 # 99903619

IMT Electric-Hydraulic Crane Maintenance Manual

Models 3203i, 4004i & 6006i

20070212

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Revisions

DATE	LOCATION	DESCRIPTION
20050526	DECAL SECTION	ECNs 9625, 9655, 9685 - CHANGES IN DECALS TO MEET ANSI STANDARDS, UPDATED GRAPHICS
20050830		MODEL CHANGES TO 3203i, 4004i

CHAPTER 1

Maintenance

In This Chapter

To obtain reliable and satisfactory service, IMT telescopic cranes require a consistent preventative maintenance schedule. Take necessary safety precautions during maintenance procedures to avoid equipment damage and personal injury. Follow the maintenance schedule included with this manual for best results.

1 Maintenance should only be performed by authorized service personnel.

2 Disengage the PTO, if applicable, before any service or repair is performed.

3 DO NOT disconnect any hydraulic components or hoses while there is pressure in those components.

4 Stand clear of high pressure hydraulic fluid leaks. Hot hydraulic fluid will cause serious injury, burns and possibly DEATH.

5 Keep the crane clean and free from built-up grease, oil and dirt to prevent slippery conditions and as an aid in the inspection of the crane.

6 Perform all checks before each period of use.

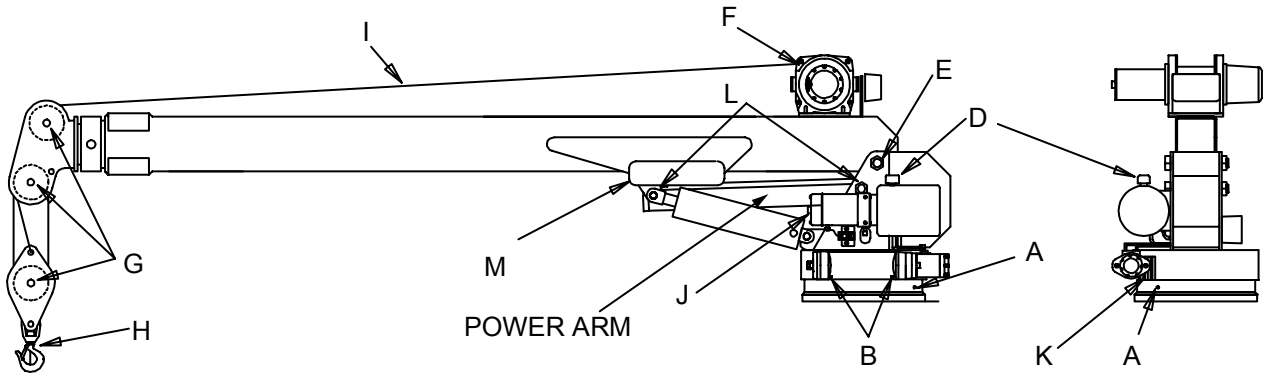
7 Replace parts with factory approved parts, only.

Repair or have repaired any components found to be inadequate, immediately.

Lubrication Schedule

Refer to the Lubrication Diagram for the locations of the lubrication points referred to in the following schedule.

DAILY	Check and fill hydraulic reservoir (D) to 1” of top using Dexron ATF. Make sure all cylinders are retracted before checking level.
WEEKLY	Apply high quality bearing grease to worm gear bearing via zerk fittings (B).
	Check rotation gear (K) for coverage and contaminants. Clean and reapply grease as necessary. Use only Moly 29 grease.
MONTHLY	Lubricate rotation bearing via zerk (A).
	Lubricate boom pivot pin via zerks (E).
	Apply small amount of machine oil to hook swivel mechanism (H).
	Apply small amount of grease between polymer rope pulleys (G) and axles.
	Apply rope oil with rag or spray to wire rope (I). Wipe off excess.
	Lubricate power arm bushings via zerks (L).
	Clean polymer slide pad (M) and apply a light coat of lithium grease. (Model 6006i)
YEARLY	Remove load brake from winch (F) and clean and apply a light coat of Lithium base grease to brake. Wipe interior bore of rope drum clean and inspect for damage. If no damage, apply light coat of Lithium grease and reassemble winch.
	Remove end cap from DC motor. Blow out debris and dust. Apply small amount of grease to armature bearing (J) and reassemble.



NOTE

Only model 6006i includes the power arm. Other lubrication locations are the same.

Prior to Starting Maintenance

Before starting crane adjustments and repairs, take the following precautions:

- Before servicing hydraulic components, relieve any hydraulic oil pressure in the system by making sure the crane is level and that the boom is resting on the boom rest.
- If servicing the electrical system, make sure to disconnect power to the crane.
- Wash and clean the crane periodically as needed. If using a power washer, avoid spraying hydraulic tank breather cap (D) or exposed rotation gear (K). If valve cover is removed for power washing check all connections afterward and allow sufficient time for air drying before re–powering the crane.

Adjustments & Repairs

Correct any hazardous conditions identified by the inspection requirements of this manual prior to resuming crane operation. Adjustments and repairs shall be done only by designated personnel.

1 Adjustments to maintain correct component function, such as:

a) Functional operating mechanisms

b) Operational aids (anti-two-block and overload protection devices) and limiting devices

c) Electronic, hydraulic and mechanical control systems

2 Repairs or replacements as needed for operation, such as:

a) Functional operating mechanisms that are cracked, broken, corroded, bent or excessively worn

b) Parts of the crane structure that are cracked, bent, broken, or excessively corroded

c) Damaged or worn hooks. IMT recommends hook replacement rather than repair.

3 Replacement parts shall have at least the original design factor.

4 Instructions shall be provided by the manufacturer for the removal of air from hydraulic circuits.

In addition, check the lubricating system for proper delivery of lubricant, and keep crane stationary while lubricants are being applied.

Equipment Inspection

The Crane Inspection Checklist, included in the General Reference section of this manual, is designed to assist you in maintaining the crane in safe operating condition. Become familiar with the checklist prior to operating the crane, and inspect to the instructions shown on the checklist.

ANSI/ASME B30.5A requires that written, dated, and signed inspection reports and records must be maintained monthly on critical items including the brakes, crane hooks, wire rope, hydraulic cylinders, and hydraulic pressure relief valves.

INSPECTION CLASSIFICATIONS:

- Initial Inspection: Prior to initial use, all new and altered cranes shall be inspected by a qualified person to verify compliance with the provision of this volume.
- Regular Inspection: The inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals are dependent in turn upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as frequent and periodic, with respective intervals between inspection as defined below;
  - Frequent Inspection - Daily to monthly intervals, performed by a designated person.
  - Periodic Inspection - Monthly to annual intervals, or as specifically recommended by the manufacturer or by a qualified person.

Periodic Crane Inspection

Every three months, and more frequently when the equipment is subject to heavy usage, perform the following inspections in addition to those specified in the Crane Inspection Checklist in the Reference Section.

LOWER AND EXTENSION BOOMS

1 Check structural defects evidenced in weld cracks, dents or bends.

2 Check slide pads for wear.

3 Check lower and extension cylinder pins for proper installation. Check hinge pin bushings for excessive wear.

BOOM & MAST ASSEMBLY

1 Check control valvebank and all other fittings for oil leaks and tightness.

2 Check all bolts and retainer plates on pin assemblies for proper installation.

3 Check torque on all unit mounting bolts.

4 Check for loose bolts, fatigue cracks or corroded structural members.

BASE ASSEMBLY

1 Check base casting housing for cracks.

2 Check for proper rotation function by making several start-stop operations. Maximum allowable free-play at mast front should be 1/8" to 3/ 16".

3 Check for proper gear mesh in turntable gear-bearing. Check motor and gear mounting bolts for tightness.

HYDRAULIC SYSTEM

1 CYLINDERS

a) Check rods for damage such as scarring, nicks, dents and rust on out-of-service units.

b) Check for leaks at weld joints and rod seals. Check for drift indicating leakage around piston rings or defective holding valves.

c) Check cylinder case for dents.

2 HYDRAULIC PUMP

a) Check for leaks at shaft seal.

b) Check for drop in operating speed.

c) Check hydraulic oil for excessive heating.

d) Check bolts and fasteners for tightness. Note any unusual vibration or noise.

3 PTO AND PUMP

a) Inspect for proper transmission gear to PTO engagement.

b) When supplied, inspect driveline U-joints for securing cap tightness and adequate lubrication.

c) Check mounting bolts on pump and PTO for tightness.

CRANES NOT IN REGULAR USE

1 A crane that has been idle for a period of one month or more, but less than six months, must be inspected by a qualified person conforming with the requirements of the initial, regular and frequent inspections

2 A crane that has been idle for a period of more than six months must be inspected by a qualified person conforming with the requirements of the initial, regular, frequent, and periodic inspections.

Testing

Operational Tests

All new, altered, modified or extensively repaired cranes shall be tested for operational compliance. The following functions must be tested:

- Load lifting and lowering mechanisms
- Boom lifting and lowering mechanisms
- Boom extension and retraction mechanism
- Swinging mechanism
- Safety devices
- Operating controls comply with appropriate function labels

Operational crane tests results shall be made available to designated person(s).

Rated Load Test

Prior to initial use, all cranes in which load sustaining parts have been altered, replaced or repaired should be load tested by, or under the direction of a qualified person. The replacement of the rope is specifically excluded from this requirement. However a functional test of the crane under a normal operating load should be made prior to putting the crane back in service.

Test load shall not exceed 110% of the manufacturer's load rating.

Written reports shall be furnished by an appointed or authorized person, showing test procedures and confirming the adequacy of repairs or alterations.

CHAPTER 2

Installation

Proper installation of your new crane is essential to safe operation, predictable performance and long machine life. IMT recommends crane installation by an experienced truck equipment professional. However, many installations can be properly done by others if the following guidelines in this Installation Section are followed.

In This Chapter

Recommended Installation Locations

The location of the crane on the truck body affects the usability and stability of the truck during lifting. Carefully plan the location of your crane on the truck body to account for safety, stability and functionality.

The following are suggested locations for your crane:

1 Passenger rear corner of the truck body. This is the most common location because it allows the operator to be on the “curb side” of the truck when working with the crane. This installation requires rear mounted outriggers.

2 In the center, at the rear – This allows the use of drop legs at each corner of the truck bed instead of outriggers. The disadvantage of this location is that for lifting at the side of the truck, the crane has to reach over half the width of the bed for the closest lifting point, which effectively lowers the maximum capacity of the crane at the side of the truck. An advantage of this location is that it provides the maximum stability for lifting the heaviest loads at the rear of the truck.

3 Other locations such as behind the cab, in the center of the bed, and as a trailer mount, have been successfully done to meet special needs. If you have special installation needs, contact the factory or your dealer for assistance in planning and executing your installation.

If you will not be lifting tall objects (24” or higher) or if you are mounting on top of the tool box on a crane reinforced utility body, you can bolt the crane directly to the body. If you will be mounting on a platform body and you will be handling loads which are taller than 24”, such as LP gas tanks, cemetery monuments, etc., use the mounting pedestal which raises the overall height of the mounted crane by 20”. This allows for more booming stroke with the taller loads.

The crane should be supported when the vehicle is traveling (see the OPERATION section of this manual). Failure to provide or use a boom rest can result in damage to the crane. The boom rest should be installed to be as rigid as possible.

Structural Preparation

Your new crane has been designed to lift the rated loads with sufficient safety factor included. However, the structure to which you bolt the crane must be strong enough to support the crane loads and to prevent failure under maximum loading conditions. If you are mounting to a truck body which has been factory reinforced for a crane, be sure that it has been designed and manufactured for the appropriate torque according to the following chart.

Crane Model	Truck Body Design Torque
Model 3203I	10,000 ft-lb
Model 4004i	16,000 ft-lb
Model 6006i	36,000 ft-lb

If you are mounting to a truck body or platform body which has not been manufactured for crane installation, make sure you design and build a sufficient structure to support the crane. IMT recommends that you seek assistance from a professional engineer for the structural design of your installation.

It is critical that you follow the material and bolt recommendations per your crane model. Refer to the following chart for material and bolt grades.

Crane Model	Material	Bolt Size	Preferred Mounting Pattern
Model 3203i	A-36 steel plate, minimum 1/2" thick	1/2" grade 8 or equivalent	12" x 12"
Model 4004i	A-36 steel plate, minimum 1/2" thick	3/4" grade 8 or equivalent	12" x 12"
Model 6006i	A-36 steel plate, minimum 1" thick	1" grade 8 or equivalent	14-3/4" x 14-3/4"

The mounting structure of the body should effectively transfer the crane loads to the ground via structural connection to the outrigger or similar structure.

CAUTION

Lifting loads without supporting the crane and truck body with outriggers can damage truck frame, body and rotation gear.

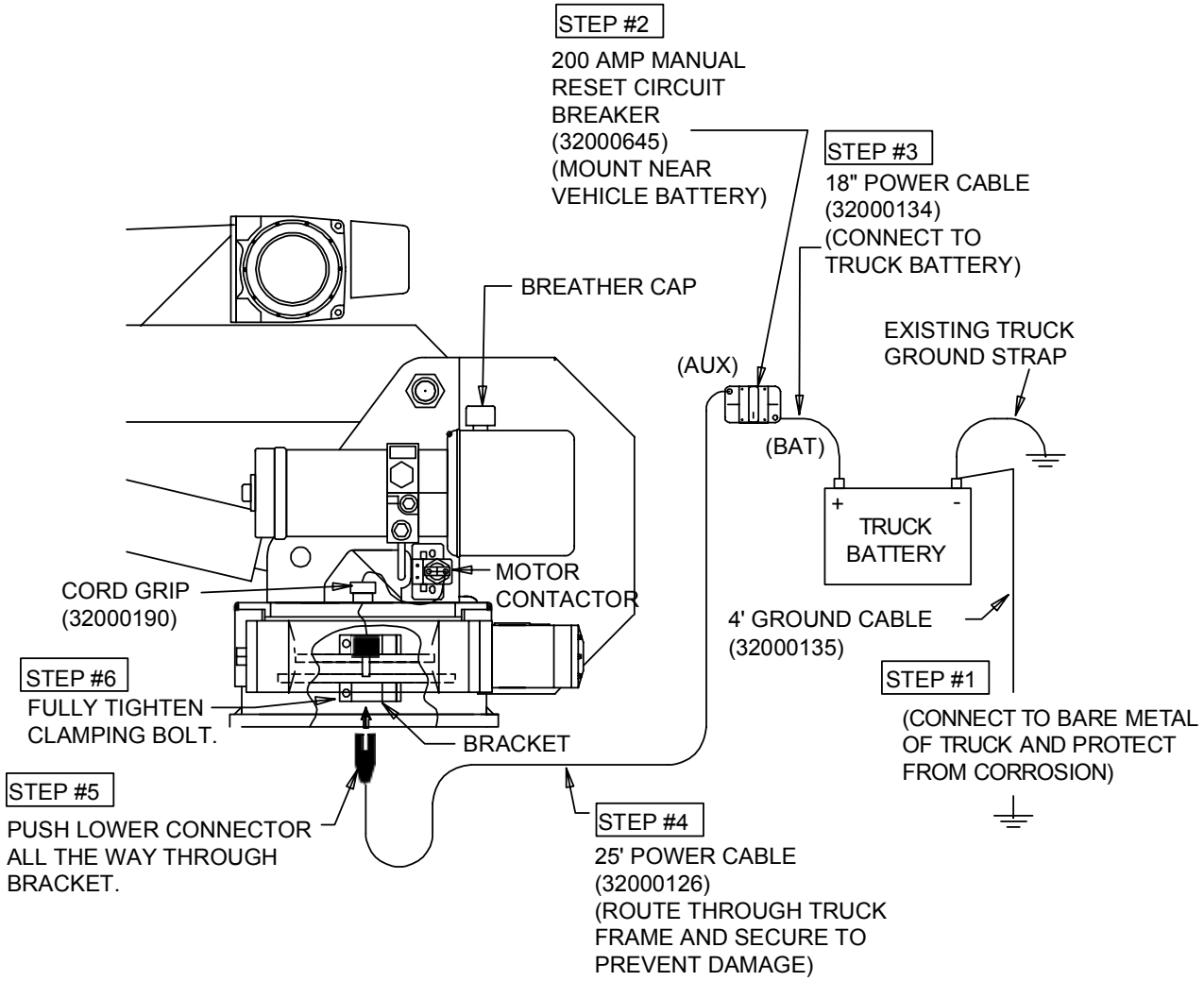
The addition of the weight of the crane to the vehicle weight can alter the driving and riding characteristics of the vehicle. It is recommended that additional overload springs be installed on the crane side of the truck to level it and compensate for the additional weight. Remember to subtract the installed weight of the crane and accessories from the payload capacity of the truck. Be careful not to overload the truck.

Electrical Installation

Once your crane is mounted, electrically connect the crane to the vehicle. See the 6006i parts manual for specific electrical information for that model.

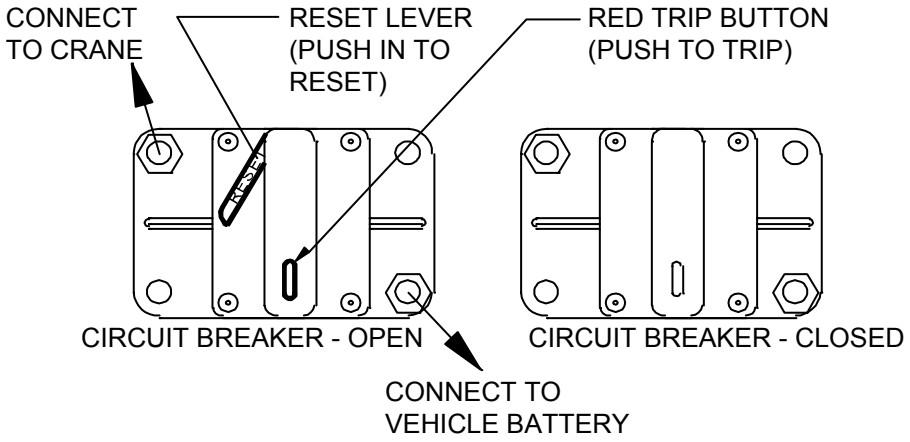
NOTE

Replace the vehicle's original equipment battery with one or two (depending on crane model) maintenance type, deep cycle batteries in order to handle the extra power requirements of the crane. Under normal usage (up to 3 to 4 short operations per day), one or two 1000 CCA Deep Cycle Truck batteries should provide sufficient power for the crane as long as the vehicle is running at a fast idle while the crane is in use. An alternator of at least 100 amp rating is required, and 150 amps are recommended for higher duty cycle applications. If longer duty cycles are anticipated, a second battery (located as close to the crane as possible) may be needed. In this case, BE SURE to provide circuit protection from shorting of the power cable either with a circuit breaker or an inline fuse. Coat all battery and power cable connections with a corrosion protective coating.



1 Install the 4-foot ground cable (32000135) from the negative terminal of the battery to the vehicle frame, making sure that good metal to metal contact is made. The crane electric system's ground completes the electrical circuit through the structure of the crane to the vehicle frame. The factory ground provided in the vehicle is NOT sufficient to carry the current required by the crane. Without the addition of this extra ground cable, your crane will not operate to full rated capacity and damage to the crane's electric motors, contactors or the vehicle electrical system may occur.

2 Mount the manual reset circuit breaker (32000645) as close as possible to the battery.



3 Connect the circuit breaker to the positive (+) post of the battery with the 18” power cable (32000134). The circuit breaker should be easily accessible in the event manual reset should become necessary.

4 Run the 25’ power cable (32000126) through the truck frame and up into the engine compartment.

5 Push the power cable connector up through the bracket clamp all the way until the upper and lower rubber insulators touch.

6 Fully tighten the clamp.

Protect the power cable from abrasion, flying gravel, hot exhaust pipes etc. by fastening it inside the frame channel and using protective covering (loom, conduit etc.). Be sure to use rubber grommets or other protection when running power cable through steel bulkheads, etc.

CHAPTER 3

Decals

In This Chapter

"Danger" Decal Descriptions

All operators must familiarize themselves with the “DANGER” decals shown in this section. Your equipment may have additional safety decals that are not described here. Any safety decals affixed to your equipment must be identified, read and understood.

The materials and adhesives used in the production of these decals were designed for maximum durability, adhesion and legibility. Nevertheless, if a decal (including capacity chart) becomes damaged or illegible, replace it at your earliest opportunity. If a crane is repaired or repainted, replace all decals before the crane is put back into service. Individual decals as well as complete decal kits are available from IMT.

The following figures show safety decals used on IMT cranes. They are shown here as an aid in their identification with an explanation of their purpose, where they are placed on the crane and the normal quantity used on each crane.

Danger Decal Figures

Decal Description

Decal Illustration

Electrocution Hazard (Large)

Part Number: 70394445

Function: To inform operator of hazards associated with contact or proximity to electrical lines, possible consequences should the hazard occur, and how to avoid the hazard.

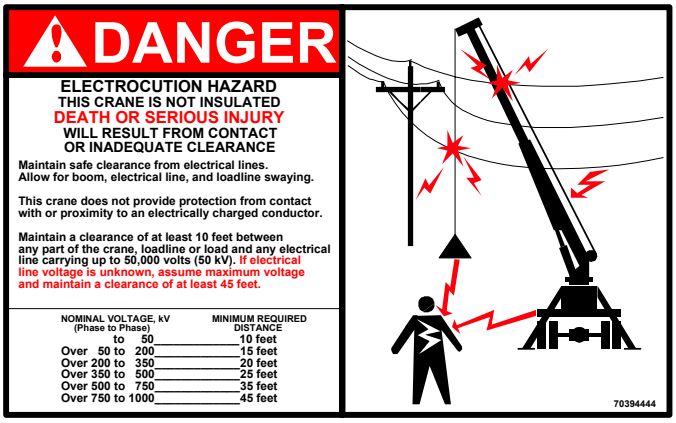
Placement: On all four sides of truck.

Electrocution Hazard (Small)

Part Number: 70394444

Function: To inform the operator and other personnel in the work area of the hazard associated with contact or proximity to electrical lines, the possible consequences should the hazard occur, and how to avoid the hazard.

Placement: At or near operator control station.



Decal Description

Decal Illustration

Danger - Operation

Part Number: 70392814

Function: To inform the operator about reading the manual and following safety regulations and safe operating practices.

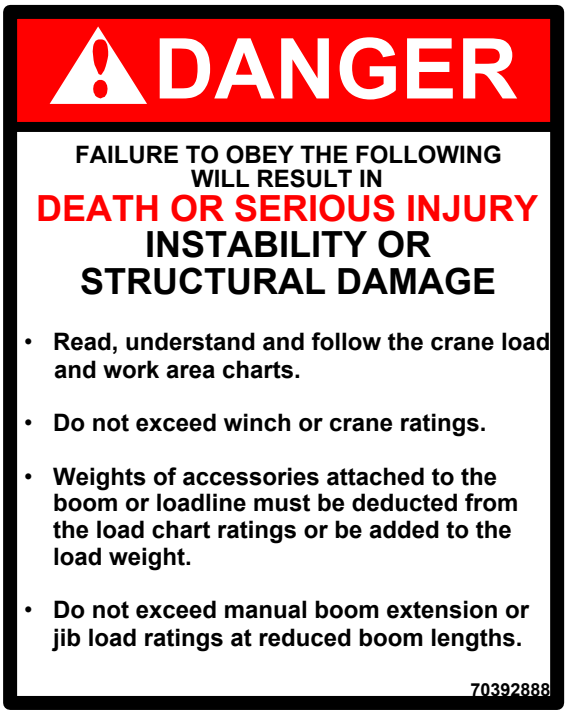
Placement: At or near operator control station.

Danger - Structural Damage or Instability

Part Number: 70392888

Function: To inform the operator about following capacity charts and correctly calculating capacities.

Placement: At or near operator control station.



Decal Description

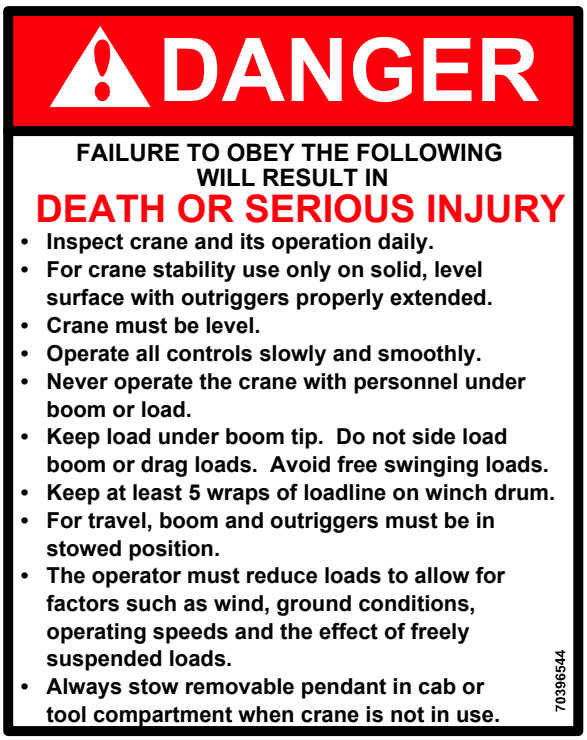
Danger - Operation Instructions

Part Number: 70396544

Function: Instructions for safe crane start-up and operation.

Placement: At or near operator control station.

Decal Illustration



Instruction Decal Descriptions

Decals in this section are instructional decals which may be affixed to your crane. Some are relevant to maintenance while others focus on operation. They are provided here as reference to help you understand their purpose and placement.

Decal Description

Decal Illustration

Grease Weekly

Part Number: 70391612 (Left); 70391613 (Right)

Function: To inform maintenance personnel of the location of grease zerks and the greasing interval.

Placement: At grease zerks with arrow pointing toward the zerk.

Rotate Crane while Greasing

Part Number: 70392524

Function: To inform maintenance personnel that it is necessary to rotate the crane while greasing the turntable gear-bearing. Rotation is required for proper and even distribution of grease to the gear-bearing.

Placement: At on near gear-bearing's grease zerk location.

Suction Line / Return Line

Part Numbers: 70392108 (Suction) &70392109 (Return)

Function: To aid in the identification of the hydraulic system suction and return lines to minimize errors during hydraulic maintenance.

Placement: On appropriate hydraulic reservoir fluid lines.

Caution - High Pressure Washing

Part Number: 70392213

Function: To inform maintenance personnel not to use high pressure washers and not to wax the crane for a period of 60 days after delivery. The use of high pressure washers and wax is detrimental to the crane's paint until cured.

Placement: Near crane operating station.

Caution - Oil Level

Part Number: 71039134

Function: To caution the operator to check the hydraulic reservoir oil level daily.

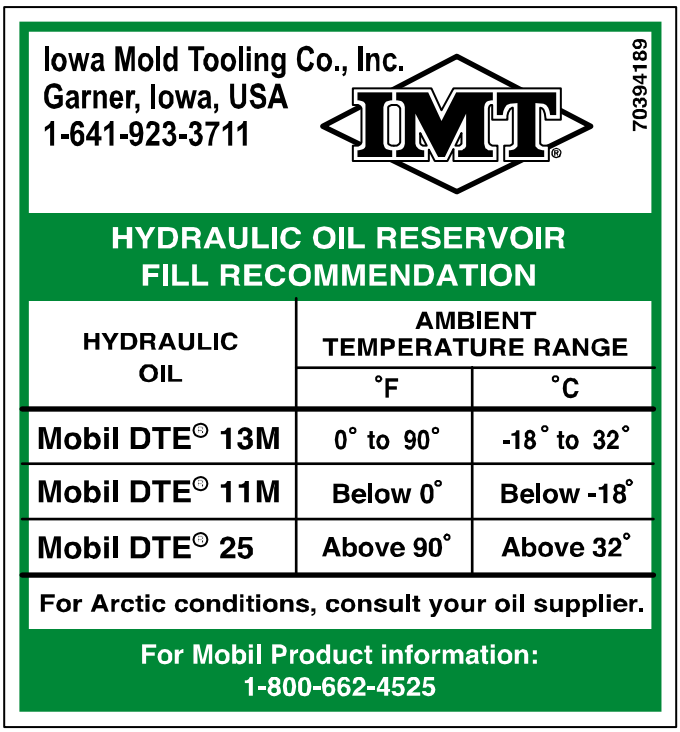
Placement: On or near hydraulic oil reservoir.

Hydraulic Oil Reservoir Fill Recommendations

Part Number: 70394189

Function: To inform operator and maintenance personnel of the recommended hydraulic oil to be used under different climactic conditions.

Placement: On or near hydraulic oil reservoir.



CHAPTER 4

General Reference

In This Chapter

Inspection Checklist

NOTICE:

The user of this form is responsible for determining that these inspections satisfy all applicable regulatory requirements.

OWNER/COMPANY:	TYPE OF INSPECTION (circle one):			
CONTACT PERSON:	DAILY	MONTHLY	QUARTERLY	ANNUAL
CRANE MAKE & MODEL:	DATE INSPECTED:			
CRANE SERIAL NUMBER:	HOURMETER READING (if applicable):			
UNIT I.D. NUMBER:	INSPECTED BY (print):			
LOCATION OF UNIT:	SIGNATURE OF INSPECTOR:			

TYPE OF INSPECTION
NOTES:
Daily and monthly inspections are to be performed by a “designated” person, who has been selected or assigned by the employer or the employer’s representative as being competent to perform specific duties.

Quarterly and annual inspections are to be performed by a “qualified” person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training and experience has successfully demonstrated the ability to solve or resolve problems related to the subject matter and work.

One hour of normal crane operation assumes 20 complete cycles per hour. If operation exceeds 20 cycles per hour, inspection frequency should be increased accordingly.

Consult Operator / Service Manual for additional inspection items, service bulletins and other information.

Before inspecting and operating crane, crane must be set up away from power lines and leveled with outriggers fully extended.

DAILY (D): Before each day of operation, those items designated with a (D) must be inspected. This inspection need not be recorded unless a deficiency (8) is found. If the end user chooses to record all daily inspections and those daily inspections include the monthly inspection requirements, there would be no need for a separate monthly inspection.

MONTHLY (M): Monthly inspections or 100 hours of normal operation (which ever comes first) includes all daily inspections plus items designated with an (M). This inspection must be recorded.

QUARTERLY (Q): Every three to four months or 300 hours of normal operation (which ever comes first) includes all daily and monthly inspection items plus items designated with a (Q). This inspection must be recorded.

ANNUAL (A): Each year or 1200 hours of normal operation (which ever comes first) includes all items on this form which encompasses daily, monthly and quarterly inspections plus those items designated by (A). This inspection must be recorded.

INSPECTION CHECKLIST STATUS KEY:	
S = Satisfactory	R = Recommendation (should be considered for corrective action)
X = Deficient (must be corrected prior to operation)	NA = Not Applicable

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS (S,R,X,NA)
D	1	Labels	All load charts, safety & warning labels, and control labels are present and legible.	
D	2	Crane	Check all safety devices for proper operation.	
D	3	Controls	Control mechanisms for proper operation of all functions, leaks and cracks.	
D	4	Station	Control and operator's station for dirt, contamination by lubricants, and foreign material.	
D	5	Hydraulic System	Hydraulic system (hoses, tubes, fittings) for leakage and proper oil level.	
D	6	Hook	Presence and proper operation of hook safety latches.	
D	7	Rope	Proper reeving of wire rope on sheaves and winch drum.	
D	8	Pins	Proper engagement of all connecting pins and pin retaining devices.	
D	9	General	Overall observation of crane for damaged or missing parts, cracked welds, and presence of safety covers.	
D	10	Operation	During operation, observe crane for abnormal performance, unusual wear (loose pins, wire rope damage, etc.). If observed, discontinue use and determine cause and severity of hazard.	
D	11	Remote Ctrl	Operate remote control devices to check for proper operation.	
D	12	Electrical	Operate all lights, alarms, etc. to check for proper operation.	
D	13	Anti 2-Block	Operate anti 2-block device to check for proper operation.	
D	14		Other (Per customer requirements)	
D	15		Other (Per customer requirements)	
M	16	Daily	All daily inspection items.	
M	17	Cylinders	Visual inspection of cylinders for leakage at rod, fittings, and welds. Damage to rod and case.	
M	18	Valves	Holding valves for proper operation.	
M	19	Valves	Control valves for leaks at fittings and between stations.	
M	20	Valves	Control valve linkages for wear, smoothness of operation, and tightness of fasteners.	
M	21	General	Bent, broken, or significantly rusted/corroded parts.	
M	22	Electrical	Electrical systems for presence of dirt, moisture, and frayed wires.	
M	23	Structure	All structural members for damage.	
M	24	Welds	All welds for breaks and cracks.	
M	25	Pins	All pins for proper installation and condition.	
M	26	Hardware	All bolts, fasteners and retaining rings for tightness, wear and corrosion.	
M	27	Wear Pads	Presence of wear pads.	
M	28	Pump & Motor	Hydraulic pumps and motors for leakage at fittings, seals, and between sections.	
M	29	PTO	Transmission/PTO for leakage, abnormal vibration, and noise.	
M	30	Hyd Fluid	Quality of hydraulic fluid and presence of water.	

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS (S,R,X,NA)
M	31	Hyd Lines	Hoses & tubes for leakage, abrasion damage, blistering, cracking, deterioration, fitting leakage, and secured properly.	
M	32	Hook	Load hook for abnormal throat distance, twist, wear, and cracks.	
M	33	Rope	Condition of load line.	
M	34	Manual	Presence of operator's manual with unit.	
M	35		Other	
Q	36	Daily	All daily inspection items.	
Q	37	Monthly	All monthly inspection items.	
Q	38	Extensions	Condition of wear pads.	
Q	39	Rotation Sys	Rotation bearing for proper torque of all accessible mounting bolts.	
Q	40	Hardware	Base mounting bolts for proper torque.	
Q	41	Structure	All structural members for deformation, cracks and corrosion.	
	42		• Base	
	43		• Outrigger beams and legs	
	44		• Mast	
	45		• Inner Boom	
	46		• Outer Boom	
	47		• Extension(s)	
	48		• Jib boom	
	49		• Jib extension(s)	
	50		• Other	
Q	51	Hardware	Pins, bearing, shafts, gears, rollers, and locking devices for wear, cracks, corrosion and distortion.	
	52		• Rotation bearing(s)	
	53		• Inner boom pivot pin(s) and retainer(s)	
	54		• Outer boom pivot pin(s) and retainer(s)	
	55		• Inner boom cylinder pin(s) and retainer(s)	
	56		• Outer boom cylinder pin(s) and retainer(s)	
	57		• Extension cylinder pin(s) and retainer(s)	
	58		• Jib boom pin(s) and retainer(s)	
	59		• Jib cylinder pin(s) and retainer(s)	
	60		• Jib extension cylinder pin(s) and retainer(s)	
	61		• Boom tip attachment	
	62		• Other	
Q	63	Hyd Lines	Hoses, fittings and tubing for proper routing, leakage, blistering, deformation and excessive abrasion.	
	64		• Pressure line(s) from pump to control valve	
	65		• Return line(s) from control valve to reservoir	
	66		• Suction line(s) from reservoir to pump	
	67		• Pressure line(s) from control valve to each function	
	68		• Load holding valve pipe(s) and hose(s)	
	69		• Other	
Q	70	Pumps, PTO's & Motors	Pumps, PTO's & motors for loose bolts/fasteners, leaks, noise, vibration, loss of performance, heating & excess pressure.	
	71		• Winch motor(s)	
	72		• Rotation motor(s)	
	73		• Other	
Q	74	Valves	Hydraulic valves for cracks, spool return to neutral, sticking spools, proper relief valve setting, relief valve failure.	
	75		• Main control valve	

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS (S,R,X,NA)
	76		• Load holding valve(s)	
	77		• Outrigger or auxiliary control valve(s)	
	78		• Other valves (per customer requirements)	
	79		• Other (per customer requirements)	
Q	80	Cylinders	Hydraulic cylinders for drifting, rod seal leakage and leakage at welds. Rods for nicks, scores and dents. Case for damage. Case and rod ends for damage and abnormal wear.	
	81		• Outrigger cylinder(s)	
	82		• Inner boom cylinder(s)	
	83		• Outer boom cylinder(s)	
	84		• Extension cylinder(s)	
	85		• Rotation cylinder(s)	
	86		• Jib lift cylinder(s)	
	87		• Jib extension cylinder(s)	
	88		• Other (per customer requirements)	
Q	89	Winch	Winch, sheaves and drums for damage, abnormal wear, abrasions and other irregularities.	
Q	90	Hyd Filters	Hydraulic filters for replacement per maintenance schedule.	
A	91	Daily	All daily inspection items.	
A	92	Monthly	All monthly inspection items.	
A	93	Quarterly	All quarterly inspection items.	
A	94	Hyd Sys	Hydraulic fluid change per maintenance schedule.	
A	95	Controls	Control valve calibration for correct pressure & relief valve settings.	
A	96	Valves	Safety valve calibration for correct pressure & relief valve settings.	
A	97	Valves	Valves for failure to maintain correct settings.	
A	98	Rotation Sys	Rotation drive system for proper backlash clearance & abnormal wear, deformation and cracks.	
A	99	Lubrication	Gear oil change in rotation drive system per maintenance schedule.	
A	100	Hardware	Check tightness of all fasteners and bolts, using torque specifications on component drawings or torque chart.	
A	101	Wear Pads	Wear pads for excessive wear.	
A	102	Loadline	Loadline for proper attachment to drum.	

Deficiency / Recommendation / Corrective Action Report

DATE:	OWNER:	UNIT I.D. NUMBER:

GUIDELINES

a A deficiency (X) may constitute a hazard. Deficiency must be corrected and/or faulty parts replaced before resuming operation.

b Recommendations (R) should be considered for corrective actions. Corrective action for a particular recommendation depends on the facts in each situation.

c Corrective actions (CA), repairs, adjustments, parts replacement, etc. are to be performed by a qualified person in accordance with all manufacturer's recommendations, specifications and requirements.

NOTE: Deficiencies (X) listed must be followed by the corresponding corrective action taken (CA).

X = DEFICIENCY R = RECOMMENDATION CA = CORRECTIVE ACTION TAKEN

X,R,CA	ITEM #	EXPLANATION	DATE CORRECTED

X,R,CA	ITEM #	EXPLANATION	DATE CORRECTED

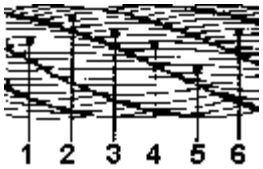
X,R,CA	ITEM #	EXPLANATION	DATE CORRECTED

Wire Rope Inspection & Replacement

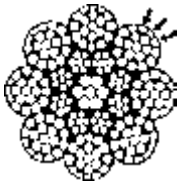
Wire rope with any of the deficiencies shown below shall be removed and replaced immediately.

a Corrosion can be cause for replacement. Any development of corrosion must be noted and monitored closely.

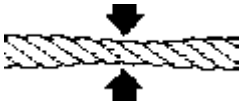
b When there are either three broken wires in one strand or a total of six broken wires in all strands in any one rope lay.



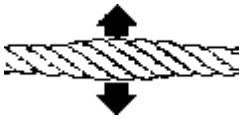
c When flat spots on the outer wires appear and those outside wires are less than 2/3 the thickness of the unworn outer wire.



d When there is a decrease of diameter indicating a core failure.

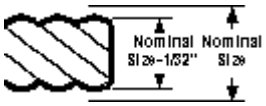


e When kinking, crushing, birdcaging or other distortion occurs.



f When there is noticeable heat damage (discoloration) of the rope by any means.

g When the diameter is reduced from nominal size by 1/32" or more.



h If a broken wire protrudes or loops out from the core of the rope.

Hook Inspection

Hooks having any of the listed deficiencies shall be removed from service unless a qualified person approves their continued use and initiates corrective action. Hooks approved for continued use shall be subjected to periodic inspection.

a DISTORTION

Bending / Twisting

A bend or twist exceeding 10° from the plane of the unbent hook.

Increased Throat Opening

HOOK WITHOUT LATCH: An increase in throat opening exceeding 15% (Or as recommended by the manufacturer).

HOOK WITH LATCH: An increase of the dimension between a fully-opened latch and the tip section of the hook exceeding 8% (Or as recommended by the manufacturer).

b WEAR

If wear exceeds 10% of the original sectional dimension. (Or as recommended by the manufacturer).

c CRACKS, NICKS, GOUGES

Repair of cracks, nicks, and gouges shall be carried out by a designated person by grinding longitudinally, following the contour of the hook, provided that no dimension is reduced more than 10% of its original value. (Or as recommended by the manufacturer). (A qualified person may authorize continued use if the reduced area is not critical).

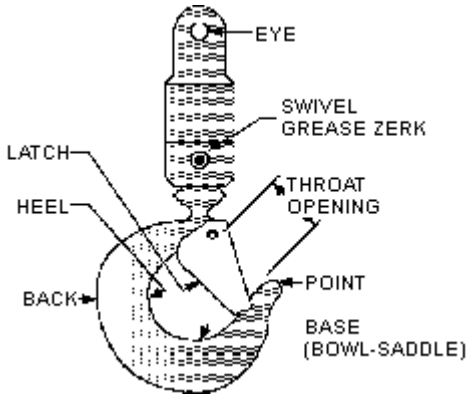
d LATCH

Engagement, Damage & Malfunction

If a latch becomes inoperative because of wear or deformation, and is required for the service involved, it shall be replaced or repaired before the hook is put back into service. If the latch fails to fully close the throat opening, the hook shall be removed from service or "moused" until repairs are made.

e HOOK ATTACHMENTS & SECURING MEANS

If any indication of distortion, wear, cracks, nicks or gouges are present, unless a qualified person authorizes their use. (Or as recommended by the manufacturer).



Anti-Two-Block Device Inspection

(See the operation, maintenance, and repair manual for this crane for a complete description.)

The anti-two-block system should be checked daily as follows:

1 Examine flexible rod and weight to insure free unrestricted mechanical operation.

2 Examine cord for damage, cuts or breaks. Grasp cord and pull to check operation of cord reel. The cord should retract on reel when released.

3 Start vehicle, engage PTO and slowly winch loadline up until anti-two-block weight comes in contact with the hook end of the loadline cable. At the moment the weight is fully supported, a marked difference in winch operation should be noted. At this point, the winch up function should become very sluggish or non-functioning and have very little pull capability. Slowly increase truck engine speed while simultaneously actuating the winch up function. The winch characteristics should remain sluggish with little or no tensioning of the cable. If operation other than as described occurs, stop immediately and investigate. Failure to do so will risk damage to the cable or the crane. If all is well at this point, actuate the boom extend function slowly, and gradually increase to full actuation. Once again the function should be sluggish or non-existent with no tightening of the winch cable. If operation other than described occurs, stop immediately and reverse the function.

4 The final check involves actuating both the winch up and extend functions together and checking for proper operation of the anti-two-blocking circuit. Once again, start slowly and stop if it appears the cable is being tensioned.

5 If the anti-two-block function appears to be functioning normally, winch the cable down until the sensing weight swings free.

Thread Torques

WARNING

Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size. Once a bolt has been torqued to 75% of its proof load and then removed, the torque coefficient may no longer be the same as when the bolt was new thus giving indeterminate clamp loads after torquing. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatigue, causing serious injury or DEATH.

When using the torque data in the torque charts, the following rules should be observed.

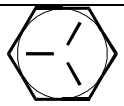
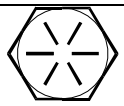
1 Bolt manufacturer's particular specifications should be consulted when provided.

2 Flat washers of equal strength must be used.

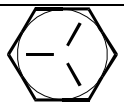
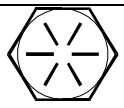
3 All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.

4 Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values.

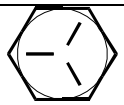
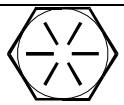
FINE THREAD TORQUE CHART (ENGLISH)

TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 SAE J429 GRADE 5		 SAE J429 GRADE 8	
		PLAIN (FT-LB)	PLATED (FT-LB)	PLAIN (FT-LB)	PLATED (FT-LB)
5/16-24	0.3125	19	14	27	20
3/8-24	0.375	35	26	49	35
7/16-20	0.4375	55	41	78	58
1/2-20	0.5	90	64	120	90
9/16-18	0.5625	120	90	170	130
5/8-18	0.625	170	130	240	180
3/4-16	0.75	300	225	420	315
7/8-11	0.875	445	325	670	500
1-12	1	645	485	995	745
1 1/8-12	1.125	890	670	1445	1085
1 1/4-12	1.25	1240	930	2010	1510
1 3/8-12	1.375	1675	1255	2710	2035
1 1/2-12	1.5	2195	1645	3560	2670

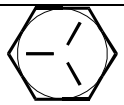
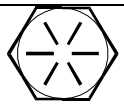
COARSE THREAD TORQUE CHART (ENGLISH)

TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 SAE J429 GRADE 5		 SAE J429 GRADE 8	
		PLAIN (FT-LB)	PLATED (FT-LB)	PLAIN (FT-LB)	PLATED (FT-LB)
5/16-18	0.3125	17	13	25	18
3/8-16	0.375	31	23	44	33
7/16-14	0.4375	49	37	70	52
1/2-13	0.5	75	57	105	80
9/16-12	0.5625	110	82	155	115
5/8-11	0.625	150	115	220	160
3/4-10	0.75	265	200	375	280
7/8-9	0.875	395	295	605	455
1-8	1	590	445	910	680
1 1/8-7	1.125	795	595	1290	965
1 1/4-7	1.25	1120	840	1815	1360
1 3/8-6	1.375	1470	1100	2380	1780
1 1/2-6	1.5	1950	1460	3160	2370

FINE THREAD TORQUE CHART (METRIC)

TIGHTENING TORQUE					
		 SAE J429 GRADE 5		 SAE J429 GRADE 8	
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	PLAIN (KG-M)	PLATED (KG-M)	PLAIN (KG-M)	PLATED (KG-M)
5/16-24	0.3125	3	2	4	3
3/8-24	0.375	5	4	7	5
7/16-20	0.4375	8	6	11	8
1/2-20	0.5	12	9	17	12
9/16-18	0.5625	17	12	24	18
5/8-18	0.625	24	18	33	25
3/4-16	0.75	41	31	58	44
7/8-11	0.875	62	45	93	69
1-12	1	89	67	138	103
1 1/8-12	1.125	123	93	200	150
1 1/4-12	1.25	171	129	278	209
1 3/8-12	1.375	232	174	375	281
1 1/2-12	1.5	304	228	492	369

COARSE THREAD TORQUE CHART (METRIC)

TIGHTENING TORQUE					
		 SAE J429 GRADE 5		 SAE J429 GRADE 8	
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	PLAIN (KG-M)	PLATED (KG-M)	PLAIN (KG-M)	PLATED (KG-M)
5/16-18	0.3125	2	2	3	2
3/8-16	0.375	4	3	6	5
7/16-14	0.4375	7	5	10	7
1/2-13	0.5	10	8	15	11
9/16-12	0.5625	15	11	21	16
5/8-11	0.625	21	16	30	22
3/4-10	0.75	37	28	52	39
7/8-9	0.875	55	41	84	63
1-8	1	82	62	126	94
1 1/8-7	1.125	110	82	178	133
1 1/4-7	1.25	155	116	251	188
1 3/8-6	1.375	203	152	329	246
1 1/2-6	1.5	270	210	438	328