VULCAN
HOIST - PALAN

OWNER'S MANUAL

ELECTRIC TROLLEYS
1 TO 10 TON RATINGS

Manuel en français de l'autre côté

KEEP THIS MANUAL

DO NOT INSTALL, OPERATE OR PERFORM MAINTENANCE ON THIS EQUIPMENT BEFORE READING AND UNDERSTANDING THIS MANUAL IN ITS ENTIRETY. FAILURE TO READ AND COMPLY WITH THE CONTENTS OF THIS MANUAL CAN RESULT IN SERIOUS BODILY INJURY OR DEATH AND / OR PROPERTY DAMAGE.

VER 2021-06-01

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1. Important Information and Warnings

THIS MANUAL CONTAINS IMPORTANT SAFETY, INSTALLATION, OPERATION AND MAINTENANCE INFORMATION. MAKE THIS MANUAL AVAILABLE TO EVERY PERSON DESIGNATED FOR THE OPERATION, INSTALLATION AND MAINTENANCE OF THESE PRODUCTS. UNLESS OTHERWISE NOTED, TONS IN THIS MANUAL ARE US SHORT TONS (2,000 LBS).

1.1 Warning, Caution and Notice

Throughout this manual, there are steps and procedures which, if not followed, may result in injury, death, or substantial property damage.

Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

Indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury or property damage.

Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

WARNING

Equipment described herein is not designed for and must not be used for lifting, supporting, or transporting people or for lifting or supporting loads over people.

Equipment described herein shall not be used in conjunction with other equipment unless required and applicable safety devices relevant to the system, crane, or application have been properly installed by the system designer, system manufacturer, crane manufacturer installer or user.

Modifications to upgrade, rerate, or otherwise alter this equipment shall be authorized only by the original equipment manufacturer.

Equipment described herein may be used in the design and manufacture of larger machines like cranes or monorails combined with a hoist. In those cases, additional equipment or devices may be required for the crane and monorail to comply with applicable design and safety standards. The crane designer, crane manufacturer, or user is responsible for supplying said equipment. Refer to ANSI/ASME B30.17, Cranes and Monorails (with Underhung Trolley or Bridge); ANSI/ASME B30.2 "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)" and ANSI/ASME B30.16 "Overhead Hoists (Underhung)".

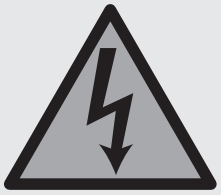
If a below-the-hook lifting device or a sling is used with the electric trolley, the user is responsible for their proper use and maintenance and should refer to ANSI/ASME B30.9 "Slings" or ANSI/ASME B30.20 "Below-The-Hook Lifting Devices".

Hoists and cranes used to handle molten material may require additional equipment or devices. Refer to ASTM-E2349, Standard Practice for Safety Requirements in Metal Casting Operations: Sand Preparation, Molding, and Core Making; Melting and Pouring; and Cleaning and Finishing.

Electrical equipment described herein is designed and built-in compliance with CSA C22.1, "Canadian Electric Code", CSA C22.2 33, UL1340, UL1004-1, and ANSI/ASME B30.17. The system designer, system manufacturer, crane designer, crane manufacturer, installer or user is responsible to ensure that the installation and associated wiring of these electrical components are compliant with all applicable Federal, State, Provincial and Local Codes.

FAILURE TO COMPLY WITH ANY ONE OF THE LIMITATIONS NOTED HEREIN CAN RESULT IN SERIOUS BODILY INJURY OR DEATH, AND/OR PROPERTY DAMAGE

DANGER



Hazardous voltages are present in the electrical components and connections between these components.

Before performing ANY mechanical or electrical maintenance on the equipment, disconnect the main switch supplying power to the equipment and lock and tag the main switch in the off position.

Refer to ANSI/ASSP Z244.1, Lockout, Tagout and Alternative Methods. Only trained and competent qualified personnel should inspect and repair this equipment.

NOTICE

It is the responsibility of the owner/user to install, inspect, test, maintain, and operate an electric trolley in accordance with ANSI/ASME B30.17 "Cranes and Monorails (with Underhung Trolley or Bridge)". If the electric trolley is installed as part of a larger lifting system, such as an overhead crane or trolley-hoist, it is also the owner/user's responsibility to comply with the applicable ANSI/ASME B30 volumes that address that type of equipment.

It is the responsibility of the owner/user to have all personnel involved with the installation, inspection, testing, maintenance, and operation of an electric trolley read this manual and applicable portions of ANSI/ASME B30.17 "Cranes and Monorails (with Underhung Trolley or Bridge)". If the electric trolley is installed as part of a larger lifting system, such as an overhead crane or trolley-hoist, the applicable ANSI/ASME B30 volumes that address that type of equipment must also be read by all personnel involved.

If the electric trolley owner/user requires additional information, or if any information in the manual is not clear, contact Vulcan Hoist. Do not install, inspect, test, maintain, or operate this electric trolley unless this information is fully understood.

Inspection of the trolley must be performed on a regular basis in accordance with the ANSI/ASME B30.17 standard by a qualified individual. The owner/user is responsible for maintaining a record of all inspections performed on the electric trolley. A regular inspection schedule of the electric trolley in accordance with the requirements of ANSI/ASME B30.17 must be established, and records kept.

Operational tests must be performed according to ANSI/ASME B30.17 by a qualified person after the initial installation, but also every time the electric trolley is reinstalled, modified, or repaired before the electric trolley can be put back into service.

The owner/user must establish a preventive maintenance program for the electric trolley. That preventive maintenance program must be followed in accordance with ANSI/ASME B30.17.

In accordance with ANSI/ASME B30.17, the owner/user shall ensure that:

Every person interacting with the electric trolley has been trained and has read the sections of this manual pertinent to their role.

Every person's role and duties regarding the electric trolley must have been identified, documented, and assigned to them.

Everybody operating the electric trolley has been provided with and has passed a written and a practical test pertinent to their role regarding the electric trolley. These tests must comply with any local, state, provincial, federal or any other provisions that may apply.

Everybody who has passed these tests has been issued a certificate or a formal record in an official registry attesting that they passed these tests.

Operators must fulfill the responsibilities they have been assigned before, during, and after hoisting operations as described in ANSI/ASME B30.17.

Personnel working in proximity to the electric trolley must abide by the general requirements during hoisting operations described in ANSI/ASME B30.17.

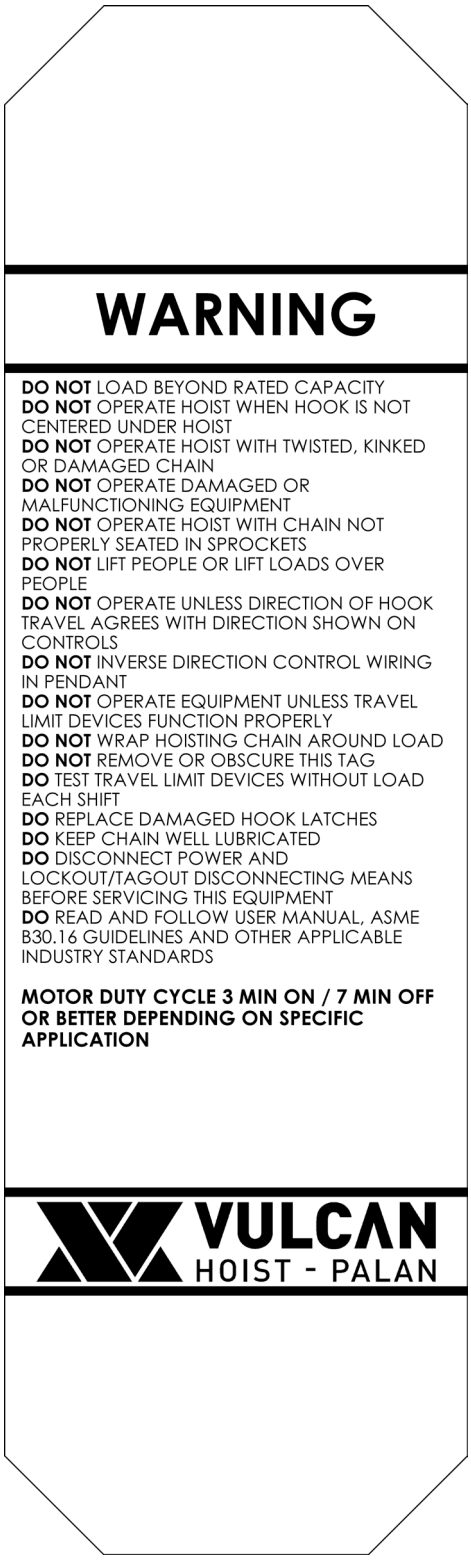
This manual contains instructions and information relating to a range of electric trolleys which may have different characteristics and/or optional features. Ignore instructions and information that do not apply to your specific electric trolley.

Replace your electric trolley's parts only with parts approved by Vulcan Hoist. If you need to repair, maintain, recertify, or inspect your electric trolley, Vulcan Hoist offers repair, maintenance, recertification, and inspection services on all its products.

Pronouns "he" and "him" are used throughout this manual to lighten the text and are not meant to exclude anybody.

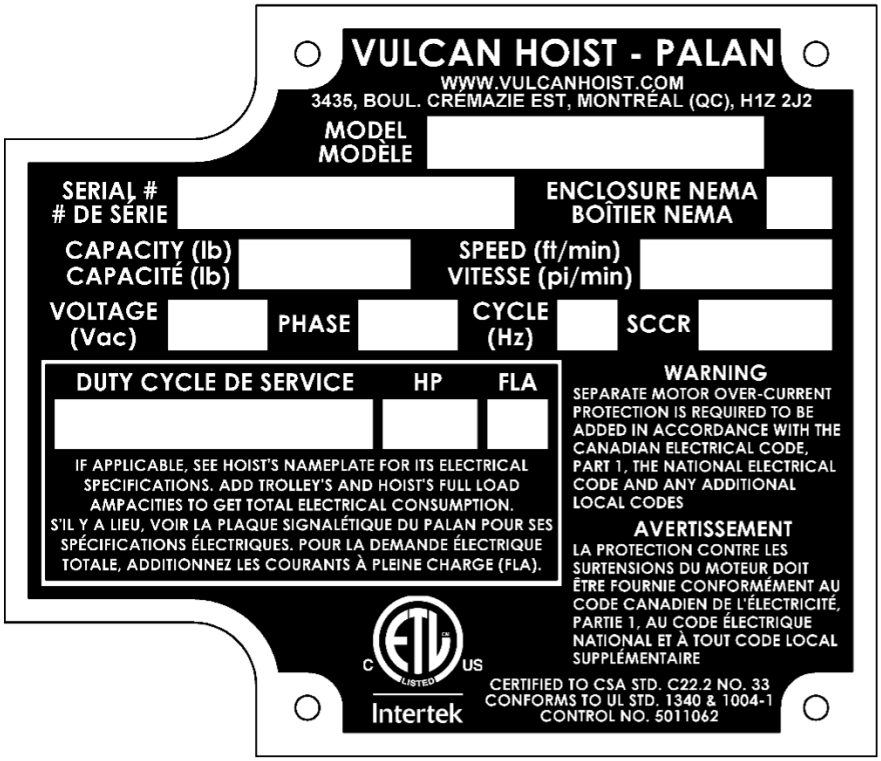
1.2 Warning Tag

The warning tag shown below is attached to every Vulcan Hoist electric trolley's controls. Read it. Do not ever remove it. If it is missing, damaged or otherwise difficult to read, order a new one from Vulcan hoist and install it next to the control pendant or radio transmitter.



1.3 Nameplate

One of the two nameplates shown below must be permanently fixed to the electric trolley. Every data field must contain the appropriate information. Contact Vulcan Hoist to get a new nameplate if your electric trolley is shipped without a completed nameplate, if it is damaged to the point it is no longer legible, if it is bent to the point it can no longer be fastened properly or if it is missing.



2. Technical Information

2.1 Electric Trolley's Specifications and Identification

Model Number					
Prefix	**Maximum load* (pounds)**	**Speed (feet/minute)**	**Beam Type**	**Nominal Voltage**	**Number of phases**
ET	1T = 2200 2T = 4400 3T = 6600 5T = 11 000 10T = 22 000	/09 = 9 /12 = 12 /18 = 18 /24 = 24 /36 = 36 /48 = 48 /72 = 72	I H	115 208 230 380 415 460 575	/1 = 1 /3 = 3
* Your electric trolley's maximum load can be inferior to its model's maximum load. Refer to your electric trolley's nameplate. Your electric trolley's maximum load could be rated in metric tonnes (MT) if specified.					

For example, an electric trolley with ET3T/24I230/3 as its model number would be equipped with a 230 V, 3-phase motor. It would roll on an "I" beam at 24 ft/min. Its rated maximum load would be 3 metric tonnes, but it could also be rated at 3 imperial short tons (6000 lbs) or 2 metric tonnes (see section 2.4)

Serial Number					
Prefix	**Sequential Number**	**Motor Brand**	**Reducer Brand**	**Year of Manufacturing**	**Month of Manufacturing**
V	XXXX (4 digits)	A = AGI B = Brook Crompton L = Leeson M = MGM Z = other	CH = Chenta	XXX (3 digits, skip centuries)	XX (2 digits)

For example, V1234ACH22106 would be the 1234th electric trolley, it would have an AGI motor, a Chenta reducer, and would have been manufactured in June 2021.

Model	Counterweights	Approximate Weight (lb)	Available Speeds for Single-speed Motors (ft/min)	Available Apeeds for Dual-speed Motors (ft/min)
ET1T	2	156	9, 12, 18, 24, 36, 48, 72	18/6, 24/8, 36/12, 72/24
ET2T	1 or 2	170	9, 12, 18, 24, 36, 48, 72	18/6, 24/8, 36/12, 72/24
ET3T	1	207	9, 12, 18, 24, 36, 48	18/6, 24/8, 36/12
ET5T	1	267	9, 12, 18, 24, 36, 48	18/6, 24/8, 36/12
ET10T	0	390	18, 24, 36, 48	18/6, 24/8, 36/12

Available Motors (Nominal Voltage)			
1 Phase, 60 Hz	**3 Phases, 60 Hz**	**3 Phases, 50 Hz***	**2 Speeds**
115 230	208 230 460 575	380 415	Every 3-phase motor
*Motors operating on 50 Hz will be 20% slower than their nominal speed			

2.2 Operational and Environmental Conditions

Unless specified otherwise, this electric trolley does not meet the requirements to work in the following environments, and, as such, should not be operated in these environments:

1. Explosive gases or vapours
2. Organic or airborne solvents
3. Excessively dusty or powdery environments
4. Excessively acidic or salty environments
5. Relative humidity over 85%
6. Ambient temperatures below -20°C (-4 F) or over 40°C (104 F)

However, outdoor installations are still possible. See section 6.7.3 of this manual.

The electric trolley's duty rating is its motor's duty rating, which is on the motor's nameplate. The duty cycle should be lowered when the electric trolley is operated in adverse conditions which could impede the motor's cooling.

2.3 Optional Features

The following are orderable optional features which do not come as standard. Ignore instructions relating to these features if your electric trolley does not have them.

1. Dual-speed motor (3-phase motors only)
2. Motor with brake
3. Motor treated against humidity and acidity
4. Low headroom versions with lug mount
5. Synthetic reducer oil for use in more extreme temperatures
6. Cycles and/or hour counter
7. Integrated limit switches
8. Stroboscopic warning light
9. Horn and/or sound alarm
10. Festooning system
11. Epoxy paint

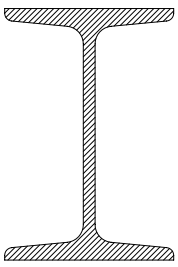
12. NEMA 4 control pendant with additional buttons
13. Wireless radio controller
14. Simultaneous controls for multiple electric hoists and/or trolleys.
15. NEMA 4 or NEMA 12 electric panel
16. Vulcan Hoist electric hoist (with controller combined with the electric trolley)
17. 115V control voltage
18. UL508A certified purpose-made electrical panel

2.4 Beam Compatibility

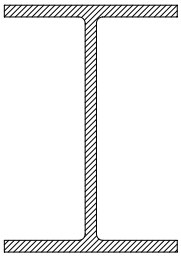
These electric trolleys are designed to be used either on "I" beams or on "H" beams. An electric trolley made for an "I" beam must not be installed on an "H" beam and vice versa. The following dimensions could be modified for an end-user's specific needs after a detailed analysis of the applications. The rated capacity could have been lowered if specified.

Model	Rated Capacity *	Maximum Beam Width	Maximum Beam Thickness	Minimum Turning Radius
ET1T	1 T	6.25	0.770**	28
	1 MT	5.50		
ET2T	2 T	7.50	0.813	33
	2 MT	6.50		
ET3T	3 T	7.25	0.813	35
	3 MT	6.50		
	2 MT	10.00		
ET5T	5 T	7.75	0.688	50
	5 MT	7.00		
	3 MT	11.50		
ET10T	10 T	6.75	1.625	61
	10 MT	6.25		
	5 MT	10.25		

* T = US short ton (2000 lbs), MT = metric tonne (1000 kg).
**0.895 for the low headroom version.
All dimensions are in inches.

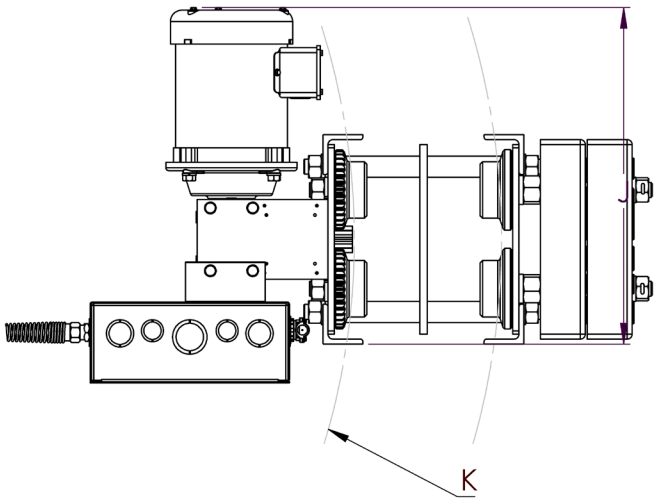


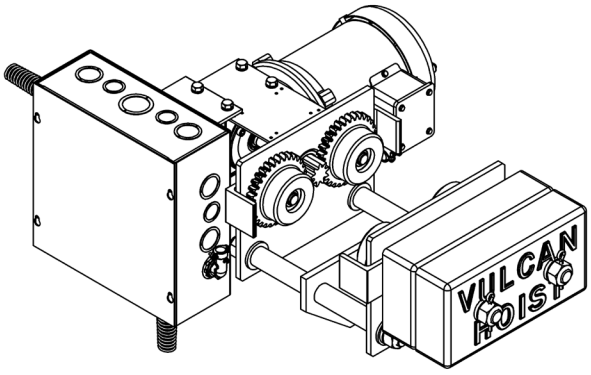
Poutre en «I»

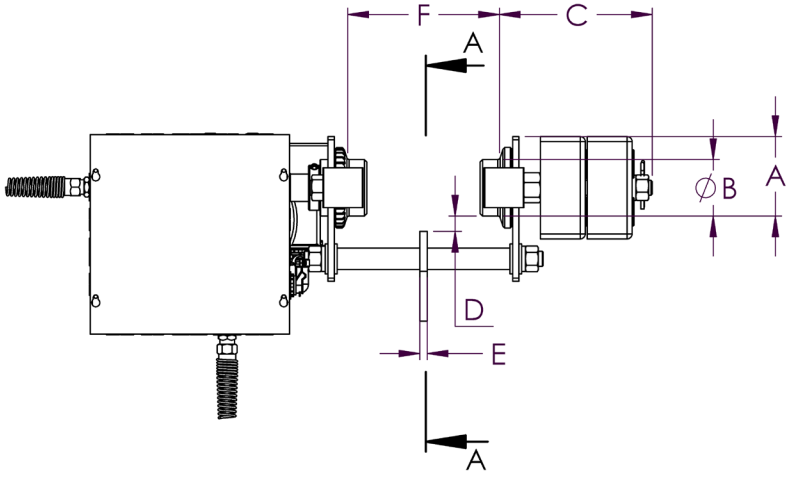


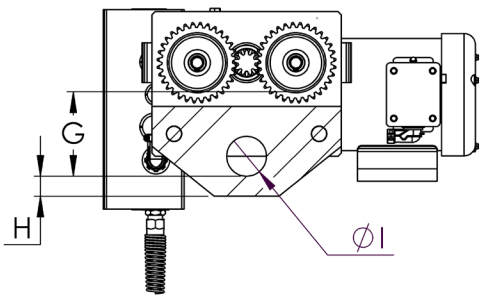
Poutre en «H»

2.5 External Dimensions



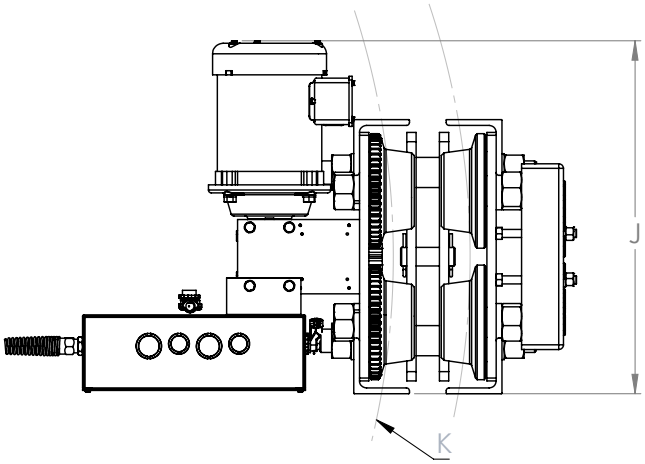


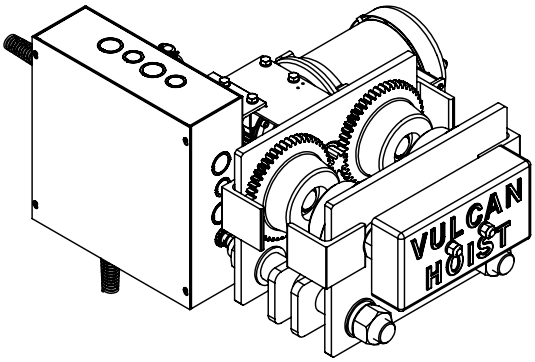


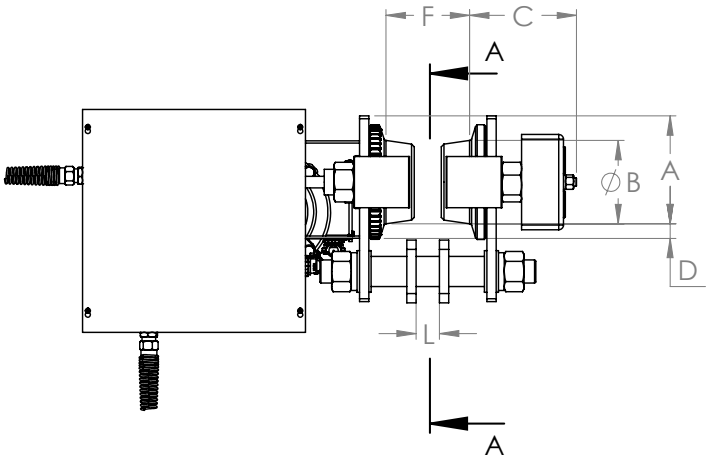


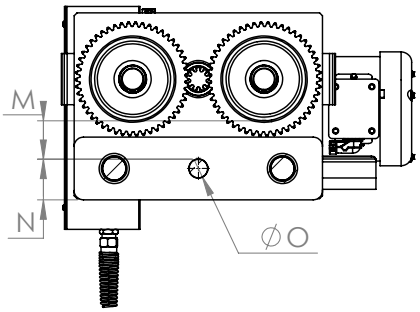
SECTION A-A

ET1T, H beam version









SECTION A-A

ET3T, I beam version, low headroom for lug mount version with a NEMA 12 control panel for two-speed motors

	Dimensions (inches)	ET1T	ET2T	ET3T	ET5T	ET10T
A		4,0	4,9	5,8	6,3	7,4
B		2,8	4,0	4,5	5,3	6,0
C		7,8	8,5	5,8	6,0	4,2
D		0,75	0,81	0,81	0,69	1,63
E		0,38	0,50	0,63	0,63	0,75
F	Minimum beam flange **	2,50	4,00	4,00	4,00	4,00
	Maximum beam flange **	5,50	6,50	6,50	7,00	6,25
G		4,3	4,4	5,8	6,2	9,3
H		1,00	1,25	1,25	1,25	1,81
I		2,0	2,0	2,0	2,0	2,5
J*		18,5	18,5	18,5	19,8	21,5
K***	Minimum turning radius	28	33	35	50	61
L	Low headroom versions only	1,00	1,25	1,25	1,25	1,25
M		1,71	1,75	2,08	2,21	3,00
N		1,63	1,81	2,19	2,25	2,38
O		0,88	0,88	1,00	1,00	1,00

Some dimensions could have been changed on request. This table is for informational purposes only, the dimensions are approximate.

* "J" does not account for optional equipment which may increase this dimension.

** "F" is adjustable between these dimensions to match the electric trolley to the beam. Your beam must fit within these dimensions while providing two 1/16" gaps between the beam and the electric trolley's wheel flanges (see section 3.2).

*** The minimum turning radius "K" is measured on the inside of the beam's curve and may be affected by optional features.

As shown in the previous diagrams, cylindrical wheels are for "H" beams and tapered wheels are for "I" beams.

2.6 Applicable Standards

As noted on the nameplate, this electric trolley is certified by Intertek and meets the following standards:

1. CSA C22.2 NO.33 Electrical safety requirements for cranes and hoist
2. UL 1340 Standard for Hoists
3. UL 1004-1 Standard for rotating electrical machine – General Requirements

This electric trolley is also designed and made to meet ANSI/ASME B30.17 Cranes and Monorails (with Underhung Trolley or Bridge).

3. Initial Installation

WARNING

Do not make any electrical connections before the electric trolley is mounted on its beam.

3.1 Unpacking

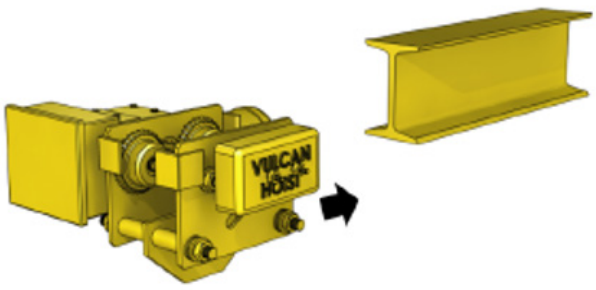
After unboxing your electric hoist, before anything else, make sure that:

1. it has not been damaged during transport
2. its rated capacity is correct and that it is rated for its application
3. its voltage, number of phases and frequency, as shown on the motor's nameplate, correspond to the electrical circuit's voltage, number of phases and frequency on which you plan to plug the electric trolley (except in cases of a 230 volts motor on a 208 volts circuit and in some cases of 50 Hz circuits)
4. the stay bolts' length and their spacers will allow you to mount adequately the electric trolley on the beam
5. the electric trolley's wheels correspond to the right type of beam ("I" or "H")
6. the warning tag is present, fixed to the wire pendant or radio transmitter and is legible as described in section 1.2
7. the nameplate is as described in section 1.3

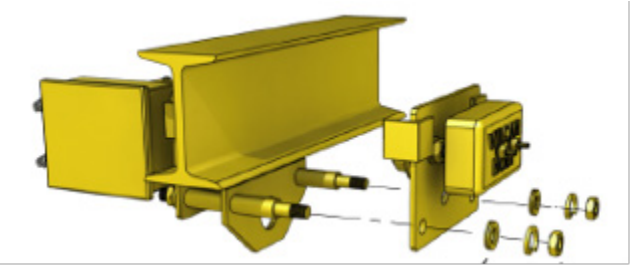
3.2 Mounting the Electric Trolley

There are two recommended methods to mount the electric trolley onto its beam:

METHOD 1. Remove the end stops on one of the beam's ends and slide in the electric trolley from the side. Replace the beam's end stops immediately after. Go to step 1.



Method 2. If the electric trolley cannot be slid onto its beam as described in the first method, remove the stay bolts' nuts, lock washers, and spacers from one side of the electric trolley. Pull apart the side plates. Put one set of wheels on the beam, then the other, and put back the spacers, lock washers, and nuts in the order you removed them. If this method was used, do not forget to properly torque the stay bolts' nuts in step 2.

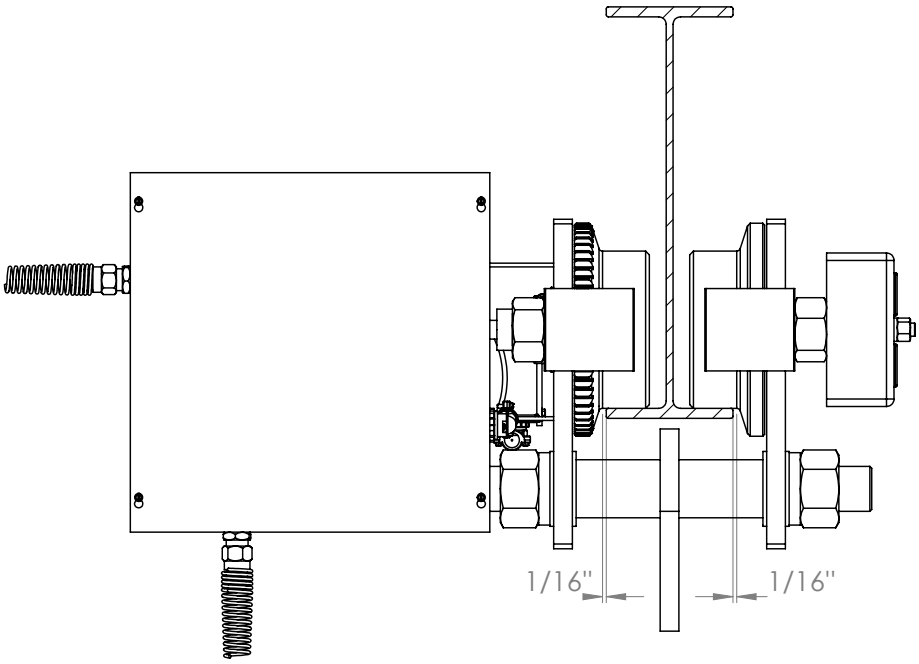


STEP 1. Measure the space between the wheel flanges and the beam. There must be a 1/16" gap between the wheel flanges and the beam on both sides, so that the wheel flanges and the beam do not touch. If that is not the case, adjust that gap by moving spacers from one side of the side plates to the other.

WARNING

The side plates must be parallel to each other and to the beam. Ensure that the spacers are equally distributed as much as possible on either side of the suspension plate(s).

The suspension plate(s), to which the load is attached, must be centered as much as possible with respect to the beam and the side plates.



STEP 2. Torque the stay bolts' nuts as specified below.

Model	Torque (ft-lb)	Torque (Nm)
ET1T	88	120
ET2T	145	197
ET3T	198	269
ET5T	344	467
ET10T	679	921

The stay bolts' nuts must be tightened to the specified torque to ensure the electric trolley's integrity and safety. Verify these nuts' tightening torque even if they were never loosened.

STEP 3. With a permanent marker, draw a line aligning the stay bolts and their nuts to be able to see if they are loosening during future maintenance and inspections. These marks will be more useful if they are visible from the floor.

STEP 4. Measure and fill in the initial dimensions in the "Deformation Inspection Template" in the annex to track the electric trolley's plastic deformation. Photocopying that template to reuse it later is recommended.

Certain dimensions must be measured periodically to determine if the electric trolley poses a risk due to its plastic deformation.

STEP 5. If a Vulcan Hoist electric hoist is to be paired with the electric trolley, mount the hoist onto the trolley. The electric trolley and hoist will be controlled with a single wire pendant or radio transmitter. Push the hoist's cable into the trolley's control panel through the 90° elbow fitting and connect the hoist's numbered wires to the matching bus bar terminals. Do not change any internal wiring.

3.3 Power Circuit Wiring

A power wire too small will create a constant low voltage and could burn the motor even if there are no loads on the electric trolley and its hoist if applicable.

Plugging your electric trolley on an inadequate power circuit and/or making wrong connections can create power surges which could damage your power circuit and/or your electric trolley and/or cause a fire.

Household power outlets cannot tolerate the motor's electric current. Do not plug your electric trolley in a household power outlet.

WARNING

Have a qualified electrician make the electric trolley's power connections. Make sure the power connections are compliant with CSA C22.2 NO.33: Electrical safety requirements for cranes and hoist.

A main disconnect switch and/or a circuit breaker must be installed before the electric trolley's power cable by a qualified electrician.

The power wires must be connected in a way to allow completely disconnecting them from the power source easily and safely.

Do not reverse the electric trolley's and/or its hoist's direction of motion by changing the wiring inside the wire pendant.

NOTICE

Your electric trolley is equipped with a device which shuts off power in case of overheating. If this device is triggered, wait for it to reinitialise before resuming use.

Except if noted otherwise on the nameplate, Vulcan Hoist electric products are designed for 60 Hz power circuits. However, they may also work on 50 Hz power circuits, albeit with reduced performance and at your own risk.

3.3.1 Connections to Single Phase, 115 or 230 Volts Power Circuits

Connect the power wires as close as possible to your building's power entry. The green wire is ground, and the white wire is neutral.

If you have the optional integrated limit switches, make sure that they stop movement in the right direction by triggering them manually.

If the electric trolley's optional integrated limit switches do not stop movement in the right direction and/or if the trolley's optional electric hoist does not move in the right direction (up-down), contact Vulcan Hoist.

NOTICE

If you have both 115V and 230V available, we recommend that you choose a 230V trolley. A motor running on 230V will consume half as much current as an equivalent 115V motor. Additionally, the electrical wires' gauge will be less critical.

3.3.2 Connections to Three-Phase, 208, 230, 460, or 575 Volts Power Circuits

Connect the power wires as close as possible to your building's power entry. The green wire is ground, and the other three are for the three phases. Refer to the provided electrical drawing to determine which wire corresponds to which phase.

If you have the optional integrated limit switches, make sure that they stop movement in the right direction by triggering them manually.

If the electric trolley's optional integrated limit switches do not stop movement in the right direction and if the trolley's optional electric hoist does not move in the right direction (up-down), swap 2 of the 3 phases **at the power source.**

3.4 Inspections, Verifications and Operational Tests Before Commissioning

NOTICE

Make sure that the electric trolley has stopped moving before changing directions.

An initial inspection **shall** be realised according to ANSI/ASME B30.17 **as described** in section **5.2 of this manual**. Additionally, make sure that:

1. the wire pendant is at an adequate height for operators
2. every nut and bolt is tight
3. the steel cable running alongside the wire pendant is fixed on both ends and that it is slightly shorter than the pendant's electrical cable
4. there are no oil leaks and there is the right amount of oil in the reducer
5. the wheels' gears are clean and greased

An operational test **shall** be realised according to ANSI/ASME B30.17 **as described in section 5.7 of this manual.** Additionally, test that :

1. the electric trolley (and its electric hoist, if applicable) move in the direction indicated on the wire pendant or radio controls
2. the electric trolley does not seem to lean to a side whether is it loaded or not

4. Operation

4.1 Introduction

Using an electric trolley consists of much more than moving it by pressing buttons. As stated in ANSI/ASME B30 standards, using an electric trolley creates inherent risks which can be mitigated by the electric trolley's specifications and construction, but only if it is used intelligently, with care, using good common sense and having the experience to anticipate potential dangers before, during, and after use. Use the advice herein, the applicable standards, and the warnings, cautions and notices presented in this manual.

The following instructions are based on and in accordance with ANSI/ASME B30.17. Portions of this standard that do not pertain directly to the electric trolleys covered by this manual are omitted. Some instructions judged relevant by Vulcan Hoist were added. If the electric trolley is attached to other equipment, or if a equipment

is attached to the electric trolley, consult those equipment's user manuals and their applicable ASME B30 standards. In case of disparities between this manual and ASME B30.17, ASME B30.17 takes precedence.

The most important rule is: **"USE COMMON SENSE".**

The words **"shall"** and **"should"** are used throughout this manual in accordance with their definitions in ASME's B30 standards, which are:

"shall" indicates that the rule or instruction is mandatory and must be followed.

"should" indicates that the rule or instruction is a recommendation, its applicability depends on each different situation.

All relevant of the inspections, operations, and maintenance described by this manual **shall** be carried out by personnel possessing appropriate knowledge and competence. Personnel is defined as follows:

Designated person: Someone selected by the employer or its representative as being competent and responsible to carry out specific tasks to which they are assigned.

Qualified person: Someone who, by possessing a relevant and recognized degree, and/or by attaining a relevant professional standing, and/or through extensive knowledge, training, and experience, has demonstrated their ability to solve problems related to the subject matter.

Federal, state, provincial and/or local authorities may have different regulations regarding requirements to be a qualified person and which acts are reserved to those qualified persons.

4.2 Personnel Responsibilities and Training

This section is not just for operators, designated or qualified persons. This section also applies to any person working directly or indirectly with the electric trolley, in proximity with the electric trolley and/or whose work may have an effect on the electric trolley. Any of these persons **shall**, in the capacity of his role,:

1. observe lockout/tagout procedures in effect in compliance with ASSP Z244.1
2. observe all safety and warning signs, labels, plates, or tags
3. **never** use the electric trolley or any related equipment if anyone is on the load or the hook
4. make sure that everybody stays at a safe distance from any suspended load
5. be sure that the electric trolley and any related equipment are used to lift loads vertically without any lateral force except if authorized by the manufacturer or a qualified person having exercised due diligence
6. **not** load the electric trolley and its related equipment over their rated load of any single equipment except for properly authorized tests or for planned engineered lifts approved by a qualified person
7. **not** override the transmitter's safety devices and features
8. verify that the operator is **not** wearing gloves which may interfere with the transmitter or any control buttons

9. check that the radio transmitter (if equipped) is stored in a safe and protected designated place

10. verify that the transmitter is shut off during power failures

11. be sure that a single person has been designated and is in charge when two or more hoisting systems are used to move the same load. This person must analyse the operation and give specific tasks to specific personnel to ensure proper positioning and rigging for the operation

12. **never** hide or remove any safety and warning signs, labels, plates, or tags

4.2.1 Owners' and Management's Responsibilities

The owner or his representative **shall** ensure that any person using the electric trolley, and any other equipment related to the electric trolley:

1. was trained on his assigned tasks

2. that his tasks and responsibilities relating to the electric trolley have been documented, identified, and assigned to him

3. provide the worker with and make sure he passed a written and a practical test which verify that he has the knowledge and skills to accomplish his tasks in compliance with federal, state, provincial, and/or local legal requirements

4. register in a formal record or issue a certificate to workers having successfully passed these tests

The owner or his representative **shall** also design, document, and implement a lockout/tagout procedure in compliance with ASSP Z244.1.

4.3 Operator's Responsibilities

4.3.1 At All Times

Electric trolley operators **shall** read and understand the "Operation" section of this manual and every warning in this manual, on the electric trolley and on the electric trolley's related equipment, as well as the "Operator Training and Operation" section of ANSI/ASME B30.17 and other ANSI/ASME B30 standards which may apply to the electric trolley's related equipment.

Electric trolley operators **shall** be familiar with the electric trolley and its controls before being authorised to use the electric trolley and its related equipment.

Electric trolley operators **shall** have been trained on proper load rigging techniques and procedures for every hoisting equipment related to the electric trolley.

Electric trolley operators **shall** have been trained to spot the signs of possible electric trolley future failures which may necessitate adjustments or repairs. If they spot possible future failure signs, they **shall** lockout/tagout the electric trolley and advise their supervisor immediately so that corrective measures can be taken before failure.

Electric trolley operators **shall** have appropriate depth perception, peripheral vision, reaction time, dexterity, and coordination.

Electric trolley operators **shall not** have a history of or be prone to seizures, loss of physical control, emotional instability or if they are taking medication which may negatively affect their cognitive or physical abilities. Operators **shall never** operate the electric trolley or any related equipment if they are under the influence of drugs and/or alcohol.

4.3.2 Before Moving a Load

Before moving a load, in addition to the previously mentioned directives in this manual, notably in section 4.2 "Personnel Responsibilities and Training", the operator **shall** also:

1. be familiar with the applicable provisions of the electric trolley's safety standards and the instructions listed in this manual
2. be familiar with controls, instructions and warnings located on the electric trolley
3. only operate the electric trolley and its related equipment if he is physically, mentally, and emotionally fit
4. never turn on or energize the electric trolley's main switch or breaker if a warning sign, lock, or tag is on the electric trolley, its controls, or its main switch or breaker, in accordance with lockout/tagout procedures in effect
5. turn the electric trolley and its controller off before de-energizing it by switching off its main switch or breaker
6. make sure everybody stands clear of the electric trolley before de-energizing it by switching off its main switch or breaker
7. perform a functional test as described in section 5.7
8. verify that the electric trolley and its related equipment move in the same direction as shown on their controls
9. verify that the transmitter and/or controls is the one controlling the intended electric trolley and related equipment
10. make sure that the electric trolley and its hoisting equipment are vertically aligned with the load's centre of gravity, unless authorized by a qualified person
11. activate warning devices, such as the stroboscopic warning light, horn and/or sound alarm, if they are supplied with the electric trolley, before moving any equipment

4.3.3 While Moving a Load

While moving a load, in addition to the previously mentioned directives in this manual, notably in section 4.2 "Personnel Responsibilities and Training", the operator **shall** also:

1. minimise, as much as possible, swinging the load and the electric trolley, by not shaking the load and by avoiding sudden direction changes, accelerations, and decelerations
2. maintain firm footing
3. verify that the load, the electric trolley, and its related equipment will clear obstacles and obstructions in the entirety of the planned lift
4. stop the electric trolley before it triggers an end stop or a limit switch. Limit switches are safety devices and **shall not** be used during normal operation, unless redundant or secondary limit switches are present and working
5. not lift, lower, or move a load over people

6. be fully focused on operating the electric trolley and avoid any distraction
7. warn people approaching the suspended load or its intended path by intermittently activating the warning devices if they are supplied on the electric trolley, or vocally if they are not
8. report any malfunction, performance issues, unusual sounds, and/or potential damage before continuing to operate the electric trolley, to someone having the authority and experience to investigate the potential issue and decide on corrective measures to execute, if any
9. warn adjacent hoisting equipment operators
10. if more than one hoisting system is used on the same load, follow the directions of the single designated person in charge of the operation
11. **never** leave a suspended load unattended, unless load supporting means intended for the load have been built under it or if guards and/or barriers preventing people going under the load have been installed
12. safely secure an outdoor electric hoist if a wind alarm is activated
13. immediately stop the electric trolley in a controlled manner if there are any doubts as to the safety of the operation, a person, the electric trolley, or any related equipment. Operations **shall** resume only after every safety concern has been addressed
14. if power is interrupted while a load is suspended, the operator **shall**:
    a. turn off every control and switch off the electric trolley's main switch or beaker
    b. after power has been restored, make sure that the electric trolley and its related equipment are moving in the direction indicated on their controls

4.3.4 After Moving a Load

After moving a load, in addition to the previously mentioned directives in this manual, notably in section 4.2 "Personnel Responsibilities and Training", the operator **shall** also:

1. put away the electric trolley and its related equipment in a way that they could not obstruct any other mobile equipment
2. inform the next operator of ant adjustment, repair or replacement needed
3. secure any outdoor equipment when they are shut off
4. turn off every controller before leaving them unattended
5. switch off the electric trolley's main switch or breaker before leaving it unattended
6. shut off the transmitter before placing it in its designated and secure place

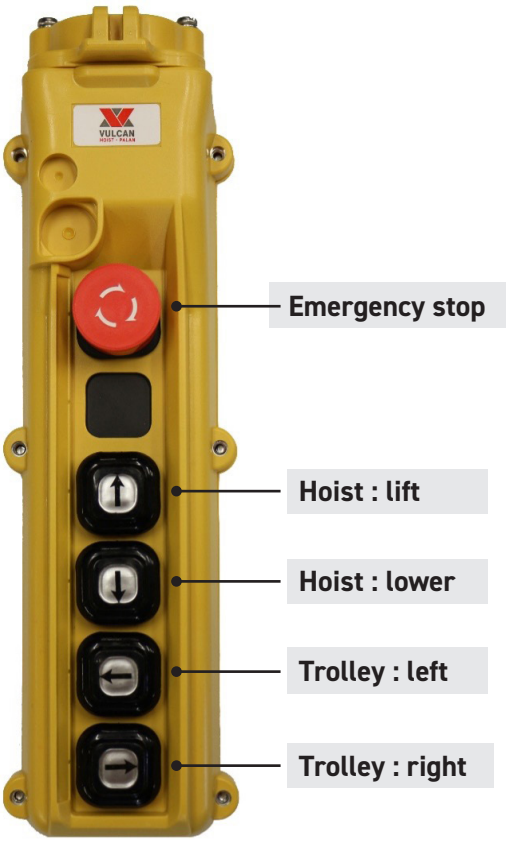
4.4 Trolley Controls

WARNING

Make sure the electric trolley is completely immobilized before changing its direction.

If you have opted for wireless controls, the transmitter's instructions have been supplied separately.

The number of buttons on your electric trolley control pendant depends on the optional features chosen and whether or not you've ordered a Vulcan Hoist electric hoist to be paired with your electric trolley. An optionless electric trolley will only have an emergency stop button and left-right arrows buttons.



4.4.1 Base Buttons

Emergency stop: immediately cuts power to the electric motor(s) and activates the trolley's and electric hoist's brake, if supplied.

Left-right arrows: moves the electric trolley left or right

4.4.2 Optional Buttons

Up-down arrows: lift (up) or lower (down) the electric hoist's hook.

Diagonal arrows: move the crane on which the electric trolley rides. These buttons will not be wired in the trolley's electric panel, it is your responsibility to wire them to your crane.

Two arrows pointing in the same direction: if your electric trolley and/or electric hoist has a two-speed motor, half pressing the button will activate the lower speed and fully pressing it will activate the higher speed.

A: actives the horn/sound alarm

5. Inspection

The following instructions are based on and in accordance with ANSI/ASME B30.17. Portions of this standard that do not pertain directly to the electric trolleys covered by this manual are omitted. Some instructions judged relevant by Vulcan Hoist were added. If the electric trolley is attached to other equipment, or if equipment is attached to the electric trolley, consult the equipment's user manual and their applicable ASME B30 standards. In case of disparities between this manual and ASME B30.17, ASME B30.17 takes precedence.

If the equipment related to the electric trolley is a hoist, refer to its owner's manual and to ASME B30.16.

5.1 Inspection Classifications

There are five **mandatory** inspection types :

1. initial inspection
2. functional inspection
3. frequent inspection
4. periodic inspection
5. inspection of equipment not in regular use

Inspection intervals depend on the intensity of the trolley's service. Service intensity is defined as follows :

Not in regular service: the electric trolley hasn't been used in the last month.

Normal service: using the electric trolley during less than 25% on a per shift basis, while either moving randomly distributed loads within its rated capacity, or uniform loads under 65% of the rated capacity.

Heavy service: the electric trolley's use exceeds normal service, but the rated capacity is never exceeded.

Severe service: normal or heavy service in adverse operating conditions, such as excessively low or high ambient temperatures, exposure to weather, corrosive fumes, dust, salty air and/or humidity, and/or other hazardous environments.

5.2 Initial Inspection

An initial inspection **shall** be completed when the electric trolley is installed for the first time, and also every time it is reinstalled, repaired, modified, adjusted or that some of its parts have been replaced. The initial inspection **shall** be carried out by a designated person. An initial inspection consists of:

1. visually and auditorily inspecting a newly installed or reinstalled electric trolley in its entirety
2. visually and auditorily inspecting all repaired, modified or replaced parts of the electric trolley. This inspection can be limited to the parts that have been affected by the modification, repair, or replacement.
3. carrying out the operational tests described in section 5.7 of this manual.

Initial inspection and test records **shall** be dated, signed, and maintained. They should be available to all relevant personnel.

The inspector should determine if the problems found during this inspection are a potential danger source and if the electric trolley should undergo further inspections.

5.3 Functional Inspection

The functional inspection **shall** be performed by the operator or a designated person at the start of each shift, or when the electric trolley is used for the first time during the shift. The inspector **shall** verify, visually or auditorily, at least:

1. that every control works
2. that necessary adjustments, repairs and/or replacements have been completed according to section 6.2 of this manual and that they work as intended
3. that any doubts or problems discovered have been immediately reported to his supervisor or a designated person

5.4 Frequent Inspection

A frequent inspection is a visual and auditory inspection carried out by the operator or a designated person while the electric trolley is in service to spot potential problems before the next periodic inspection. A frequent inspection **shall** be carried out at the following intervals:

1. monthly for normal service
2. weekly to monthly for heavy service
3. daily to weekly for severe service

The inspector **shall** verify, at least:

1. every item covered during a functional inspection
2. proper performance and adjustment of mechanisms and that there are no sounds indicating abnormal wear or a failure
3. that warning devices, if supplied, work as intended
4. rail stops' presence and position on the beam or crane
5. electric trolley's drop stops presence and condition
6. that the stay bolts' nuts are still tight and that the permanent marker lines drawn on the stay bolts and their nuts is still aligned.

A qualified person **shall** determine if the problems found during this inspection are a potential danger and if the electric trolley should undergo further inspections and/or repairs.

5.5 Periodic Inspection

Periodic inspections **shall** be carried out by a designated person. These inspections should be documented and archived. A frequent inspection **shall** be carried out at the following intervals:

1. yearly for normal service
2. semi-yearly for heavy service
3. quarterly for severe service

It is suggested to execute the maintenance steps described in section 6.7 of this manual at the same interval during periodic inspections. The inspector **shall** verify, at least:

1. every item covered during a frequent inspection
2. that parts show no sign of permanent deformation, cracks, or excessive corrosion.
3. that there are no missing or loose fasteners such as nuts, bolts, pins, or rivets
4. that sprockets, external gears, wheels, drums, and pulleys are not cracked or excessively worn
5. that there are no wear, cracks, or permanent deformation on parts such as pins, fasteners, bearings, shafts, drop stops, switch baffles, interlock bolts and limit switches
6. that brakes, if supplied, are well adjusted and not excessively worn
7. that motors, controls, main power switch or breaker, contactors, limit switches, buttons and other electrical components haven't deteriorated
8. that electrical connectors in the trolley's electrical panel are in good condition, free of debris and corrosion, and that electrical connectors are securely fixed to their terminals
9. that limit switches perform adequately. Every limit switch must be tested by hitting them with the electric trolley unloaded and as slowly as possible.
10. that every sign, label, plaque, or tag related to safety, warnings, instructions, or function is present, legible, and securely attached to the electric trolley
11. that beams and/or cranes on which the electric trolley rides are not deformed and/or excessively worn
12. that wheel flanges are not worn excessively and can effectively guide the electric trolley on its beams and/or crane
13. that the gap between the wheel flanges and the beam exists and is less than 1/16" wide (see section 3.2).
14. measure and make sure that the electric trolley meets the criteria listed in the table below. Diagrams of the dimensions and a suggested inspection template can be found in the "Deformation Inspection Template" found in annex.

Dimension	Description	Decomissioning Criteria
A	Lateral Plates Top Width	1. Width should not differ by more than 1/16" throughout the entire length. 2. Width should not differ by more than 3/32" than the initial width. 3. There should not be more than a 3/32" difference between the maximums of A and B.
B	Lateral Plates Bottom Width	Width should not differ by more than 1/16" throughout the entire length.
C	Gear Side Spacers Length	1. The lateral plate and the suspension plate should be parallel throughout their entire width and length. 2. There should not be more than 1/8" between C and D. 3. The stay bolts' spacers **shall** be square to their bearing surfaces. 4. The stay bolts' spacers **shall not** be deformed in any way.
D	Plain Side Spacers Length	
E	Lug Mount Width (low headroom only)	The lug mount suspension plates should be parallel throughout their entire length and height.
F	Gear Side Washer Number	1. There should not be more than one spacing washer difference between F and G. 2. It is recommended to have at least one spacing washer.
G	Plain Side Washer Number	
H	Suspension Plate Hole Height	For this section we consider only permanent deformation caused by the loads, not deformation caused by wear. **1 and 2 ton models:** max. 0,040" between the initial measurement of H **or** between H and I. **3 ton models:** max. 0,060" between the initial measurement of H **or** between H and I. **5 and 10 ton models:** max. 0,080" between the initial measurement of H **or** between H and I.
I	Suspension Plate Hole Width	
J	Length Under the Suspension Hole	Wear **shall not** cause a loss of more than 10% of material under the suspension hole.
K	Lug Diameter (low headroom)	1. The lug **shall not** bend at all. 2. Wear **shall not** cause a loss of more than 10% of the lug's cross-sectional area. 3. The cotter pins **shall** be present and in good condition.

WARNING

Even if the electric trolley satisfies every criterion in the previous table, this does not necessarily infer that it is safe. A qualified person **shall** determine if the results of this inspection are a source of danger and/or if they require a more thorough inspection, to be put out of commission temporarily to take corrective measures or to be permanently decommissioned.

Dated and signed inspection reports **shall** be carried out, maintained, and archived.

5.6 Inspection for Trolleys not in Regular Use

Electric trolleys that have not been used in more than a month but less than a year **shall** undergo a frequent inspection before being recommissioned. Electric trolleys that have not been used in more than a year **shall** undergo a periodic inspection before being recommissioned.

5.7 Operational Tests

After the electric trolley's initial installation, but also after every time it is reinstalled, repaired, modified, adjusted or that some of its parts have been replaced, an operational test **shall** be carried out. If it has not been installed or reinstalled, these tests can be limited to the parts affected by the repair, replacement, adjustment, or modification. These tests **shall** be realised under the supervision of a designated person who **shall** ensure that:

1. the electric trolley moves smoothly without creating knots or stretching its electrical cables throughout the entirety of its possible movements
2. if the beams and/or cranes on which the electric trolley rides can move, they can do so without creating knots or stretching their or the electric trolley's electrical cables
3. the limit switches function as intended
4. if equipped, safety and warning devices function as intended.

Additionally, if an operational test must be performed, a load test **shall** be carried out under the supervision of a qualified person. That qualified person may choose to alter this test. These tests **shall** be fully documented, dated, signed, maintained, and archived. The load test's steps are:

1. Hoist a load from the electric trolley weighing between 100% and 125% of its rated load. Keep the load suspended by the hoist's brake to make sure that it is not dropping.
2. Transport the test load with the electric trolley throughout its entire possible range of motion.
3. If the electric trolley rides on a mobile beam or crane, move the load around the perimeter of the beam or crane and the electric trolley's combined possible range of motion.
4. If applicable, lower the load, stop lowering, and hold it before it lands to test the hoist's brakes once more.

6. Maintenance

The following maintenance instructions are based on and in accordance with ANSI/ASME B30.17. Portions of this standard that do not pertain directly to electric trolleys covered by this manual are omitted. Some instructions judged relevant by Vulcan Hoist were added. If the electric trolley is attached to other equipment, or if equipment is attached to the electric trolley, consult the equipment's user manual and their applicable ASME B30 standards. In case of disparities between this manual and ASME B30.17, ASME B30.17 takes precedence.

If the equipment related to the electric trolley is a hoist, refer to its owner's manual and to ASME B30.16.

6.1 Introduction

Maintenance personnel assigned to the electric trolley **shall** be properly trained to safely carry out their tasks and to be aware of its adjustments, repairs, replacements, and modifications. This will ensure the electric trolley's reliability, performance, and lifespan.

A qualified person should determine if issues spotted during maintenance are a source of danger and/or if they require a more thorough inspection, to be put out of commission temporarily to take corrective measures, or to be permanently decommissioned.

6.2 Adjustments, Replacements, and Repairs

Any circumstance or concern judged potentially dangerous during inspections, operations, installations and/or maintenance **shall** result in the electric trolley being immediately put out of service. The electric trolley **shall not** be back in service as long as the potential danger has been cleared or corrected by an adjustment, part replacement or repair judged adequate by a designated person.

NOTICE

Any part replacement **shall** be made by an equivalent part approved in writing by Vulcan Hoist. If a part is replaced without this approbation, the electric trolley's certifications listed in section 2.6 of this manual and the manufacturer's warranty will be void.

Any modification of the electric trolley **shall** be approved in writing by Vulcan Hoist. If the electric trolley is modified without this approbation, the electric trolley's certifications listed in section 2.6 of this manual and the manufacturer's warranty will be void.

Vulcan Hoist offers repair and certification services.

6.3 Storing

Electric trolleys should be stored in a clean, dry place. They should be positioned in a way to:

1. not fold, twist, crush, or stretch an electrical cable
2. prevent it falling or tipping over
3. not use the electrical panel, the reducer, or the motor to support the electric trolley's own weight
4. be identifiable to keep track of the electric trolley's history

To put a stored electric trolley back into service, you **shall** complete the applicable inspection described in section 5.6 and the applicable maintenance items from section 6.7 of this manual.

6.4 Maintenance Personnel's Responsibilities

Maintenance personnel is responsible for and **shall**, at least, ensure that:

1. they have read and understood safety warnings and instructions contained in this manual and other safety standards in effect
2. they never try to perform any electrical or other major repairs unless they are specifically authorised to do so and that the electric trolley and its related equipment have been shut off according to the lockout/tagout procedures in effect
3. only replace parts with equivalent parts approved by the original equipment manufacturer
4. never touch the electric trolley or its related equipment with a live electrical wire or any electrical device which could discharge an electrical current on the electric trolley, including not using it as a welding ground
5. any missing, illegible, obstructed, or unfixed label, sign, plaque or tag be suitably repaired or replaced
6. report to a designated person any suspected malfunction or failure before putting the electric trolley back into service

6.5 Maintenance Procedures

6.5.1 Before Maintenance

Before carrying out maintenance work, maintenance personnel **shall** make sure that:

1. the electric trolley and its related equipment have been immobilised and will stay immobilised for the duration of the maintenance work
2. the electric trolley and its related equipment have been placed in a way to create the least interference possible with other operations
3. no load is suspended by the electric trolley

4. every control has ben shut off
5. the lockout/tagout procedure in effect has been applied
6. =safety signs and barriers be placed directly under the electric trolley if the maintenance to be carried out may cause a danger, including tools being dropped
7. to place rail stops or other means to stop other electric trolleys and other equipment which could collide with the maintained electric hoist, maintenance personnel, or maintenance equipment
8. if it is not possible to place rail stops or other means to stop equipment as described in the previous point, that one or more designated signal persons, having a clear view of the entire hoisting system, have the only task to watch the maintenance operation and ensure that no other equipment causes a collision

6.5.2 After Maintenance

After having carried out maintenance work, maintenance personnel **shall** make sure that:

1. every shielding part and enclosure have been put back into place or closed
2. safety and warning devices have been re-enabled
3. every part is well fastened and that nothing is loose that shouldn't be
4. all the maintenance equipment, including barriers and signs, have been put away
5. the lockout/tagout procedure in effect has been applied

6.6 Preventive Maintenance

A preventive maintenance program **shall** be established based on the original equipment manufacturer's recommendations, and optionally modified by a qualified person. A dated maintenance registry should be maintained

6.7 Recommended Periodical Preventive Maintenance

These maintenance items and their intervals are the minimum recommended by the manufacturer of this electric trolley based on a normal service. A designated person should increase the frequency of the maintenance if the electric trolley is subjected to a heavy or severe service or if he judges it is appropriate to do so.

These maintenance items may be carried out simultaneously with other inspections and operations described previously in this manual.

6.7.1 Quarterly Maintenance

1. Clean the electric trolley to make it easier to inspect and lubricate it.
2. Look for oil leaking from the reducer. The reducer's oil level should be appropriate to prevent premature wear. Check the oil's level and colour.
3. If applicable, check the brake's adjustment. Brake adjustment instructions have been provided to you sepa-

rately if you have opted for a motor with a brake.

4. Check if the suspension and lateral plates and the stay bolts look worn, deformed, or cracked.
5. Check that the gear pinion is still square to it gears. If it is not, check that the reducer is still well fastened and aligned to the lateral plate.
6. Check that the wheels are still square to the lateral plates
7. Verify these items, and tighten or replace fasteners if needed:
    a. The motor is securely fastened to the reducer.
    b. The reducer is securely fastened to the lateral plate.
    c. The counterweight(s) (if applicable) are securely fastened to their bolts and the cotter pins are present and in good condition.
    d. The stay bolts' nuts show no signs of loosening. The permanent marker lines drawn on the stay bolts and their nuts should still be aligned. See the table in section 3.2 for the proper tightening torque if needed.
8. Check the welds for cracks, if applicable.
9. To prevent the push-button pendant cable from failure, check that the strain reliever cable is not damaged and that it is still attached on both ends and well fixed to the push pendant cable. Adjust the strain reliever cable if needed.
10. Apply grease to the gears and pinions after you have cleaned the old grease and inspected them.

6.7.2 Yearly Maintenance

Change the reducer's oil. This electric trolley's reducer uses ISO-VG 320 gear oil. For outdoor installations or for use in extreme conditions, use synthetic ISO-VG 220 gear oil.

Start by removing the fill plug to ensure that you'll be able to refill the reducer once you've emptied it. Check the oil level to make sure there hasn't been any leaks.

Remove the drain plug and let as much oil out as possible in a way as to not drop any oil if the trolley is still installed on a beam. Preferably, use a clean and clear container to better inspect the used oil afterwards.

Put the drain plug back. Make sure that the reducer is relatively leveled and fill it with new oil up to the fill hole's edge. Put the fill plug back on the reducer. Clean any oil which may have spilled.

Inspect the used oil to make sure it contains only a trivial number of metallic debris and impurities. Make sure it shows no signs of overheating or excessive wear.

6.7.3 Maintenance for Outdoor Installations

If the electric trolley is used outdoors, and especially if it is used in a humid, salty, and/or corrosive environment, if temperature variations may cause condensation, if it is exposed to extreme temperatures or any other severe service criterion, additional recommendations are as follows:

1. Make sure that the electric trolley is sheltered when not in use, and that its shelter be solid and rainproof.

2. Keep an eye out for corrosion. If it is practical, sand the corrosion off and repaint rusted sections.

3. Apply a rustproofing agent on the electric trolley.

4. Inspect and maintain the electric trolley more often. Inspections should be according to severe use intervals.

5. Consider using ISO-VG 220 gear oil.

6. Adjust the duty cycle according to the ambient temperature and humidity.

7. Troubleshooting

WARNING

Hazardous voltages are present in the hoist and in connections between components.

The electric trolley and any related equipment **shall** be de-energize before performing ANY maintenance, inspection, or troubleshooting. Refer to NSI/ASSP Z244.1, Lockout, Tagout and Alternative Methods.

To avoid a shock hazard, mechanical or electrical maintenance **shall not** be performed on two-speed (or VFD control) electric trolley and related equipment within 5 minutes of de-energizing (disconnecting) the electric trolley and any related equipment.

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

Symptom	Cause	Solution
Electric trolley moving in the wrong direction	Power supply phases reversed	Have an electrician switch 2 of the 3 power supply cords wired at the power source.
	Direction changes are too quick	Especially with single-phase motors, wait for the electric trolley to be fully immobilised before changing directions.
	Improper electrical connections	Refer to the witing diagram supplied separately and check all connections.
Electric trolley doesn't operate well or at all	Loss of power	Check circuit breakers, switches, fuses, and connections on power lines / cable.
	Low voltage in trolley's power supply	Determine cause of low voltage and bring to within plus or minus 10 % of the voltage specified on the motor nameplate. The voltage should be measured at the trolley's contactor.
	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate of the motor.
	Gears jammed	Debris stuck between the pinion and gears could prevent them from turning
	Broken reducer	Free the output shaft and try turning the input shaft. Depending on the gear ratio, turning the output shaft may not turn the input shaft.
	Thermal overload protection device is triggered	See troubleshooting problem "Motor or brake overheating".
	Improper, loose, or broken wire in hoist electrical system	Shut off power supply, check wiring connection on hoist control panel and inside push–button pendant.

Electric trolley doesn't operate well or at all	Brake does not release	There should be an audible click each time the brake is activated or released. Check motor brake coil for continuity. Replace brake if needed.
	Faulty magnetic-contactor	Check coil for open or short circuit. Check all connections in the control circuit. Check for open contactors. Replace as needed.
	Emergency stop activated on push button pendant or radio transmitter	Turn the emergency stop button clockwise to unlock the control and allow trolley operation. Check that the emergency stop button closes its electrical circuit when it is released.
	Defect in control transformer	Check transformer coil for signs of overheating. Disconnect transformer and check for open winding.
	Motor burned out	Replace the motor.
	Limit switch is activated	Check that the limit switches are not triggered and that they prevent motion in the right direction.
	Broken conductor in pendant cord	Check the continuity for each conductor in the cable. If one is broken, replace entire cable.
	Burnt fuse	Check for electrical continuity on the fuse's ends. Replace with the same fuse if needed.
	Surge current	Activating the motor, especially if it is single-phased, can create a quick current peak up to 3 or 4 times the normal current. Make sure your electrical circuit can handle these current peaks.
Electric trolley's motion is harsh and irregular	Debris on beam	Clean the surfaces on which the wheels roll on.
	Broken gear tooth	A pinion, gear, or reducer tooth may be broken. Replace the faulty part immediately.
	Electric trolley has deformed	One or more parts of the electric trolley have been deformed due to overloading. Immediately stop using the electric trolley.
Motor or brake overheating	Excessive duty cycle	Lower the frequency and/or duration of movements to let the electric trolley cool down. Check if the motor's fan is working well if applicable.
	Excessive duty cycle for the ambient temperature	As described in the previous point, lower the duty cycle in hotter environments.
	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate of the motor.
Electric trolley works intermittently	Thermal overload protection device is triggered	See troubleshooting problem "Motor or brake overheating".
	Connectors making poor contact	Check for loose or stretched electrical connections. Replace as needed.
	Contactor contacts arcing	Check for burned contacts. Tighten or replace as needed.
	Loose connection in circuit	Check all wires and terminals for bad connections. Replace as needed.
	Broken conductor in Pendant Cord	Check for intermittent continuity in each conductor in the pendant cable. Replace entire pendant cable if continuity is not constant.

8. Warranty

Your Vulcan Hoist electric trolley is guaranteed against defects in materials and workmanship FOR 2 YEARS from the date of purchase if all the following conditions are met:

1. Any part replacement or modification of the electric trolley **must** be approved in writing by Vulcan Hoist. If a part is replaced or the electric trolley is modified without this approbation, the electric trolley's certifications listed in section 2.6 of this manual and this warranty will be void.
2. Before repairing, replacing a part, or modifying the electric trolley under warranty, Vulcan Hoist must approve it in writing to validate the warranty.
3. No credits will be issued for defective parts. Vulcan Hoist will ship only replacement parts, subject to warranty inspection.
4. Labour will be paid at a pre-set rate depending on the problem.
5. For major problems, such as transmission or drive components, the electric trolley must be returned prepaid to Vulcan Hoist for inspection and repair. If the repairs are under warranty, the electric trolley will be returned prepaid.

Annex

Glossary

Adverse operating conditions - Environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of an electric trolley, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust laden or moisture laden atmospheres, and hazardous locations.

Beam - An immobile structure on which the electric trolley rides.

Capacity - See Load, rated

Circuit breaker - An electrical switch which cuts current in case of electrical overload, short-circuit or ground fault.

Contactor - A high current electrical power switch controlled by a low current electrical circuit.

Crane - A mobile structure on which the electric trolley rides.

Designated person - A person selected or assigned by the employer or the employer's representative as being competent to perform specific duties. This person is responsible for fulfilling his assigned duties. A designated person can also be an operator.

Duty cycle - Total time the electric trolley can be activated over a 10-minute period without risk of damaging it, wearing it excessively, and/or overheating it. The electric trolley's duty cycle is indicated on its motor's nameplate

Hoist - Equipment used for lifting or lowering a freely suspended (unguided) load.

Lifting equipment, hoisting equipment - Devices that are not normally reeved onto the hoist chain, such as hook-on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the load to be lifted.

Limit switch - An electrical switch which is triggered when the trolley reaches the end of its allowed range of motion, thus cutting power to one direction of travel electric trolley and preventing it from going over its boundaries.

Load - The total superimposed weight on the load block or hook.

Load, rated - The maximum weight for which a hoist is designated by the manufacturer or a qualified person.

Load suspension parts - The load suspension parts of the trolley are parts which are stressed by the load block.

Lockout/Tagout procedure - A safety procedure ensuring that the electric trolley and other electrical equipment cannot be energized when that would create a safety risk (for example if the electric hoist is damaged or if someone is inspecting it or carrying out maintenance) by labelling and/or locking its power source and its controls.

Nameplate - A unique plaque permanently fixed to the electric trolley indicating crucial information. See section 1.3

Operator - Person assigned to controlling the electric trolley.

Overload - Any load greater than the rated load.

Pendant station - Controls suspended from the hoist for operating the electric trolley from the floor.

Related equipment - Any object being attached physically and/or electrically to the electric trolley (such as a hoist hooked on the electric trolley) and/or any object to which the electric trolley is physically and/or electrically attached (such as a crane on which it rides).

Qualified person - Someone who, by possessing a relevant and recognized degree, and/or by attaining a relevant professional standing, and/or through extensive knowledge, training, and experience, has demonstrated their ability to solve problems related to the subject matter. Federal, state, provincial and/or local authorities may have different regulations regarding requirements to be a qualified person and which acts are reserved to those qualified persons.

Rigging - Rigging is the action of attaching a load to hoisting equipment using hooks, chains, slings, and other means.

Service, heavy - The electric trolley's use exceeds normal service, but the rated capacity is never exceeded.

Service, normal - The electric trolley is being used during less than 25% on a per shift basis, while either moving randomly distributed loads within its rated capacity, or uniform loads under 65% of its rated capacity.

Service, not in regular service - The electric trolley hasn't been used in the last month.

Service, severe - Normal or heavy service in adverse operating conditions, such as excessively low or high ambient temperatures, exposure to weather, corrosive fumes, dust, salty air and/or humidity, and/or other hazardous environments.

Strain reliever cable - A steel cable running alongside and tied to the pendant's electrical cable in order to prevent the pendant's electrical cable from stretching and breaking.

Switch - A device for making, breaking, or changing the connections in an electric circuit.

Transmitter - A wireless controller's push-button signal sending unit.

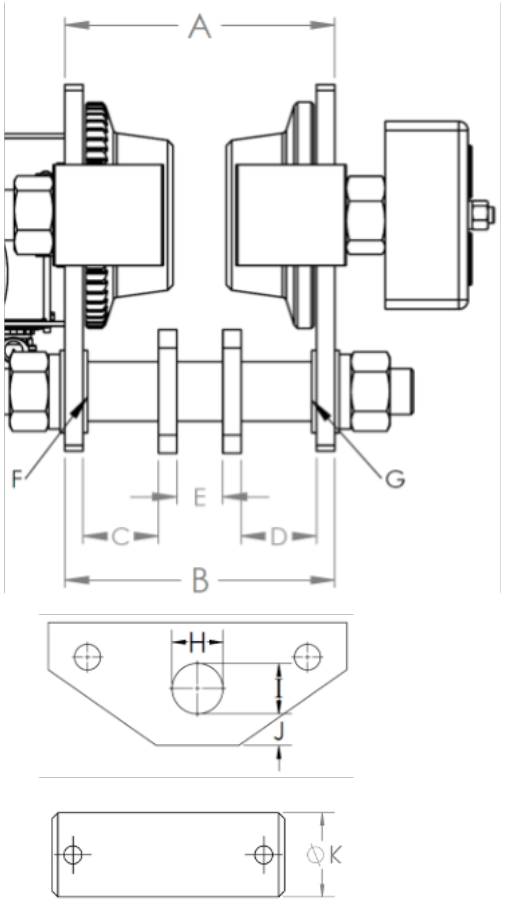
Trolley - A machine unit that travels on a monorail track or crane bridge girder.

Trolley-hoist - A hoist and trolley unit consisting of a hoist suspended from or mounted to a trolley, or a hoist with an integral trolley.

Pendant, pendant station - A push-button controller which is wired to the electric trolley's control panel. See section 4.5.

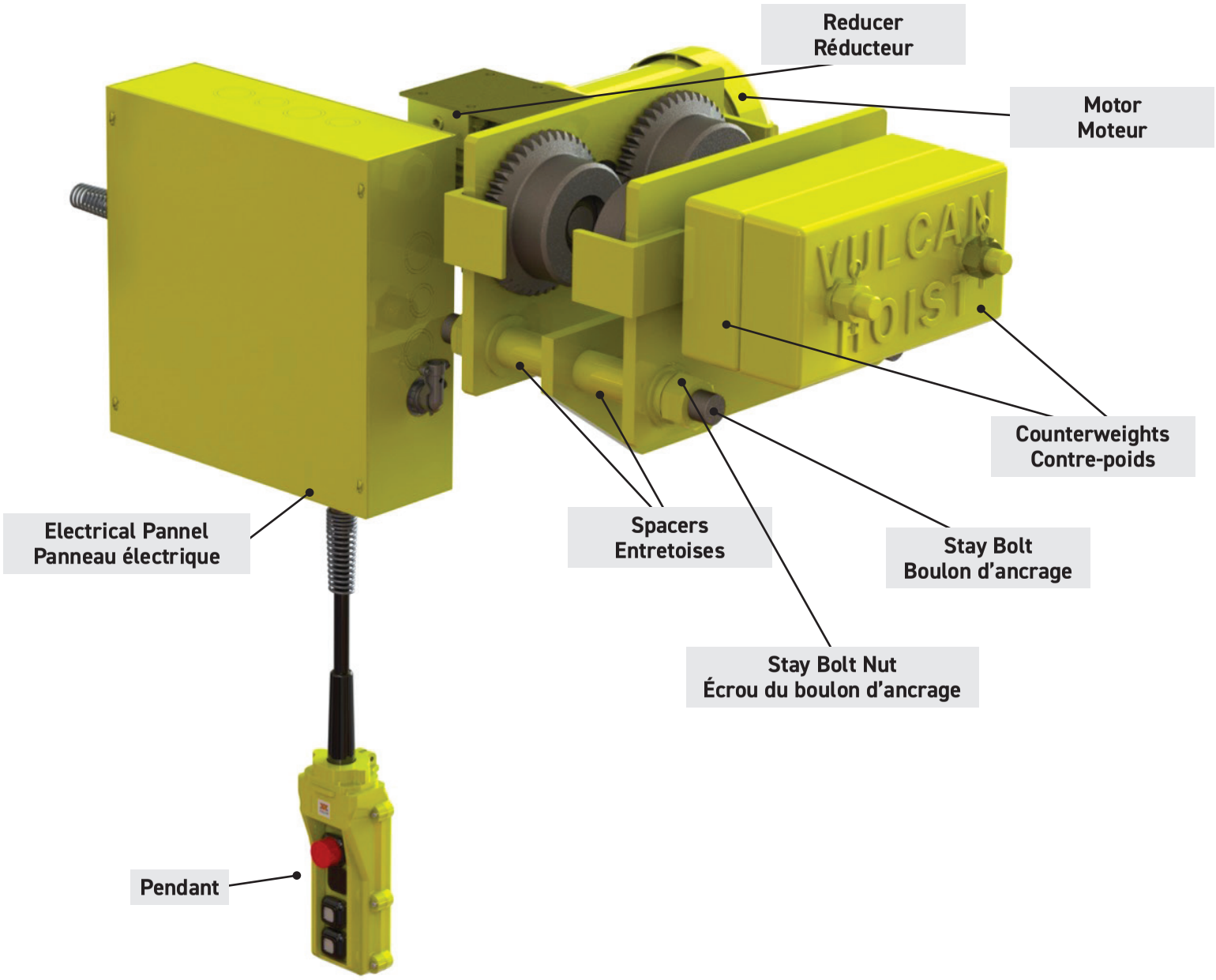
Deformation Inspection Template
Gabarit d'inspection de la déformation

Date	DD / MM / 20YY	Serial Number Numéro de série	V ____ _ __ 2__ __	
Model Modèle	ET ___ T _____	Inspector Inspecteur		
DIMENSION		**DESCRIPTION**	**INITIAL INITIALE**	**ACTUAL ACTUELLE**
A	Lateral Plates Top Width	Largeur du haut des plaques latérales		
B	Lateral Plates Bottom Width	Largeur du bas des plaques latérales		
C	Gear Side Spacers Length	Longueur des entretoises côté engrenages		
D	Plain Side Spacers Length	Longueur des entretoises côté plein		
E	Lug Mount Width (low headroom only)	Largeur du montage à œillet (encombrement réduit seulement)		
F	Gear Side Washer Number	Nombre de rondelles côté engrenages		
G	Plain Side Washer Number	Nombre de rondelles côté roues pleines		
Ht	Suspension Plate Hole Height	Hauteur du trou de la plaque de suspension		
I	Suspension Plate Hole Width	Largeur du trou de la plaque de suspension		
J	Length Under the Suspension Hole	Longueur sous le trou de suspension		
K	Lug Diameter (low headroom)	Diamètre du goujon (encombrement réduit)		



NOTE: MEASURE WHILE THE ELECTRIC TROLLEY IS NOT LIFTING A LOAD. SEE SECTION 5.5 OF THE MANUAL.
NOTE: MESUREZ LORSQUE LE CHARIOT ÉLECTRIQUE NE LÈVE PAS UNE CHARGE. VOIR SECTION 5.5 DU MANUEL.

Nomenclature



Assemblies and BOMs – Assemblages et listes de pièces

H: H Beam I: I Beam L: Low headroom, lug mount	H: Poutre en « H » I: Poutre en « I » L: Encombrement réduit pour installation à œillet
Bill of materials may differ, notably due to certain options. If you have any doubts or questions, contact Vulcan Hoist before ordering parts	La liste de pièces peut varier, notamment lorsque certaines options sont fournies. Si vous avez des questions ou des doutes, contactez Vulcan Hoist-Palan avant de commander des pièces.

ET1T						
REF	PART NUMBER	DESCRIPTION	H	I	HL	IL
1	HOPET01T-041	Side plate	1	1	1	1
2	HOPET01T-030	Side plate	1	1	1	1
3	HOPET01T-031	Wheel Pin	2	2	2	2
4	HOPET01T-031-L	Wheel Pin	2	2	2	2
5	HOPET01T-042-H	Gear Wheel for H Beam	2	-	2	-
5	HOPET01T-042-I	Gear Wheel for I Beam	-	2	-	2
6	HOPET01T-038-H	Plain Wheel for H Beam	2	-	2	-
6	HOPET01T-038-I	Plain Wheel for I Beam	-	2	-	2
7	HOPET-045	Counterweight	2	2	2	2
8	HOPET-047	Trolley Pinion	1	1	1	1
9	HOPET-025	Worm Gear Reducer	1	1	1	1
10	HOPET-041X	Gearbox Mounting Plate	2	2	2	2
11	HOPET01T-049	Suspension Plate	1	1	-	-
12	HOPET01T-054/[1, 2, 3, 4]	Trolley Support Shaft	2	2	2	2
13	HOPET-06[0,1, 2, 3, 4, 5]	Electric Motor	1	1	1	1
14	HOPET-080	Electrical Panel	1	1	1	1
15	HOPET01T-M003	Stopper	4	4	4	4
16	HOPET-M003	Electric Enclosure Fixture	1	1	1	1
17	HOPET-091	Cable Angle Connector	2	2	2	2
18	HOPHL-011B	Cable Strain Reliever	2	2	2	2
19	HOPET01T-048	Lug Plate	-	-	2	2
20	HOPET01T-M002	Lug Pin	-	-	1	1
21	HOPET-033	Name Plate	1	1	1	1
22	HOPET-039/1	Ball Bearing	4	4	4	4
23	HOPET01T-038-A	Internal Retaining Ring	4	4	4	4
24	HOPET-040/1	External Retaining Ring	4	4	4	4
25	HAR046	Hex nut	2	2	2	2
26	HAR107	Split lock washer	2	2	2	2
27	HAR059	Split lock washer	2	2	2	2
28	HAR044	Hex nut	2	2	2	2

29	HAR059	Split lock washer	2	2	2	2
30	HAR044	Hex nut	2	2	2	2
31	HAR138	Shaft Collar	1	1	1	1
32	HOPET-044	Ball Bearing	1	1	1	1
33	HAR044	Hex nut	4	4	4	4
34	HAR006	Flat washer	8	8	8	8
35	HAR059	Split lock washer	4	4	4	4
36	HOPET01T-M004	Shaft spacer	4	4	4	4
37		Motor Key	1	1	1	1
38		Reductor Key	1	1	1	1
39	HAR106	Hex bolt	4	4	4	4
40	HAR054	Split lock washer	4	4	4	4
41	HAR032	Hex bolt	8	8	8	8
42	HAR053	Split lock washer	8	8	8	8
43	HAR002	Rivet	4	4	4	4
44	HOPET01T-M004	Shaft spacer	-	-	2	2
47	HAR005	Cotter pin	2	2	4	4
48	HOPHL-083	Shim washer	3	3	3	3

ET2T			1 SPEED - VITESSE				2 SPEEDS - VITESSES			
REF	PART NUMBER	DESCRIPTION	H	I	HL	IL	HSW	ISW	HSWL	ISWL
1	HOPET02T-041	Side plate	1	1	1	1	1	1	1	1
2	HOPET02T-030	Side plate	1	1	1	1	1	1	1	1
3	HOPET02T-031	Wheel Pin	2	2	2	2	2	2	2	2
4	HOPET02T-031-L	Wheel Pin	2	2	2	2	-	-	-	-
4	HOPET02T-031-L	Wheel Pin	-	-	-	-	2	2	2	2
5	HOPET02T-042-H	Gear Wheel for H Beam	2	-	2	-	2	-	2	-
5	HOPET02T-042-I	Gear Wheel for I Beam	-	2	-	2	-	2	-	2
6	HOPET02T-038-H	Plain Wheel for H Beam	2	-	2	-	2	-	2	-
6	HOPET02T-038-I	Plain Wheel for I Beam	-	2	-	2	-	2	-	2
7	HOPET-045	Counterweight	2	2	2	2	1	1	1	1
8	HOPET-047	Trolley Pinion	1	1	1	1	1	1	1	1
9	HOPET-025	Worm Gear Reducer	1	1	1	1	1	1	1	1
10	HOPET-041X	Gearbox Mounting Plate	2	2	2	2	2	2	2	2
11	HOPET02T-049	Suspension Plate	1	1	-	-	1	1	-	-
12	HOPET02T-054/[1, 2, 3, 4]	Trolley Support Shaft	2	2	2	2	2	2	2	2
13	HOPET-06[0, 1, 2, 3, 4, 5]	Electric Motor	1	-	1	1	1	1	1	1
14	HOPET-080	Electrical Panel	1	1	1	1	1	1	1	1
15	HOPET02T-M003	Stopper	4	4	4	4	4	4	4	4
16	HOPET-M003	Electric Enclosure Fixture	1	1	1	1	1	1	1	1

17	HOPET-091	Cable Angle Connector	2	2	2	2	2	2	2	2
18	HOPHL-011B	Cable Strain Reliever	2	2	2	2	2	2	2	2
19	HOPET02T-048	Lug Plate	-	-	2	2	-	-	2	2
20	HOPET02T-M002	Lug Pin	-	-	1	1	-	-	1	1
21	HOPET-033	Name Plate	1	1	1	1	1	1	1	1
22	HOPHL-072	Ball Bearing	4	4	4	4	4	4	4	4
23	HOPET-038A/2	Internal Retaining Ring	4	4	4	4	4	4	4	4
24	HOPET-040/2	External Retaining Ring	4	4	4	4	4	4	4	4
25	HAR047	Hex nut	2	2	2	2	2	2	2	2
26	HAR062	Split lock washer	2	2	2	2	2	2	2	2
27	HAR062	Split lock washer	2	2	2	2	2	2	2	2
28	HAR047	Hex nut	2	2	2	2	2	2	2	2
29	HAR059	Split lock washer	2	2	2	2	-	-	-	-
29	HAR055	Split lock washer	-	-	-	-	2	2	2	2
30	HAR044	Hex nut	2	2	2	2	-	-	-	-
30	HAR096	Hex nut	-	-	-	-	2	2	2	2
31	HAR138	Shaft Collar	1	1	1	1	1	1	1	1
32	HOPET-044	Ball Bearing	1	1	1	1	1	1	1	1
33	HAR047	Hex nut	4	4	4	4	4	4	4	4
34	HAR058	Flat washer	*	*	*	*	*	*	*	*
35	HAR062	Split lock washer	4	4	4	4	4	4	4	4
36	HOPET02T-M004	Shaft spacer	4	4	4	4	4	4	4	4
37		Motor Key	1	1	1	1	1	1	1	1
38		Reductor Key	1	1	1	1	1	1	1	1
39	HAR106	Hex bolt	4	4	4	4	4	4	4	4
40	HAR054	Split lock washer	4	4	4	4	4	4	4	4
41	HAR032	Hex bolt	8	8	8	8	8	8	8	8
42	HAR053	Split lock washer	8	8	8	8	8	8	8	8
43	HAR002	Rivet	4	4	4	4	4	4	4	4
44	HOPET02T-M004	Shaft spacer	-	-	2	2	-	-	2	2
45	HAR015	Hex bolt	-	-	-	-	2	2	2	2
47	HAR005	Cotter pin	2	2	4	4	-	-	2	2
48	HOPHL-083	Shim washer	3	3	3	3	3	3	3	3

ET3T						
REF	PART NUMBER	DESCRIPTION	H	I	HL	IL
1	HOPET03T-041	Side plate	1	1	1	1
2	HOPET03T-030	Side plate	1	1	1	1
3	HOPET03T-031	Wheel Pin	2	2	2	2
4	HOPET03T-031	Wheel Pin	2	2	2	2

5	HOPET03T-042-H	Gear Wheel for H Beam	2	-	2	-
5	HOPET03T-042-I	Gear Wheel for I Beam	-	2	-	2
6	HOPET03T-038-H	Plain Wheel for H Beam	2	-	2	-
6	HOPET03T-038-I	Plain Wheel for I Beam	-	2	-	2
7	HOPET-045	Counterweight	1	1	1	1
8	HOPET-047	Trolley Pinion	1	1	1	1
9	HOPET-025	Worm Gear Reducer	1	1	1	1
10	HOPET-041X	Gearbox Mounting Plate	2	2	2	2
11	HOPET03T-049	Suspension Plate	1	1	-	-
12	HOPET03T-054/[1, 2, 3, 4, 5]	Trolley Support Shaft	2	2	2	2
13	HOPET-06[0, 1, 2, 3, 4, 5]	Electric Motor	1	1	1	1
14	HOPET-080	Electrical Panel	1	1	1	1
15	HOPET03T-M003	Stopper	4	4	4	4
16	HOPET-M003	Electric Enclosure Fixture	1	1	1	1
17	HOPET-091	Cable Angle Connector	2	2	2	2
18	HOPHL-011B	Cable Strain Reliever	2	2	2	2
19	HOPET03T-048	Lug Plate	-	-	2	2
20	HOPET03T-M002	Lug Pin	-	-	1	1
21	HOPET-033	Name Plate	1	1	1	1
22	HOPHL-072	Ball Bearing	4	4	4	4
23	HOPET-038A/2	Internal Retaining Ring	4	4	4	4
24	HOPET-040/2	External Retaining Ring	4	4	4	4
25	HAR049	Hex nut	2	2	2	2
26	HAR060	Split lock washer	2	2	2	2
27	HAR060	Split lock washer	2	2	2	2
28	HAR049	Hex nut	2	2	2	2
29	HAR055	Split lock washer	2	2	2	2
30	HAR096	Hex nut	2	2	2	2
31	HAR138	Shaft Collar	1	1	1	1
32	HOPET-044	Ball Bearing	1	1	1	1
33	HAR049	Hex nut	4	4	4	4
34	HAR111	Flat washer	*	*	*	*
35	HAR060	Split lock washer	4	4	4	4
36	HOPET03T-M004	Shaft Spacer	4	4	4	4
37		Motor Key	1	1	1	1
38		Reductor Key	1	1	1	1
39	HAR106	Hex bolt	4	4	4	4
40	HAR054	Split lock washer	4	4	4	4
41	HAR032	Hex bolt	8	8	8	8

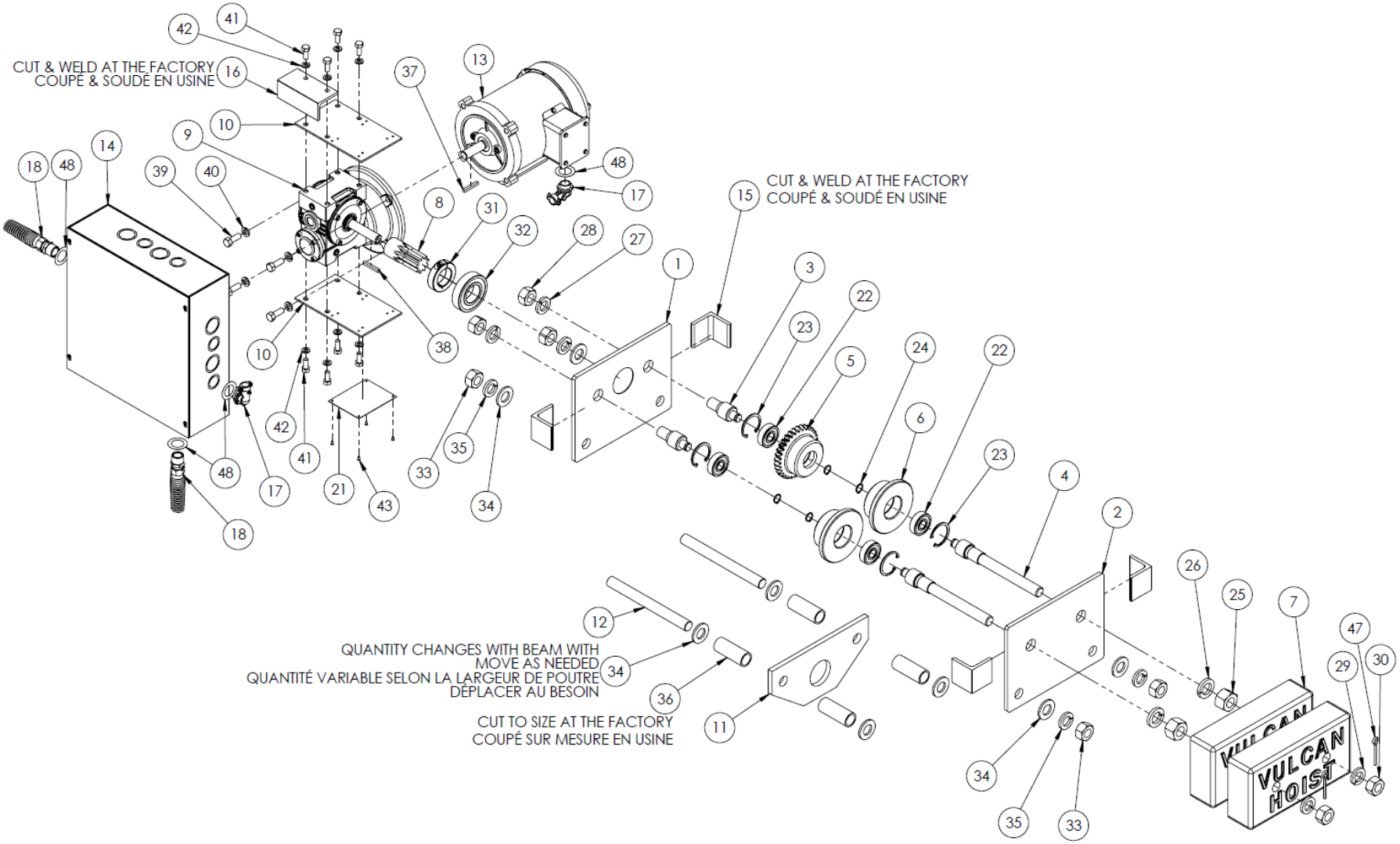
42	HAR053	Split lock washer	8	8	8	8
43	HAR002	Rivet	4	4	4	4
44	HOPET03T-M004	Shaft spacer	-	-	2	2
45	HAR016	Hex bolt	2	2	2	2
47	HAR005	Cotter pin	-	-	2	2
48	HOPHL-083	Shim washer	3	3	3	3

ET5T						
REF	PART NUMBER	DESCRIPTION	H	I	HL	IL
1	HOPET05T-041	Side plate	1	1	1	1
2	HOPET05T-030	Side plate	1	1	1	1
3	HOPET05T-031	Wheel Pin	2	2	2	2
4	HOPET05T-031	Wheel Pin	2	2	2	2
5	HOPET05T-042-H	Gear Wheel for H Beam	2	-	2	-
5	HOPET05T-042-I	Gear Wheel for I Beam	-	2	-	2
6	HOPET05T-038-H	Plain Wheel for H Beam	2	-	2	-
6	HOPET05T-038-I	Plain Wheel for I Beam	-	2	-	2
7	HOPET-045	Counterweight	1	1	1	1
8	HOPET-047	Trolley Pinion	1	1	1	1
9	HOPET-025	Worm Gear Reducer	1	1	1	1
10	HOPET-041X	Gearbox Mounting Plate	2	2	2	2
11	HOPET05T-049	Suspension Plate	1	1	-	-
12	HOPET05T-054/[1, 2, 3]	Trolley Support Shaft	2	2	2	2
13	HOPET-06[0, 1, 2, 3, 4, 5]	Electric Motor	1	1	1	1
14	HOPET-080	Electrical Panel	1	1	1	1
15	HOPET03T-M003	Stopper	4	4	4	4
16	HOPET-M003	Electric Enclosure Fixture	1	1	1	1
17	HOPET-091	Cable Angle Connector	2	2	2	2
18	HOPHL-011B	Cable Strain Reliever	2	2	2	2
19	HOPET05T-048	Lug Plate	-	-	2	2
20	HOPET05T-M002	Lug Pin	-	-	1	1
21	HOPET-033	Name Plate	1	1	1	1
22	HOPHL-072	Ball Bearing	8	8	8	8
23	HOPET-038A/2	Internal Retaining Ring	4	4	4	4
24	HOPET-040/2	External Retaining Ring	4	4	4	4
25	HAR049	Hex nut	2	2	2	2
26	HAR060	Split lock washer	2	2	2	2
27	HAR060	Split lock washer	2	2	2	2
28	HAR049	Hex nut	2	2	2	2
29	HAR055	Split lock washer	2	2	2	2

30	HAR096	Hex nut	2	2	2	2
31	HAR138	Shaft Collar	1	1	1	1
32	HOPET-044	Ball Bearing	1	1	1	1
33	HAR098	Hex nut	4	4	4	4
34	HAR109	Flat washer	*	*	*	*
35	HAR108	Split lock washer	4	4	4	4
36	HOPET05T-M004	Shaft spacer	4	4	4	4
37		Motor Key	1	1	1	1
38		Reductor Key	1	1	1	1
39	HAR106	Hex bolt	4	4	4	4
40	HAR054	Split lock washer	4	4	4	4
41	HAR032	Hex bolt	8	8	8	8
42	HAR053	Split lock washer	8	8	8	8
43	HAR002	Rivet	4	4	4	4
44	HOPET05T-M004	Shaft spacer	-	-	2	2
45	HAR016	Hex bolt	2	2	2	2
47	HAR005	Cotter pin	-	-	2	2
48	HOPHL-083	Shim washer	3	3	3	3

ET10T						
REF	PART NUMBER	DESCRIPTION	H	I	HL	IL
1	HOPET10T-041	Side plate	1	1	1	1
2	HOPET10T-030	Side plate	1	1	1	1
3	HOPET10T-031	Wheel Pin	2	2	2	2
4	HOPET10T-031	Wheel Pin	2	2	2	2
5	HOPET10T-042-H	Gear Wheel for H Beam	2	-	2	-
5	HOPET10T-042-I	Gear Wheel for I Beam	-	2	-	2
6	HOPET10T-038-H	Plain Wheel for H Beam	2	-	2	-
6	HOPET10T-038-I	Plain Wheel for I Beam	-	2	-	2
8	HOPET-047/1	Trolley Pinion	1	1	1	1
9	HOPET-025	Worm Gear Reducer	1	1	1	1
10	HOPET-041X	Gearbox Mounting Plate	2	2	2	2
11	HOPET10T-049	Suspension Plate	1	1	-	-
12	HOPET05T-054/[1, 2, 3]	Trolley Support Shaft	3	3	3	3
13	HOPET-06[0, 1, 2, 3, 4, 5]	Electric Motor	1	1	1	1
14	HOPET-080	Electrical Panel	1	1	1	1
15	HOPET10T-M003	Stopper	4	4	4	4
16	HOPET-M003	Electric Enclosure Fixture	1	1	1	1
17	HOPET-091	Cable Angle Connector	2	2	2	2
18	HOPHL-011B	Cable Strain Reliever	2	2	2	2

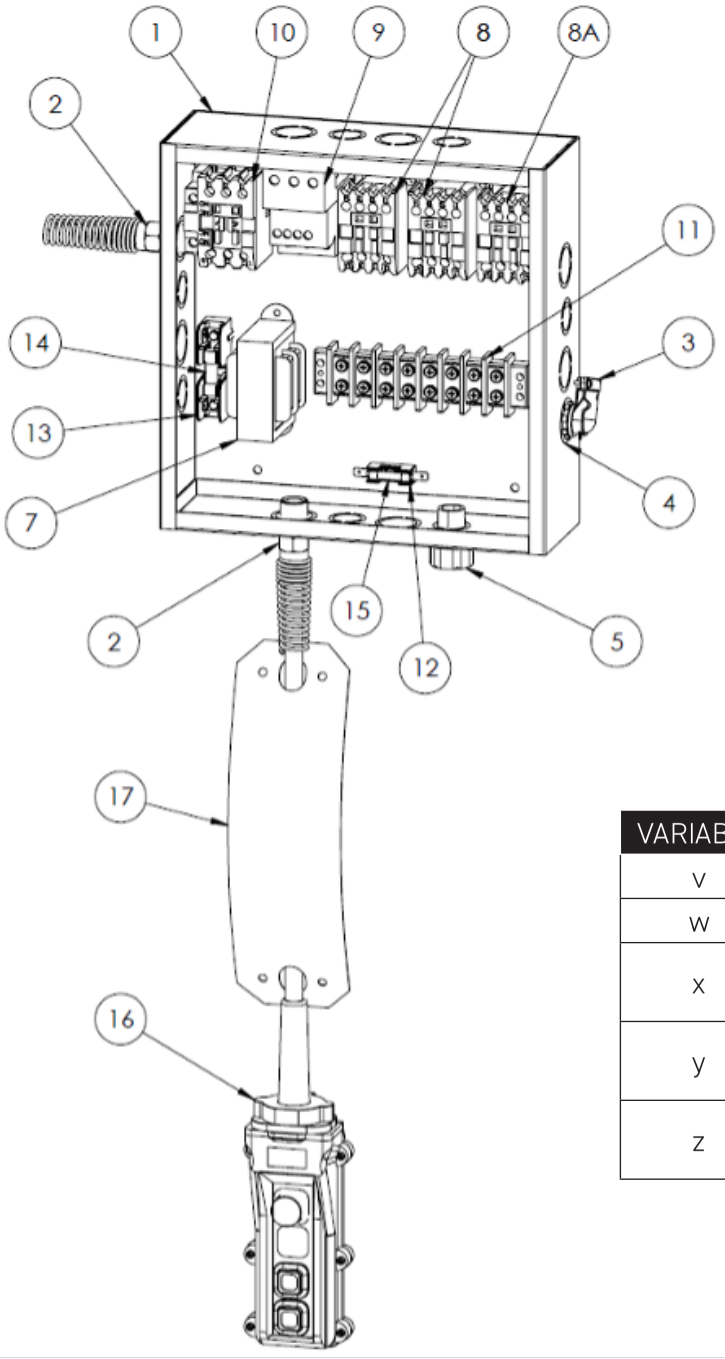
19	HOPET10T-048	Lug Plate	-	-	2	2
20	HOPET05T-M002	Lug Pin	-	-	2	2
21	HOPET-033	Name Plate	1	1	1	1
22	HOPET-039/4	Ball Bearing	8	8	8	8
22.1	HOPET10T-M004B	Bearing Spacer	4	4	4	4
23	HOPET-038A/4	Internal Retaining Ring	4	4	4	4
24	HOPET-040/4	External Retaining Ring	4	4	4	4
25	HAR050	Hex nut	2	2	2	2
26	HAR061	Split lock washer	2	2	2	2
27	HAR061	Split lock washer	2	2	2	2
28	HAR050	Hex nut	2	2	2	2
31	HAR138	Shaft Collar	1	1	1	1
32	HOPET-044	Ball Bearing	1	1	1	1
33	HAR098	Hex nut	6	6	6	6
34	HAR109	Flat washer	*	*	*	*
35	HAR108	Split lock washer	6	6	6	6
36	HOPET05T-M004	Shaft spacer	6	6	6	6
37		Motor Key	1	1	1	1
38		Reductor Key	1	1	1	1
39	HAR106	Hex bolt	4	4	4	4
40	HAR054	Split lock washer	4	4	4	4
41	HAR032	Hex bolt	8	8	8	8
42	HAR053	Split lock washer	8	8	8	8
43	HAR002	Rivet	4	4	4	4
44	HOPET05T-M004	Shaft spacer	-	-	3	3
47	HAR005	Cotter pin	-	-	4	4
48	HOPHL-083	Shim washer	3	3	3	3


CUT & WELD AT THE FACTORY
COUPÉ & SOUDÉ EN USINE
CUT & WELD AT THE FACTORY
COUPÉ & SOUDÉ EN USINE
QUANTITY CHANGES WITH BEAM WITH
MOVE AS NEEDED
QUANTITÉ VARIABLE SELON LA LARGEUR DE POUTRE
DÉPLACER AU BESOIN
CUT TO SIZE AT THE FACTORY
COUPÉ SUR MESURE EN USINE
VULCAN
HOIST

Electrical Subassembly – Sous-assemblage électrique

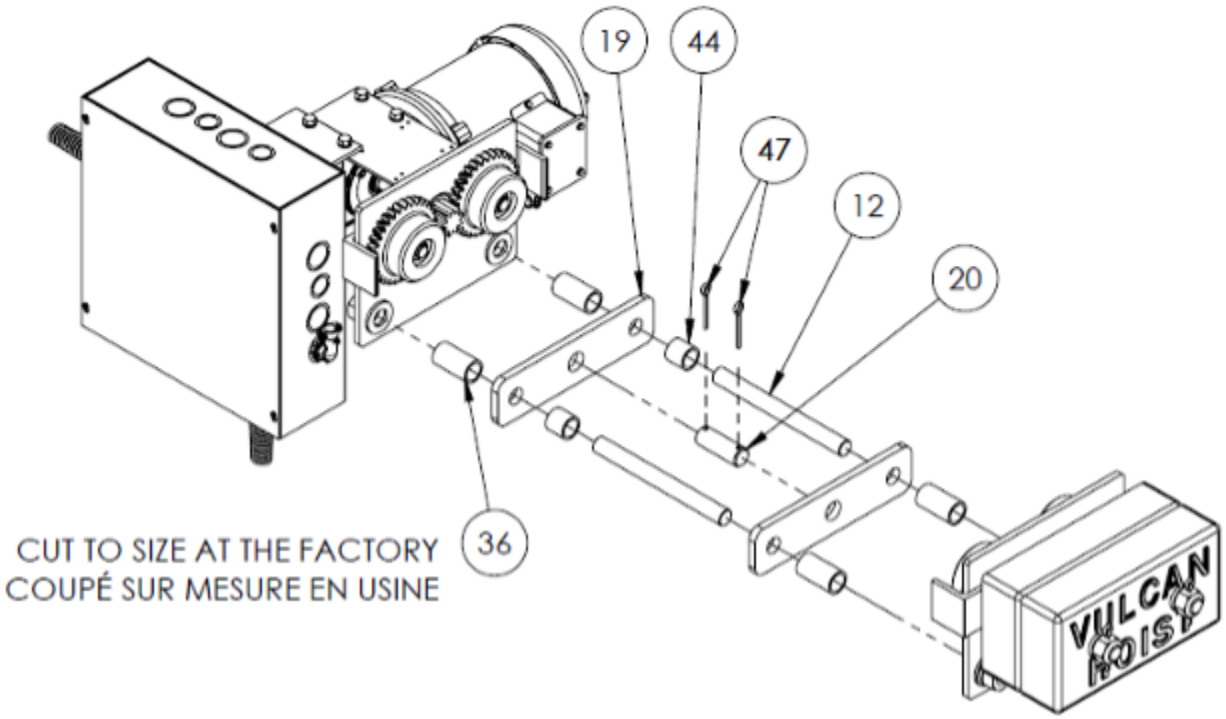
ELECTRICAL BOM - LISTE DE PIÈCES ÉLECTRIQUES						
REF	PART NUMBER NUMÉRO DE PIÈCE	DESCRIPTION	3 PHASES 1 SPEED 1 VITESSE	3 PHASES 2 SPEEDS 2 VITESSES	1 PHASE 1 SPEED 1 VITESSE	NOTE
1B	HOPET-080/1	10x10 NEMA 1 Enclosure	1	0	1	Not pictured - Pas sur l'image
1C	HOPET-081/3	10x10 NEMA 4 Enclosure	1	0	1	Not pictured - Pas sur l'image Optional - Optionel
1	HOPET-081/6	12x12 NEMA 1 Enclosure	0	1	0	
1A	HOPET-081/9	12x12 NEMA 4 Enclosure	0	1	0	Not pictured - Pas sur l'image Optional - Optionel
2	HOPHL-011B	Cable Strain Reliever	2	2	2	
3	HOPET-091	Cable Angle Connector	1	1	1	
4	HOPHL-083	Shim Washer	12	12	12	
5	HOPHL-012	Bigger Strain Reliever	1	1	1	
7	HOPHL-095-www/vvv	Transformer	1	1	1	
8	HOPHL-094/vvv	Contactor	1	1	1	
8A	HOPHL-094AA1/vvv	Dual Speed Contactor	0	1	0	
9	HOPHL-110-vv	Thermal Relay	1	1	1	
10	HOPHL-094AA5/vvv	Stop Contactor	1	1	1	
11	HOPET-086/8	Terminal Block	1	1	1	
12	HOPHL-095A	Glass Fuse Holder	1	1	2	
13	HOPHL-095C	Ceramic Fuse Holder	1	1	0	
14	HOPHL-095B-xxx	xxxA Ceramic Fuse	1	1	0	
15	HOPHL-095D-0yyy	yyyA Glass Fuse	1	1	2	
16	HOPHL-008Bz-1WST	Control Pendant	1	1	1	Button number may different Nombre de boutons varie
17	HOPHL-009	Warning Label	1	1	1	Do not remove - Ne pas enlever

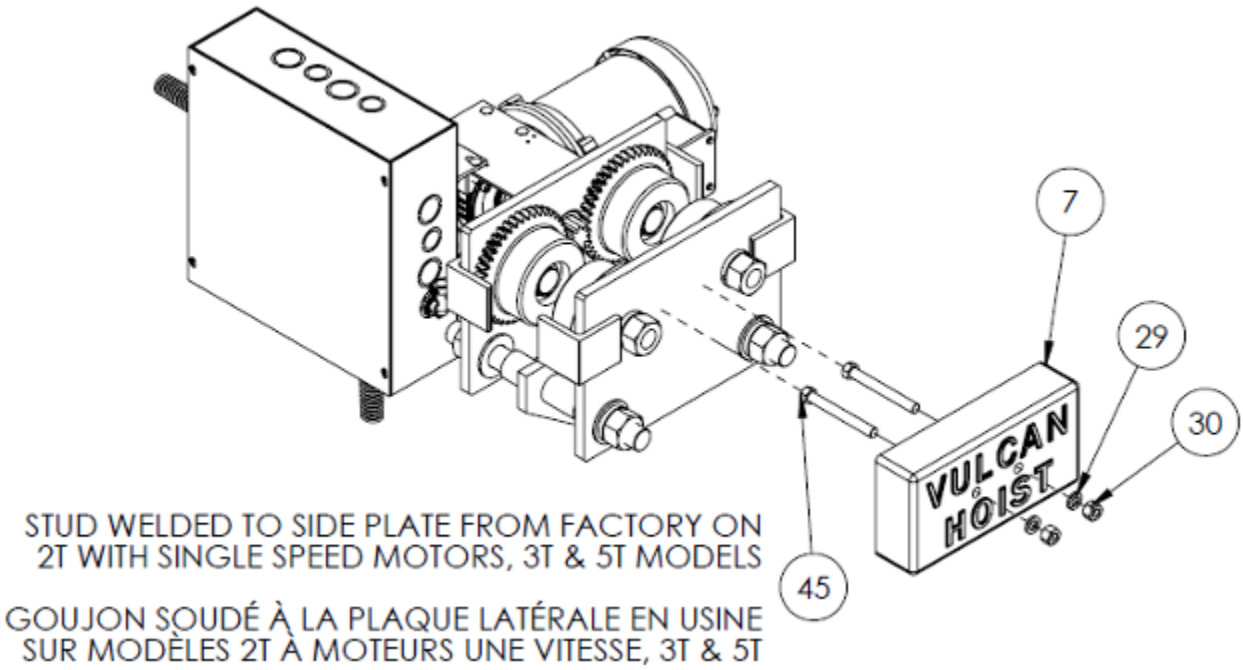
Note: For lowercase characters in part numbers, see the variable characters table next page
Note: Pour les lettres minuscules dans les numéros de pièces, voir la table des variables à la prochaine page



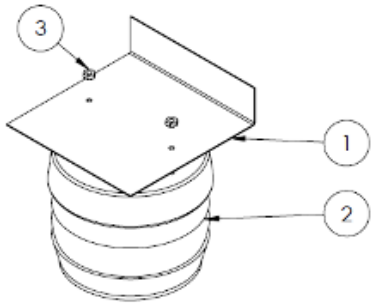
VARIABLE	MEANING	SIGNIFICATION
v	Control voltage	Voltage de contrôle
w	Supply voltage	Voltage d'alimentation
x	Primary fuse amperage	Ampérage du fusible primaire
y	Secondary fuse amperage	Ampérage du fusible secondaire
z	Number of buttons, including blanks	Nombre de boutons, vide compris

Low Headroom Versions
Versions à encombrement réduit





Models with Welded Counterweight Studs
Modèles avec goujons à contre-poids soudés



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Strobe Light Bracket		1
2	Strobe Light ST500-ACA		1
3	HAR085	Hex Nut 10-24 Self-locking	2