabled for accel and constant speed • 02 Enabled for constant speed only	01	
B022	Overload restriction setting	Rated current x 1.5	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
B023	Deceleration rate at overload restriction	1.0 / 30.0	
B031	Software lock mode selection • 00 Low-level access, [SFT] blocks edits • 01 Low-level access, [SFT] blocks edits (except F001 and Multi-speed parameters) • 02 No access to edits • 03 No access to edits except F001 and Multi-speed parameters	01	
B080	[AM] analog signal gain	100.	
B082	Start frequency adjustment	0.5	
B083	Carrier frequency setting	5.0	
B084	Initialization mode (parameters or trip history) • 00 Trip history clear • 01 Parameter initialization • 02 Trip history clear and parameter initialization	00	
B085	Country code for initialization • 00 Japan version • 01 Europe version • 02 USA version	01 / 02	
B086	Frequency scaling conversion factor	1.0	
B087	STOP key enable • 00 Enable • 01 Disable	00	
B088	Restart mode after FRS • 00 Restart from 0Hz • 01 Restart from frequency detected from actual speed of motor	00	
B090	Dynamic braking usage ratio	0.0	
B091	Stop mode selection • 00 DEC (decelerate and stop) • 01 FRS (free-run to stop)	00	
B092	Cooling fan control • 00 Fan always ON • 01 Fan ON during Run, OFF during Stop • 02 Fan is temperature-controlled	00	
B095	Dynamic braking control • 00 Disable • 01 Enable during RUN only • 02 Enable always	00	
B096	Dynamic braking activation level	360 / 720	
B130	Over-voltage LADSTOP enable • 00 Disable • 01 Enable	00	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
B140	Over-current trip suppression • 00 Disable • 01 Enable	00	
B150	Carrier mode • 00 Disable • 01 Enable	00	

"C" Group: Intelligent Terminal Functions

Func. Code	Name / Description		Default Value –FEF / –FU	Set Value
C001	Terminal [1] function	Twenty-four option codes available (see page 23)	00	
C002	Terminal [2] function		01	
C003	Terminal [3] function		02 / 16	
C004	Terminal [4] function		03 / 13	
C005	Terminal [5] function		18 / 09	
C006	Terminal [6] function		09 / 18	
C011	Terminal [1] active state	• 00 Normally open [NO] • 01 Normally closed [NC]	00	
C012	Terminal [2] active state		00	
C013	Terminal [3] active state		00	
C014	Terminal [4] active state		00 / 01	
C015	Terminal [5] active state		00	
C016	Terminal [6] active state		00	
C021	Terminal [11] function	Ten option codes available (see page 24)	01	
C022	Terminal [12] function		00	
C026	Alarm relay terminal function		05	
C028	[AM] signal selection	Two option codes available (see page 24)	00	
C031	Terminal [11] active state	• 00 Normally open (NO) • 01 Normally closed (NC)	00	
C032	Terminal [12] active state		00	
C033	Alarm relay terminal active state		01	

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
C041	Overload level setting	Rated current of inverter	
C042	Frequency arrival setting for accel	0.0	
C043	Arrival frequency setting for decel	0.0	
C044	PID deviation level setting	3.0	
C052	PID FBV function high limit	100.0	
C053	PID FBV function variable low limit	0.0	
C071	Communication speed selection • 04 4800 bps • 05 9600 bps • 06 19200 bps	06 / 04	
C072	Node allocation	1.	
C074	Communication parity selection • 00 No parity • 01 Even parity • 02 Odd parity	00	
C075	Communication stop bit selection	1	
C076	Communication error select • 00 Trip (error code E60) • 01 Decelerate to stop and trip (error code E60) • 02 Disable • 03 Free run stop (coasting) • 04 Decelerate to a stop	02	
C077	Communication error time-out	0.00	
C078	Communication wait time	0.	
C081	O input span calibration	100.0	
C082	OI input span calibration	100.0	
C085	Thermistor input tuning	100.0	
C086	[AM] terminal offset tuning	0.0	
C091	Debug mode enable • 00 Display • 01 No display	00	
C101	Up/Down memory mode selection • 00 Clear last frequency (return to default frequency F001) • 01 Keep last frequency adjusted by UP/DWN	00	

Func. Code	Name / Description		Default Value –FEF / –FU	Set Value
C102	Reset selection • 00 Cancel trip state at input signal ON transition, stops inverter if in Run Mode • 01 Cancel trip state at signal OFF transition, stops inverter if in Run Mode • 02 Cancel trip state at input signal ON transition, no effect if in Run Mode		00	
C141	Input A select for logic output	Nine option codes available (LOG excluded), see page 24	00	
C142	Input B select for logic output		01	
C143	Logic function select • 00 [LOG] = A AND B • 01 [LOG] = A OR B • 02 [LOG] = A XOR B		00	
C144	Terminal [11] ON delay		0.0	
C145	Terminal [11] OFF delay		0.0	
C146	Terminal [12] ON delay		0.0	
C147	Terminal [12] OFF delay		0.0	
C148	Output relay ON delay		0.0	
C149	Output relay OFF delay		0.0	

"H" Group: Motor Constants Functions

Func. Code	Name / Description	Default Value –FEF / –FU	Set Value
H003/ H203	Motor capacity	Factory set	
H004/ H204	Motor poles setting • 2 poles • 4 poles • 6 poles • 8 poles	4	
H006/ H206	Motor stabilization constant	100	
H007/ H207	Motor voltage select	Factory set	

Intelligent Input Terminal Listing

Symbol	Code	Input Terminal Name
FW	00	Forward Run/Stop
RV	01	Reverse Run/Stop
CF1	02	Multi-speed select, Bit 0 (LSB)
CF2	03	Multi-speed select, Bit 1
CF3	04	Multi-speed select, Bit 2
CF4	05	Multi-speed select, Bit 3 (LSB)
JG	06	Jogging
DB	07	External DC braking
SET	08	Set (select) second motor data
2CH	09	2-stage accel and decel
FRS	11	Free-run stop
EXT	12	External trip
USP	13	Unattended start protection
SFT	15	Software lock
AT	16	Analog input voltage/current sel.
RS	18	Reset inverter
PTC	19	PTC thermistor thermal protection
STA	20	Start (3-wire interface)
STP	21	Stop (3-wire interface)
F/R	22	FWD, REV (3-wire interface)
PID	23	PID disable
PIDC	24	PID Reset
UP	27	Remote control Up func.
DWN	28	Remote control Down func.
UDC	29	Remote control data clearing
OPE	31	Operator control
ADD	50	Add frequency enable
F-TM	51	Force Terminal Mode
—	255	Not selected

Intelligent Output Terminal Listing

Symbol	Code	Input Terminal Name
RUN	00	Run signal
FA1	01	Freq. arrival type 1 – constant speed
FA2	02	Freq. arrival type 2 – over-frequency
OL	03	Overload advance notice signal
OD	04	Output deviation for PID control
AL	05	Alarm signal
Dc	06	Analog input disconnect detect
FBV	07	PID second stage output
NDc	08	Network detection signal
LOG	09	Logic output function

Analog Input Configuration

The following table shows the parameter settings and [AT] state required to select various analog input sources.

A005	[AT]	External Frequency Command Input
00	OFF	[O]
	ON	[OI]
01	(ignored)	Sum (O + OI)
02	OFF	[O]
	ON	Keypad potentiometer
03	OFF	[OI]
	ON	Keypad potentiometer

Analog Output Function Listing

The following table shows the functions available for assignment to the analog output terminal via terminal [AM], option set by C028:

Option Code	Function Name	Description	Corresponding Signal Range
00	Analog freq. monitor	Actual motor speed	0 to max. freq. (Hz)
01	Analog current output monitor	Motor current (% of max. rated output current)	0 to 200%