

SINGLE GIRDER CRANE MANUAL

Job No:	BW120021
Item Description:	5T STREET SINGLE GIRDER CRANE
Serial Number:	NQC7377
Owner:	QUEENSLAND URBAN UTILITIES
Manufacturer:	NQCRANES



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SECTION 1.

INTRODUCTION

1.1 GENERAL

1.2 SINGLE GIRDER CRANES

1.3 LOAD CARRYING BOX GIRDER

1.4 END CARRIAGES

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1. INTRODUCTION

1.1 GENERAL

Your new **North Queensland Cranes** overhead electric crane is a single beam box girder construction built to the following Australian Standards.

AS 3990	- SAA Steel Structure Code
AS 1418, Part 1,2 & 3	- SAA Crane & Hoists Code
AS 1554.1	- SAA Structural Steel Welding Code

1.2 SINGLE GIRDER CRANES

Single Girder Cranes consist of four main sub-assemblies:

- One Load Carrying Box Girder
- Two Travel End Carriages and Drives
- Monorail Hoist and Hoisting Equipment
- Electrical Control and Radio Control

1.3 LOAD CARRYING BOX GIRDER

Load Carrying Box Girder consists of four plates forming a box section. Longitudinal welds between webs and flanges are continuous single sided fillet welds. The webs of the box girder are stiffened with vertical diaphragms and in some instances horizontal stiffeners may be used. Traverse splices in the webs and flanges are full penetration prepared butt welds. Hoist runs on top of bottom flange.

1.4 END CARRIAGES

End Carriages each carriage contains one idler wheel and one drive wheel assembly. The crane travel motion is driven by two independent low maintenance drive units. The end carriage structure consists of RHS or plate welded to make a fabricated section to fit the wheel brackets or blocks. Two diaphragms are provided near the position where the girder and end carriage are connected.

1.5 HOIST AND TRAVEL DRIVES

Hoist and Travel Drives are fully covered in other sections of this manual.

SECTION 2.

GENERAL SAFETY & OPERATION

2.1 APPROPRIATE USE

2.2 PROHIBITED PRACTICES

2.3 GENERAL SAFETY INFORMATION

**2.4 SELECTION AND QUALIFICATION OF OPERATING AND
MAINTENANCE PERSONNEL**

**2.5 SAFETY INSTRUCTIONS FOR INSTALLATION AND
DISASSEMBLY**

**2.6 SAFETY INSTRUCTIONS WHEN FIRST PUTTING THE CRANE
INTO SERVICE AFTER COMPLETING INSTALLATION**

2.7 SAFETY INSTRUCTION FOR OPERATION

2.8 SAFETY INSTRUCTION FOR MAINTENANCE

2.9 CRANE MAINTENANCE AS PER CODE AS2550.1 & 2550.3



2. GENERAL SAFETY AND OPERATION

2.1 APPROPRIATE USE

The crane is only intended for lifting and moving loads and may be used as stationary or travelling unit.

The crane may only be operated when in perfect working order by trained personnel in accordance with the relevant safety and accident prevention regulations. This also includes compliance with operating and maintenance conditions specified in the operating instructions.

The crane is industrial equipment designed to be used with a rated voltage of up to 415v for alternating current.

Power feed is via catenary cables and enclosed power conductor systems. These systems are live up to the terminal of the isolating switch (main connection switch, isolating switch).

The relevant isolating switch must be switched off and secured when performing maintenance/ repair work.(Note: Isolate to site requirements)

During operation or when the main switch is not switched off, electrical components inside enclosures, motors, switchgear cabinets, load handling attachments, terminal boxes, etc., carry dangerous voltages. This voltage may cause fatal injuries.(Live testing is now not permitted)

Serious personal injury or damage to property may occur in the event of:

- unauthorised removal of covers
- inappropriate use of the crane
- incorrect operation
- insufficient maintenance
- exceeding the maximum rated capacity (the maximum rated capacity is the maximum permitted load. Pay attention to the sum of the load to be lifted and the load handling attachment)
- working on live parts

2.2 PROHIBITED PRACTICES

Certain work and practices are prohibited when using the crane as they may involve danger to life and limb and result in lasting damage to the crane eg.

- Unsafe load handling (e.g. swinging the load)
- Do not handle suspended loads about persons
- Do not pull or drag suspended loads at an angle
- Do not pull free fixed or obstructed loads with the crane
- Do not exceed the maximum permitted load and permitted load dimensions



- Do not allow the rope to run over edges
- Do not use the rope as a load bearing sling
- Do not allow loads to drop when the rope is in a slack condition
- Do not subject the control unit to inappropriate mechanical loads
- Transporting persons with the crane is not permitted
- Do not tamper with or manipulate electrical equipment.

2.3 GENERAL SAFETY INFORMATION

Persons under the influence of drugs, alcohol or medicines, which affect reactions, must not install, operate, put into service, maintain, repair or disassemble the crane.

Any conversions and modifications to the installation require the written consent of North Queensland Cranes.

Work on electrical equipment of the crane may only be carried out by qualified electricians in accordance with electrical regulations. In the event of malfunctions, the crane operation must be stopped, the crane switched off and the relevant main switches locked immediately. Defects must be rectified immediately.

National accident prevention regulations and general site safety regulations must be observed when operating our products. Follow these instructions and/ or regulations in order to avoid accidents and damage. The operating instructions must be kept available at the place where the crane is in use at all times. They include significant aspects and appropriate excerpts from the relevant guidelines, standards and regulations. The owner must instruct his personnel appropriately.

Any failure to comply with the safety instructions stated in these operating instructions can result in death or personal injury.

Observe general statutory and other obligatory regulations relating to accident prevention and environmental protection and basic health and safety requirements in addition those included in these operating instructions. Such requirements may also relate, for example, to the handling of hazardous material or the provision/wearing of personal protection equipment. Comply with these regulations and general accident prevention regulations relevant for the place at which the crane is used may still constitute a danger to life and limb if it is not installed, operated, maintained or used appropriately by personnel, which have not been trained or specially instructed. The operating instructions must, if required, be supplemented by the owner with working procedures, operating personnel, etc. Supervising and reporting obligations as well as special operating conditions must also be taken into consideration.

Personnel assigned to working with the crane must have read and understood the operating instruction and in particular, the chapter on safety information.



All activities relating to crane, which are not described in these operating instructions, may only be carried out by specialist personnel specifically trained for the particular crane.

The owner must ensure that personnel work in a safety and hazard conscious manner in compliance with the operating instructions.

The owner must ensure that the crane is only operated when in proper working order and that all relevant safety requirements and regulations are complied with. Crane must be taken out of service immediately if functional defects or irregularities are detected. In the event of a stoppage (e.g. if defect regarding safe and reliable operation are detected, in emergency situations, in the event of operating malfunctions, for repairs and maintenance purpose, if damage is detected or after finishing work), the operator/experienced technician must carry out all prescribed safety measures. Personal protective clothing must be worn as necessary or as required by regulations. Personnel must not wear loose clothing, jewellery including rings or long hair loose. Injury may occur, for example, by being caught or drawn into the mechanism.

All safety and hazard information and recommendations on the crane, e.g. at access points and mains connection switches must be maintained in complete and legible conditions. Inching (i.e. giving short pulses to the motor) must always be avoided. Emergency limit stop devices (e.g. slipping clutch or emergency limit switch) must not be approached in normal operation.

Modifications, additions to and conversions of the crane, which may impair safety in any way, must not be carried out without the written consent of North Queensland Cranes. This also applies to the subsequent installation of safety devices as well as for performing welds on load bearing parts. Safety devices must not be rendered inoperative.

Only genuine spare parts and accessories may be used. Observe prescribed deadlines or those specified in the operating instructions for routine checks / inspections.

2.4 SELECTION AND QUALIFICATION OF OPERATING AND MAINTENANCE PERSONNEL

For independent operation or maintenance of the crane, the owner may only employ persons:

- Who are at least 18 years of age
- Who are mentally and physically suitable
- Who have been instructed in the operation or maintenance of the crane and have proven their qualification to the owner in this respect (in addition to theoretical training, instruction also includes sufficient practical operating experience as well as acquiring the ability to identify defects which are hazard to safe operation).
- Who can be expected to carry out the work assigned to them reliably.

The owner must assign operating and maintenance personnel their relevant tasks.

2.5 SAFETY INSTRUCTIONS FOR INSTALLATION AND DISASSEMBLY

- Installation and disassembly work may only be performed by experienced technicians.
- Installation and disassembly work must be coordinated by the person carrying out the work and the owner within the scope of their responsibility.
- The working and danger zone must be made safe.
- The installation must be isolated in accordance with the relevant electrical regulations.
- Customer-specific regulations must be observed.
- Only appropriate, tested and calibrated tools and equipment may be used.
- The electrode holder and earth must be connected to the same assembly when welding work is carried out. If the current flow is returned via protective conductors, screening elements or anti-friction bearings, serious damage may be caused to these or their components.

2.6 SAFETY INSTRUCTIONS WHEN FIRST PUTTING THE CRANE INTO SERVICE AFTER COMPLETING INSTALLATION

- The working area or danger zone must be made safe.
- First check that the voltage and frequency specified on the data plates match the owner's mains power supply.
- All clearance dimensions and safety distances (see approval drawing) must be checked before putting the crane into service.
- When putting the crane into service, it may be necessary to perform work in the danger zone.
- In the course of putting crane into service, it may be necessary to temporarily render safety devices or features inoperative.
- It must be ensured that only trained personnel are employed for putting the crane into service.

2.7 SAFETY INSTRUCTION FOR OPERATION

The operator must check the function of the brakes and emergency limit stop and emergency stop devices before starting work.

All instructions and measure described in the operating instructions with regard to safe operation and item concerning general safety and accident prevention which have to be observed before, during and after putting into service must be strictly complied with. Any failure to comply can lead to accidents resulting in fatalities.



Cranes must be taken out of service immediately or not put into operation if any defects relating to operating safety and reliability are detected.

Safety devices must not be rendered inoperative or modified in contradiction to their intended use.

Only operate the crane when all protective devices and safety-relevant equipment, e.g. movable protective devices and emergency-stop devices, are fitted and fully functioning.

Anybody who identifies an immediate danger of personal injury must actuate the emergency-stop button without delay. This also applies in the case of damage occurring to part of the installation and equipment, which makes immediate stoppage necessary. After an "emergency stop", the operator must not switch on restart actuation of this function have been rectified and that continued operation of the installation constitutes no further hazard.

The crane must be switched off immediately in the event of the following faults:

- In the event of damage to electrical devices and cables as well as parts of the insulation.
- In the event of brake and safety device failure.
- In the lifting motion is switched off during lifting of the load, this may be triggering of the overload protection device, In this case the lifting motion must be interrupted and lifted load must be immediately deposited.

For a description of the load measuring function, see enclosed documentation of load detectors.

Ensure that nobody is endangered by operation of the crane before switching on / putting into operation.

If the operator notices person who may be exposed to a risk to health or personal safety by the operation of the crane, he must suspend operation immediately and may not resume operation again until the persons are outside the danger zone.

Before putting the crane into operation, the operator must be satisfied that the installation is in a safe and correct operating condition.

Work on the crane may only be carried out when instructions to this effect have been issued, when operation and function of the hoist unit have been explained and when the working and danger zone has been made safe.

Cooling devices, such as ventilation openings, may not be rendered permanently inoperative (e.g. covered or closed).



Special local conditions or special application can lead to situations, which were not known when this chapter was written. In such cases, special safety measure must be implemented by the owner.

2.8 SAFETY INSTRUCTIONS FOR MAINTENANCE

Maintenance measure is defined as regular maintenance, inspection and repair work.

Mechanical and electrical repair and maintenance work may only be carried out by appropriately trained personnel (experienced technicians).

Adjustment, maintenance and inspection activities and inspection deadlines including specification concerning replacement of part/assemblies prescribed in the operating instructions must be observed.

Ensure that all electrical components are de-energized before commencing work on electrical installations and devices. When all work on the crane has been completed, operation of the crane must not resume until the owner has given approval to this effect.

Unauthorised persons must be prohibited from carrying out work on machinery or part of the crane. Before starting all repair and maintenance work, the crane must be switched off, taken out of operation and secured (switches must be locked) against accidental or unauthorised putting into operation (restarting).

It must be ensured that:-

- The crane is switched off and checked that it is de-energized and, in special cases, isolated;
- Moving parts are stationary and stopped;
- Moving parts cannot start moving while maintenance work is being performed;
- The power supply cannot be accidentally restored as long as the crane has been taken out of service for maintenance and repairs purposes;
- Ensure that the operating and auxiliary materials as well as spare parts are disposed of in a safe and environmentally sound way.

Instructions for repair work in the course of operation

The danger zone must be marked off with red / white safety chains or safety tape and indicated with warning signs.

In each individual case, the owner or the person specified by him must check whether the relevant work may be carried out in the course of operation without risk of personal injury owing to the particular local conditions.

To avoid injury, only use calibrated and appropriate tools and auxiliary material for maintenance, inspection and repair purposes.

If there is a risk of objects falling, the danger zone must be made safe.

Maintain a sufficient safety distance to mobbing or rotating parts to prevent clothing, parts of the body or hair becoming entangle.

Avoid naked flames, extreme heat and sparks in the vicinity of cleaning agents and flammable parts or part liable to deformation (e.g. wood, plastic parts, oil grease) as well as in electrical installations; non-compliance may result in fire hard. Harmful gas may evolve or insulation may be damaged.

Additional instruction for repair work on electrical equipment.

Only use genuine fuse links with specified amperage and tripping characteristic. Defective fuse links must not be repaired or bridged and must only be replaced by fuse links of the same type. Switch off the crane immediately in the event of electrical power supply malfunctions.

Work on the electronic and electrical components or equipment may only be carried out by qualified electrician.

If inspection, maintenance and repair work is to be carried out on parts of the crane these must; if prescribed by regulation be isolated.

First verify the safe isolation of the parts from the supply before commencing work. The electrical equipment of the crane must be inspected and checked at regular interval. Defects, such as loose connections, damaged cable and worn contactor must be rectified immediately.

Sine it is possible that after a longer period of operation the switching points of relays (time, frequency, monitoring relays) change due to ageing of the components, the relay switching points in circuits relevant to safety must be checked at regular intervals.

Electrical equipment must be replaced as a preventive measure on reaching the limit of its theoretical duration of service.

If work has to be carried out on live parts, a second person must be available in order to actuate the emergency-stop button or mains connection switch/isolating switch for voltage disconnection in a emergency. The second person must be familiar with resuscitation measure.

Only use insulated tools.

Before disconnecting and connecting electrical plug-and-socket connections, always disconnect them from the supply (this does not apply to mains connection, provided they do not represent a dangerous contact voltage in the sense of the safety regulations).



2.9 CRANE MAINTENANCE AS PER CODE AS2550.1 & 2550.3

AS2550.1 - 7.2 Maintenance

AS2550.3 – 7.2.1 Maintenance

A preventative maintenance program shall be established giving consideration to the manufacturer's recommendations, It shall be based on the working environment and the frequency and severity of use of the crane.

When parts and components are replaced, replacement shall be identical or equivalent to the original equipment parts and components.

Where past experience has shown particular problems with a crane, a specific rectification program shall be instigated.

All safety related malfunctions and problems shall be corrected before the crane is returned to service.

AS2550.1 - Note: Recommended servicing frequencies for different crane classifications are given in Appendix F, Table F1.

**TABLE F1
RECOMMENDED MINIMUM MAINTENANCE AND INSPECTION SERVICE
REQUIREMENTS**

Crane Classifications	C1	C2	C3	C4	C5	C6	C7	C8
	M1	M2	M3	M4	M5	M6	M7	M8
Operating hours per day	≥0.5	0.5-1	>1-2	>2-4	>4-8	>8-16	>16	>20
Routine maintenance weeks	12	12	12	12	8	8	4	4
Periodic third party inspection, weeks	52	52	52	52	52	52	52	52

AS2550.1 – 7.3.3 Routine Inspection

Routine inspection shall be carried out in accordance with the manufacturer's recommendations.

Note: The inspection should include all items specified in instructions written in accordance with this Standard for routine inspection, including the following:

- a) All functions and their controls for speed, smoothness of operation and limits of motion.
- b) All emergency and safety switches and interlocks.
- c) Lubrication of all moving parts, inspection of filter element/s and fluid levels.
- d) Visual inspection and measurements, as necessary, of structural members and other critical components such as brakes, gears, fasteners,

pins, sheaves, locking devices, electrical contactors, wear on wheels and rails.

- e) Signage, including warning signs and control markings.
- f) Checking electrical, mechanical and structural components for safe condition and function.
- g) Additional items nominated in the instructions written in accordance with this Standard. Particular attention should be paid to any component with a recent or existing history of repeated failures.

Opening of cover plates and removal of guards shall be considered necessary by the inspector due to the existing condition.

When parts and components are replaced, the replacements shall be identical or equivalent to the original parts or components.

A written report shall be furnished on completion of the inspection.

Notes:

1. A competent person may recommend that routine inspections be carried out more frequently.
2. Where manufacturer's recommendations are not available, the routine inspections should take place at intervals not exceeding those shown in Table F1 of Appendix F, unless the crane is not in service.

AS2550.3 – 7.2.2 Routine Maintenance Service

Routine maintenance service shall be carried out at intervals not exceeding three months apart unless the crane is not in service. The maintenance shall include all items specified in instructions written in accordance with this Standard for routine maintenance and include, but not necessarily be limited to, the following:

- a) All functions and their controls for speed, smoothness of operation and limits of motion.
- b) All emergency and safety switches and interlocks.
- c) Where required, lubrication of moving parts, cleaning or replacement of filter element(s) and addition of fluids to maintain the correct levels.
- d) Electrical contactors and mechanical interlocks.
- e) Adjustments to brakes and clutches.
- f) Wear components shall be inspected with consideration of their ability for continued safe use.
- g) Signage, including warning signs and control markings.
- h) Additional items nominated in the instructions written in accordance with this Standard.

A written report shall be furnished on completion of the maintenance.

Note: A competent person may recommend that routine maintenance is carried out at more frequent intervals.



SECTION 3.

CERTIFICATES

3.1 TEST CERTIFICATE

3.2 WARRANTY



NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS – NQCranes

TEST CERTIFICATE – OVERHEAD CRANES, HOISTS & LIFTING DEVICESDESCRIPTION OF DEVICE (INCLUDING MAX RC): 5T SGOH CASWELL STREET

OWNER'S: NAME: QUEENSLAND URBAN UTILITIES
 ADDRESS: CASWELL STREET, BRISBANE, QLD, 4000
 LOCATION: CASWELL STREET

MAKER'S: NAME: NQCranes
 ADDRESS: 26 ENTERPRISE STREET, PAGET, QLD, 4740
 SERIAL / REF No: NQC7377
 JOB No: BW120021
 CLASSIFICATION: CS/m4.
 DATE OF MANUFACTURE: 2013.

TEST RESULTSDATE OF TEST: 3/2/2014MAX RC (TONNES): 5000 KGTEST LOAD (TONNES): 5500 KG.

SATISFACTORY PERFORMANCE WITH 10% OVERLOAD
 Vehicle Hoist Performance With 25% Overload

☒ Yes
☐ No

☐ No
☐ No

Test Load (Tonne) 110% Max RC
 Test Load (Tonne) 125% Max RC

DEFLECTIONS**SPAN****ALLOWABLE
DEFLECTION****ACTUAL
DEFLECTION**

1/500 BRIDGE BEAM	_____ mm	<u>16</u> mm	<u>9</u> mm
1/500 RUNWAY BEAM	_____ mm	_____ mm	_____ mm
L/300x2.0 COLUMN MOUNTED JIB @ MAX RADIUS	_____ mm	_____ mm	_____ mm
L+H/300x1.5 FREESTANDING JIB @ MAX RADIUS	_____ mm	_____ mm	_____ mm
L/300 CANTILEVER BEAM	_____ mm	_____ mm	_____ mm
1/500 VEHICLE HOIST RUNWAY (25%)	_____ mm	_____ mm	_____ mm
OTHER	_____ mm	_____ mm	_____ mm

STATUTORY SIGNS FITTED:

☒ Yes☐ No

COMMENTS:

NORTH QUEENSLAND CRANE SERVICES PTY LTD HEREBY CERTIFY THAT THE ABOVE CRANE WAS OVERLOAD TESTED AS ABOVE AND IS SATISFACTORY FOR USE TO THE MAX R.C. AS PER AS1418.1, AS1418.3, AS1418.18 AND AS1418.9.

NAME:

Darren Williams

(Please Print)

SIGNATURE:

DATE:

3/2/14.

WARRANTY

- 1.** All work carried out by us is subject to a warranty period of twelve (12) calendar months from commissioning for new cranes, (3) calendar months for major repair work, and (30) days for general repair work, from date of delivery (or if applicable site test, whichever is the later) against faulty material, workmanship or design by us except failure due to misuse. In the case of goods or parts not of our manufacture, warranty is limited to that given by the manufacturer or such goods or parts. Warranty for costs incurred for the removal and replacement of these items is also limited to that given by the manufacturer. This warranty does not cover adjustments, maintenance or normal wear and tear. All costs incurred for access to perform the warranty work will be at your expense.
- 2.** Where installation of equipment occurs outside the Mackay area, warranty conditions will apply but any costs associated with the transport of goods or personnel or any other expenses associated with the maintenance on that site to conduct such warranty work will not be covered under the terms of warranty.
- 3.** Should you elect to personally or by outside contractors, conduct repairs, modifications, adjustments or servicing to machinery or equipment during the warranty period without written consent the warranty will become null and void and claims for reimbursement of the costs for repairs of the work in question or future warranty work will not be accepted. Regular servicing by North Queensland Cranes or an authorized agent is a condition of warranty.
- 4.** The suitability of your runways, gantries, building, foundations, roof trusses and any other structure is your responsibility. In the case where the warranted product has to interface with components not supplied by us, the warranty will become null and void should performance of these non-supplied components cause damage to the warranted product.
- 5.** Non-compliance with manufacturer's service requirements will render the warranty null and void.
- 6.** The duration of the warranty period is calculated on a standard 38-hour single shift week basis.
- 7.** All warranty work will be carried out during normal working hours, i.e. Monday to Friday, 7:30 am to 4:00 pm.
- 8.** Warranty does not apply to hoist rope, rope guide, hoist hook, pendant, pendant cable, misuse of the crane or with the use of second hand goods (Rails, hoists, etc).



SECTION 4.

QA DOCUMENTS

4.1 CRANE DATA SHEET

4.2 ELECTRICAL TEST SHEET

4.3 INSTALLATION AND COMMISSIONING REPORT





Date Printed: 08/04/14

JOB DATA

LIBRARY NO:	NQC7377
CLIENT NAME:	Queensland Urban Utilities
LOCATION:	CASWELL ST
DESIGN REGO NO:	
CRANE DESCRIPTION:	5T Street Single Girder Crane CASWELL STREET

HOIST DATA

HOIST MODEL:	STREET - ZX082-1SOEM4K074-LR0001-41550E45X
HOIST SERIAL NO:	Z05429.03
HOIST MOTOR TYPE:	AT132ML2
HOIST MOTOR SERIAL NO:	13051811005002
HOIST MOTOR KW/A:	12.7/22.0Kw 48.44/28A
BRAKE TYPE/NO:	ELECTROMAGNETIC
HOIST ROPE SIZE:	10x17 Dyformed Strands 85.8M/L 13MM DIA
NUMBER OF FALLS:	2

CROSS TRAVEL DATA

C/T MOTOR TYPE:	SK805/4BRE10
C/T MOTOR SERIAL NO 1:	201079249-100/17483330
C/T MOTOR SERIAL NO 2:	
C/T MOTOR KW/A:	0.63Kw 2.60/1.50A
C/T BRAKE TYPE/NO:	ELECTROMAGNETIC
C/T G/BOX TYPE:	SK373.1F-80S/4BRE10
C/T G/BOX SERIAL NO 1:	201079249-100 17518592
C/T G/BOX SERIAL NO 2:	
C/T G/BOX RATIO:	20/2 M/MIN
C/T WHEEL DIAMETER:	150MM
C/T WHEEL PROFILE:	FLAT, ROUND, NO FLANGE
C/T BUFFER TYPE:	RUBBER STOPPER

LONG TRAVEL DATA

L/T MOTOR TYPE:	SK71L/4 BRE5 M5
L/T MOTOR SERIAL NO 1:	201078030-100/17514047
L/T MOTOR SERIAL NO 2:	201078030-100/17514049
L/T MOTOR KW/A:	0.37Kw 1.89/1.09A
L/T BRAKE TYPE/NO:	ELECTROMAGNETIC
L/T G/BOX TYPE:	SK172.1F-71L/4 BRE5 M5
L/T G/BOX SERIAL NO 1:	201078030-100 17555586
L/T G/BOX SERIAL NO 2:	201078030-100 17555584
L/T G/BOX RATIO:	
L/T WHEEL DIAMETER:	150MM
L/T WHEEL PROFILE:	FLAT DOUBLE FLANGED
L/T BUFFER TYPE:	RUBBER STOPPER

CONTROLS DATA

PENDANT TYPE:	TELEMECHANIQUE
PENDANT LENGTH:	42M
RADIO CONTROL MODEL	FSE 512
RADIO CONTORL S/N:	512-1208420
RADIO CONTROL ID CODE:	
RADIO CONTROL FREQ:	2402-2480 MHZ
COLLECTOR TYPE/SIZE:	
CONDUCTOR TYPE/SIZE:	16MM2
CONTACTOR TYPE:	Schneider, Finder, Yskawa USD's
CONTROL VOLTAGE:	48V

NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS – NQ CRANES

ELECTRICAL TEST CERTIFICATE

CLIENT: Queensland Urban Utilities						JOB NO: BW120021					
						REFER DOCKET NO:					
EQUIPMENT DETAILS : 5T SGOH CASWELL STREET						LIB NO: NQC7377					
Certificate of Test: I hereby certify that the electrical work listed below has been tested in accordance with the prescribed procedures and that such work complies with the requirements of the section 159 (3) Electrical Safety Regulations 2002.											
JOB DESCRIPTION :		INSTALL 5T SGOH CASWELL STREET									
DETAILS OF ELECTRICAL MECHANIC WHO TESTED THE ELECTRICAL WORK LISTED BELOW.		Name: <i>D. Deland</i>									
		Electrical Mechanics Licence # <i>230775/C</i>						Date: <i>3/2/14.</i>			
		Signature of Electrical Mechanic: <i>[Signature]</i>									
North Queensland Crane Services Pty Ltd Licence No: 65624		Signature of Electrical Contractor or his Endorsee: <i>[Signature]</i>						Date: <i>07/03/14.</i>			
Phase Rotation <i>✓</i>		Correct <i>Yes / No</i>									

MOTOR	TYPE	VOLTS	CURRENT (A)		NAME PLATE (A)	INSUL. (MΩ)	EARTH (Ω)	CONT. (Ω)	BRAKE (Ω)	
<i>1618</i>		<i>415</i>	<i>3.2</i>	<i>U1</i>	<i>3/105</i>	<i>> 200</i>	<i>U1-PE</i>	<i>1.1</i>	<i>136</i>	<i>U1-V1</i>
			<i>3.2</i>	<i>V1</i>		<i>> 200</i>	<i>V1-PE</i>	<i>1.1</i>	<i>136</i>	<i>U1-W1</i>
			<i>3.3</i>	<i>W1</i>		<i>> 200</i>	<i>W1-PE</i>	<i>1.1</i>	<i>136</i>	<i>W1-V1</i>
			<i>6.1</i>	<i>U2</i>		<i>> 200</i>	<i>U2-PE</i>	<i>1.1</i>	<i>55</i>	<i>U2-V2</i>
			<i>10.2</i>	<i>V2</i>		<i>> 200</i>	<i>V2-PE</i>	<i>1.1</i>	<i>55</i>	<i>U2-W2</i>
			<i>10.2</i>	<i>W2</i>		<i>> 200</i>	<i>W2-PE</i>	<i>1.1</i>	<i>55</i>	<i>W2-V2</i>
						<i>></i>	<i>U1-U2</i>			
<i>Trav</i>		<i>415</i>	<i>0.9</i>	<i>U1</i>	<i>0.6/1.8</i>	<i>> 200</i>	<i>U1-PE</i>	<i>1.1</i>	<i>182</i>	<i>U1-V1</i>
			<i>0.9</i>	<i>V1</i>		<i>> 200</i>	<i>V1-PE</i>	<i>1.1</i>	<i>182</i>	<i>U1-W1</i>
			<i>0.9</i>	<i>W1</i>		<i>> 200</i>	<i>W1-PE</i>	<i>1.1</i>	<i>182</i>	<i>W1-V1</i>
			<i>1.7</i>	<i>U2</i>		<i>> 200</i>	<i>U2-PE</i>	<i>1.1</i>	<i>77</i>	<i>U2-V2</i>
			<i>1.7</i>	<i>V2</i>		<i>> 200</i>	<i>V2-PE</i>	<i>1.1</i>	<i>77</i>	<i>U2-W2</i>
			<i>1.7</i>	<i>W2</i>		<i>> 200</i>	<i>W2-PE</i>	<i>1.1</i>	<i>77</i>	<i>W2-V2</i>
						<i>></i>	<i>U1-U2</i>			

POINT TO POINT		POWER	CONTROL	DRAWING NO.
COMPLETED BY: <i>Deland</i>	Hoist	<i>✓</i>	<i>✓</i>	
DATE: <i>3/2/14</i>	Cross Travel	<i>✓</i>	<i>✓</i>	
	Long Travel	<i>✓</i>	<i>✓</i>	
COMMENTS				

NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS - NQ CRANES

ELECTRICAL TEST CERTIFICATE

CLIENT: Queensland Urban Utilities				JOB NO: BW120021					
				REFER DOCKET NO:					
EQUIPMENT DETAILS : 5T SGOH CASWELL STREET				LIB NO: NQC7377					
Certificate of Test: I hereby certify that the electrical work listed below has been tested in accordance with the prescribed procedures and that such work complies with the requirements of the section 159 (3) Electrical Safety Regulations 2002.									
JOB DESCRIPTION :		INSTALL 5T SGOH CASWELL STREET							
DETAILS OF ELECTRICAL MECHANIC WHO TESTED THE ELECTRICAL WORK LISTED BELOW.		Name: <u>D. Gains</u>							
		Electrical Mechanics Licence # <u>230775/C</u>				Date: <u>8/2/14</u>			
		Signature of Electrical Mechanic: <u>[Signature]</u>							
North Queensland Crane Services Pty Ltd Licence No: 65024		Signature of Electrical Contractor or his Endorsee: <u>[Signature]</u>				Date: <u>07/03/14</u>			
Phase Rotation <u>✓</u>		Correct <u>Yes</u> / No							
MOTOR	TYPE	VOLTS	CURRENT (A)	NAME PLATE (A)	INSUL. (MΩ)	EARTH (Ω)	CONT. (Ω)	BRAKE (Ω)	
C/T 1		415	0.25	U1	0.25/1.4	> 200	U1-PE	1.1	U1-V1
			0.25	V1		> 200	V1-PE	1.1	U1-W1
			0.26	W1		> 200	W1-PE	1.1	W1-V1
			1.3	U2		> 200	U2-PE	1.1	U2-V2
			1.3	V2		> 200	V2-PE	1.1	U2-W2
			1.3	W2		> 200	W2-PE		W2-V2
						>	U1-U2		
C/T 2		415	0.25	U1	0.25/1.4	> 200	U1-PE	1.1	U1-V1
			0.26	V1		> 200	V1-PE	1.1	U1-W1
			0.26	W1		> 200	W1-PE	1.1	W1-V1
			1.3	U2		> 200	U2-PE	1.1	U2-V2
			1.4	V2		> 200	V2-PE	1.1	U2-W2
			1.3	W2		> 200	W2-PE	1.3	W2-V2
						>	U1-U2		
POINT TO POINT		POWER		CONTROL		DRAWING NO.			
COMPLETED BY:		Hoist							
DATE:		Cross Travel							
		Long Travel							
COMMENTS									

NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS – NQCranes

INSTALLATION AND COMMISSIONING REPORT

Customer/Project: Queensland Urban Utilities.....

Job No: BW120021.....

Lib No: NQC7377

Installation Description: 5T SGOH CASWELL STREET.....

Commissioned By: [Signature]

Title:

Date: 3/2/14

NOTE:

- WHERE INFORMATION IS REQUIRED IN CHECK BOXES IT MUST BE SUPPLIED
- ALL ITEMS TO BE CHECKED OFF
- INITIALS OF PERSON CHECKING OFF MUST BE INSERTED IN LINE OF EACH CHECK BOX

ITEM NO.	DESCRIPTION	ACCEPT	NOT ACCEPT	N/A	REMARKS	INITIALS
1	Check crane with General Arrangement Drawing Reg. No:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		[Signature]
2	Check all Girder connection bolts are tightened to correct torque.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		[Signature]
3	Check trolley adjustments are in accordance with the attached checklists.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		[Signature]
4	Check breather plugs fitted <ul style="list-style-type: none"> - Hoist - Long Travel - Cross Travel 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		[Signature]
5	Check oil levels <ul style="list-style-type: none"> - Hoist - Long Travel - Cross Travel - Other 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		[Signature]
6	Check rope drum and rope <ul style="list-style-type: none"> - Cleaned Rope Drum - Cleaned Wire Rope - Relubricated Drum - Relubricated Rope 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		[Signature]
7	Check correct signs fitted <ul style="list-style-type: none"> - Library No. - Classification - RC Beam - RC Bottom Block - Compass sign 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		[Signature]
8	Check pendant <ul style="list-style-type: none"> - Type Fitted - Height 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>		[Signature]
9	Check cross travel end stops set correctly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		[Signature]
10	Check all electrics <ul style="list-style-type: none"> - Components not loose in cubicle - Check all connections 	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>		[Signature]

NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS – NQCranes

INSTALLATION AND COMMISSIONING REPORT

ITEM NO.	DESCRIPTION	ACCEPT	NOT ACCEPT	N/A	REMARKS	INITIALS
11	Check limit switches set correctly <ul style="list-style-type: none"> - Hoist Upper Working - Hoist Upper Final - Hoist Bottom - Cross Travel - Long Travel 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12	Check all operating functions <ul style="list-style-type: none"> - Mechanical - Electrical - Emergency Stop 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
13	Check busbar and the collectors run smoothly.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
14	Check flat cable if mech. damage occurs when running <ul style="list-style-type: none"> - Downshop - Cross Travel - Pendant 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
15	Check warning device(s) operate <ul style="list-style-type: none"> - Hooter - Buzzer - Flashing Light 	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
16	Check (if applicable) <ul style="list-style-type: none"> - Lights Operate - Storm Clamps - Anti-Collision Devices 	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
17	Check crane appearance and repair any paint defects.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
18	Check Deflection of Beam and Overload Test as per form OPS-310-78/F	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
19	Test mechanical overload to 110% of RC for Donati and 107.5% for Street. NOTE: All functions should cut out except hoist lower.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
20	Check Log Book and Pouch have been installed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

CHECKED BY INSTALLER:

NAME (Please Print):

SIGNATURE:

DATE:

3/2/14

CHECKED BY SUPERVISOR/MANAGER:

NAME (Please Print):

SIGNATURE:

DATE:

NORTH QUEENSLAND CRANE SERVICE PTY. LTD.

TRADING AS – NQCranes

INSTALLATION AND COMMISSIONING REPORT**STREET TROLLEY CHECKLIST**

ITEM NO.	DESCRIPTION	OK Tick	Not OK Tick	N/A Tick	Remarks	Initials
S1	Lower the hoist unit so that the wheels are touching the beam flange ensuring that the 3-5mm clearance gap is maintained. ❖ Do not remove the hoist lifting tackle until the hoist is fully secured on the runway.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S2	Remove each of the four M12 locking grub screws from the panel side trolley castings.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S3	Use the single cone point setscrew, screw into each hole in turn and tighten until a 'centre-pop' indent is made in the hoist legs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S4	Using a 10mm diameter drill, drill a full cone of 10mm diameter into both legs at four positions (see Figure 8).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S5	Remove any swarf from the holes using a magnet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S6	Replace cone point setscrew in its storage position, securing with the locknut.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S7	Replace each of the four M12 locking grub screws and tighten to 40Nm. Secure each grub screw with locknut tightened to 40Nm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS
S8	Replace the reaction roller assembly on the wheel support casting. Set the reaction roller as per section 3.5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		AS

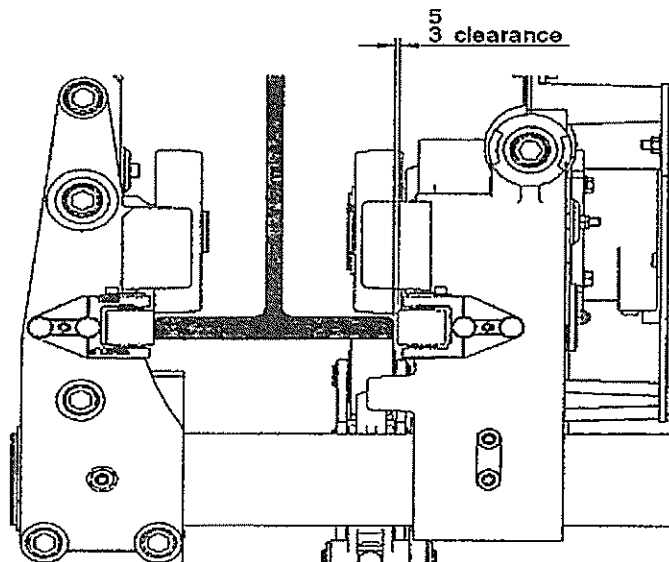


Figure 7 – Low Headroom Runway Clearance

SECTION 5.

HOIST

EXCELLENCE IN SERVICE AND SUPPORT

SUPERIOR PRODUCTS AND DESIGN



ZX6 & ZX8 ELECTRIC WIRE ROPE HOIST



INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



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INTRODUCTION

This manual has been carefully prepared to assist you in the installation, maintenance and safe operation of the Street Crane equipment as described in the manual. It is in the interest of all parties involved with the use of this equipment to ensure that procedures are followed efficiently and safely.

Before installing, using or starting any maintenance work on the hoist study this manual carefully. Obtain a complete understanding of the hoist and its controls in order to ensure the safe and efficient use of the hoist. Ensure that all persons involved in the operation are suitably qualified and trained in its safe operation.

Provided that the recommended operation, maintenance and lubrication procedures are followed, you will maximise the Hoists life expectancy and have trouble free service.

Anyone working with or on the equipment should also be aware of their relevant responsibilities under the Factories Act, the Health and Safety at Work Act 1974 and Lifting Operations and Lifting Equipment Regulations (LOLER) 1998. The user has the responsibility for ensuring that the equipment is properly inspected and maintained and is safe to use.

NOTE: Other national regulations may apply for other countries.

In Great Britain codes of practice exist for the "Safe Use of Cranes". This standard, BS 7121, also covers inspection, testing and examination. The user should be familiar with its contents and it is advisable to have a copy of this standard kept alongside this manual. BS 7121 covers the following subjects:-

- Safe systems of work
- Management of the lifting operation
- Planning of the lifting operation, risk assessments and method statements
- Selection and duties of personnel and their minimum attributes
- Maintenance of cranes
- Inspection, Testing and Examination

In addition, management and supervision have an initial role to play in any safety programme by ensuring that:-

- The equipment is suitable for the job intended
- The equipment has been thoroughly examined and is safe to use
- A safety procedure is adopted for emergency situations i.e. power failure
- A safe system of work is adopted for maintenance personnel

It should be emphasised that the safety advice and maintenance details included in this document should be made available where they can be most effective. It is your responsibility to ensure that this information is made available at THE PLACE OF WORK.



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1. GENERAL SAFETY INSTRUCTIONS

1.1 SYMBOLS



WARNING – This symbol draws attention to the possible injury or risk of life.



WARNING OF ELECTRICAL POTENTIAL – This symbol is found on electrical enclosures. These should only be opened by qualified persons or suitably instructed personnel.



WARNING OF SUSPENDED LOAD – This symbol warns of the risk to life and limb from standing under a suspended load.

1.2 PERSONNEL - Definitions and Attributes

The user should ensure that the person carrying out any task has such appropriate practical and theoretical knowledge and experience of the equipment in question as will enable them to perform the task safely and recognise any hazards associated with the work. They should be physically and mentally fit and trained in Safe Hoisting Practices and the use of safety and access equipment. No work of any kind should be authorised to persons who are under the influence of narcotics, alcohol or medication, which affects their ability to react. Hazards can only be minimised by care, common sense and being alert at all times.

Various personnel can be involved in the lifting operation, installation and inspection and maintenance of the equipment, supervisors, coordinators, operators, slingers, signallers, erectors and maintenance personnel. The duties of these personnel and their minimum attributes are defined in BS 7121-1:2006. Also, ISO 15513 gives competency requirements for crane drivers (operators), slingers, signallers and assessors. In the text of this manual the following definitions apply:-

User – person or organisation that has control of both the lifting operation and the crane operator and has the responsibility to ensure the equipment is properly maintained and thoroughly examined by a competent person.

Competent Person – person who has such practical and theoretical knowledge and mechanical and / or electrical experience of the crane / hoist and the equipment used in the lifting operation which enables them to detect defects or weaknesses and to assess their importance in relation to the safety and continued use of the lifting equipment.

Operator- trained person who is operating the crane / hoist for the purpose of positioning loads.

1.3 MAINTENANCE SAFETY PROCEDURE

When personnel are required to work on the crane / hoist for inspection, maintenance or other reasons, a system should be in operation to ensure that they are not endangered by movement of the equipment and that a secure working place is provided. Personnel should follow such a procedure. Where no formal procedure exists, Street Crane recommends the following:-

On commencing any maintenance work on the crane or hoist:-

1. Obtain the necessary authorisation / permit to work.
2. Park the crane or hoist in a designated maintenance position, clear of any personnel.
3. Follow the appropriate health and safety regulations and procedures.
4. Remove any loads or attachments from the hook and ensure that the bottom block is suitably supported to prevent accidental runaway.

5. Disconnect the mains switch and safeguard against unauthorised powering up, by placing locks and warning notices in the appropriate positions.



Some maintenance procedures are more effectively performed with power to the equipment. If work has to be carried out on live parts, an additional competent person must be available to actuate the power isolating switch in an emergency. Ensure that there is an effective manner of communication between personnel.

6. To avoid injuries, use only insulated tools and equipment.
7. On completion of any maintenance work, ensure all fixings, guards, covers, drip trays, etc. are replaced.

1.4 MAINTENANCE AND INSPECTION ACCESS

The equipment itself may have no provision for maintenance access or it may be fitted with full or partial maintenance access platforms. Where no or only partial access has been provided on the equipment, separate or additional access equipment will be required to service some of the components. These components should be accessed via a secure, mobile or temporary structure e.g. tower scaffold, self-standing stair platforms, scissor-lift or cherry picker. All access equipment should be assembled and operated by trained personnel in accordance with the manufacturer's instructions following the appropriate health and safety regulations and procedures.

The following should be considered when choosing the most appropriate type of maintenance access equipment.

- Floor space available for the access equipment.
- Working height above floor level.
- Number of personnel who require access at high level.
- Total weight of any parts to be removed / replaced.
- Provision of safety harness anchor points

1.5 WARRANTY / REPLACEMENT PARTS

The warranty will become invalid if the instructions for installation, operation and maintenance instructions contained in this manual are not followed.

Where replacement components are required use only genuine Street Crane parts. Modifications to the crane or any of its mechanisms should not be carried out without the approval of Street Crane Company Limited. Failure to adopt these recommendations will invalidate the warranty and could result in an unsafe condition.

Please dispose of electrical and electronic equipment in an approved and environmentally friendly manner.

1.6 PERIODIC TESTS

The hoist must be inspected by a competent person at least once a year. The competent person may consider shorter periods to be more appropriate depending on the duty of the hoist. A record of the results of the test should be kept in the hoist log book, section 7.7. As part of the annual test the remaining service life of the hoist should be established, see section 7.2.

1.7 STORAGE

If the hoist is to be placed in storage for any period of time ensure that:-

- The hoist is covered and stored indoors in a heated building.
- Pack the hoist clear of the floor. Raise the bottom block to its top position and ensure that there are no 'kinks' in the wire rope.
- Ensure all electrical switches are turned to the OFF position.
- Always fully inspect the hoist before installing and putting into service.

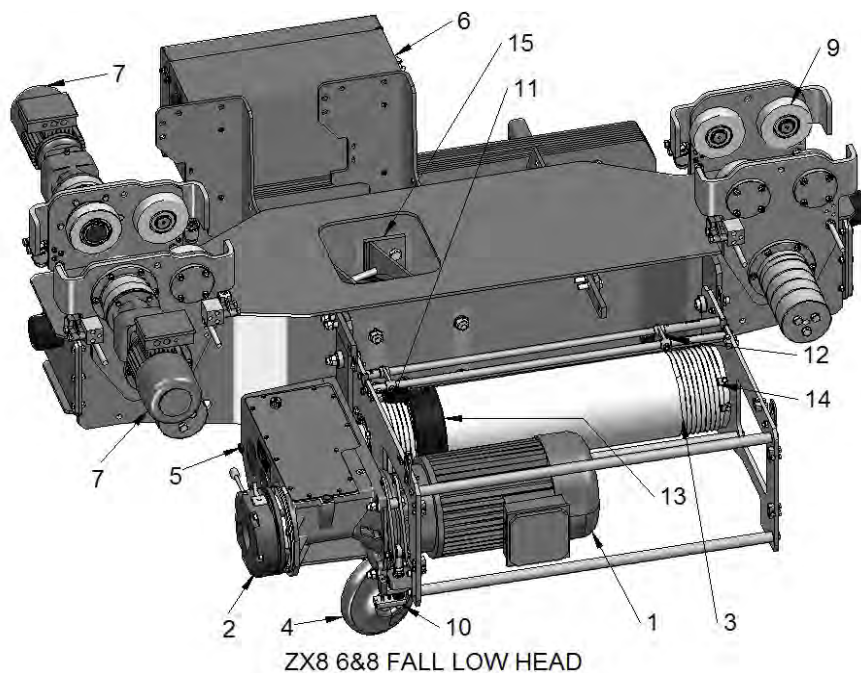
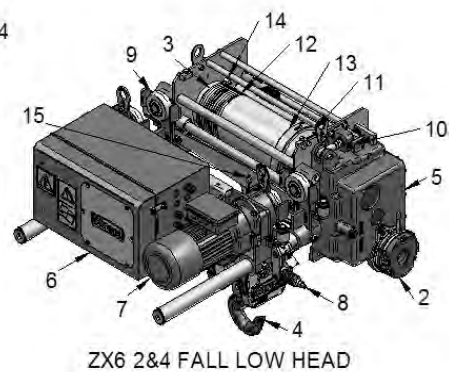
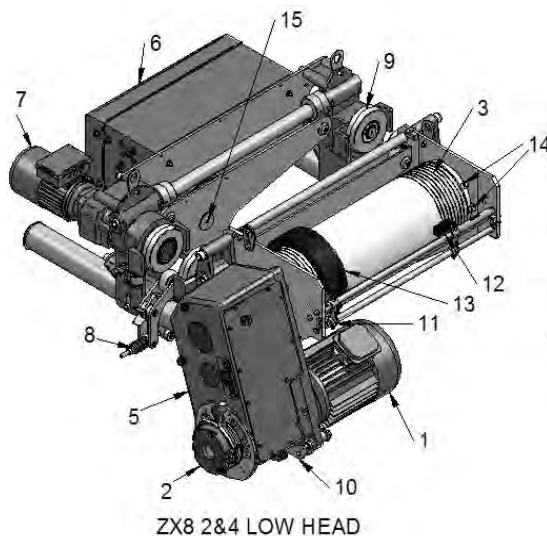
1.8 TRAINING AND AFTER SALES SERVICE

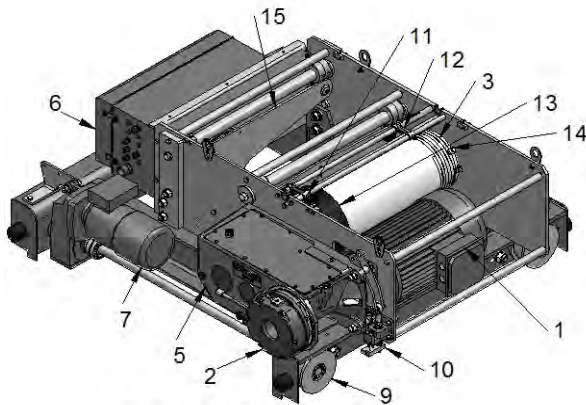
If required, Street Crane Company are able to provide trained service technicians to assist in inspection and maintenance procedures and provide operator training.

2 DESCRIPTION OF EQUIPMENT

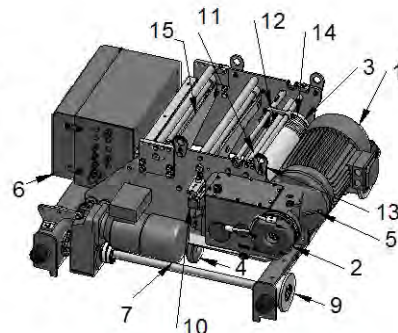
The ZX series hoist is of the electrically driven wire rope type. The hoist has a maximum load that it is permitted to lift. This is referred to as the Rated Capacity or Safe Working Load (SWL). The rated capacity is clearly marked on the hoist nameplate and the bottom block.

- | | | |
|------------------|------------------------------|------------------------------|
| 1. Hoist motor | 6. Control panel | 11. Upper level limit switch |
| 2. Hoist brake | 7. Travel drive | 12. Lower level limit switch |
| 3. Wire rope | 8. Reaction roller (LH only) | 13. Rope guide |
| 4. Bottom block | 9. Travel wheels | 14. Rope clamps |
| 5. Hoist gearbox | 10. Rated capacity limiter | 15. Sheave assembly |

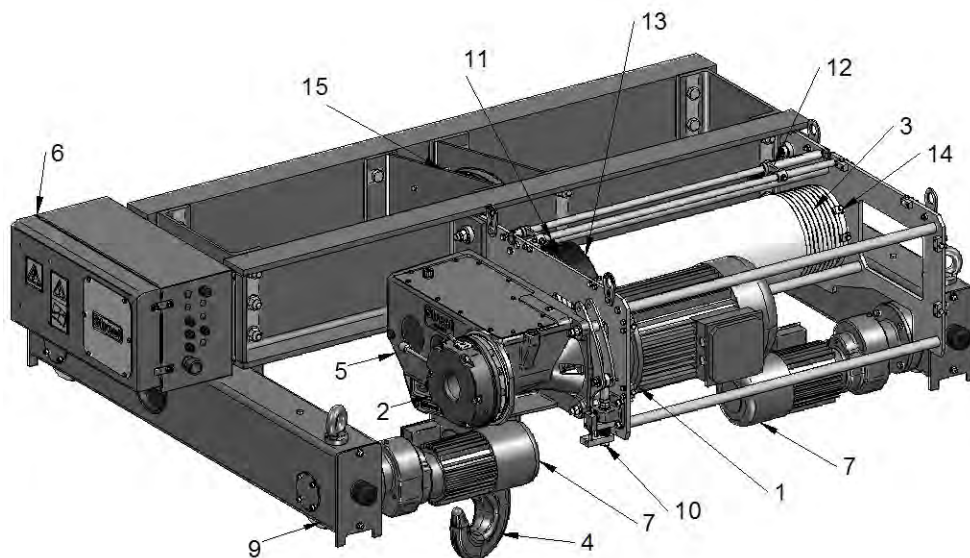




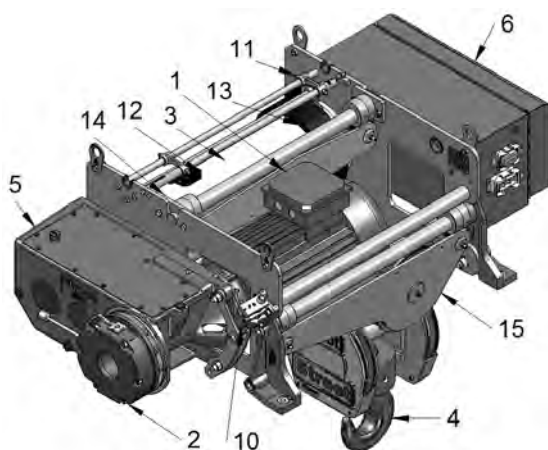
ZX8 2&4 FALL CRAB



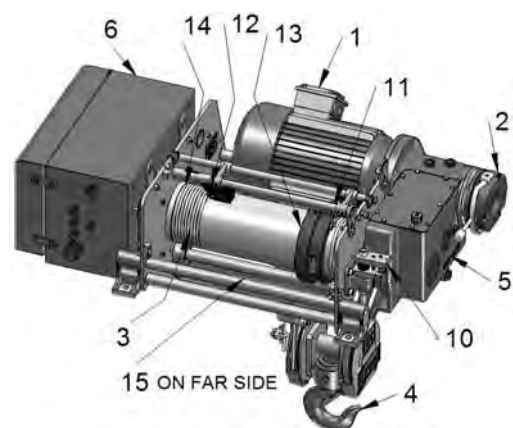
ZX6 2&4 FALL CRAB



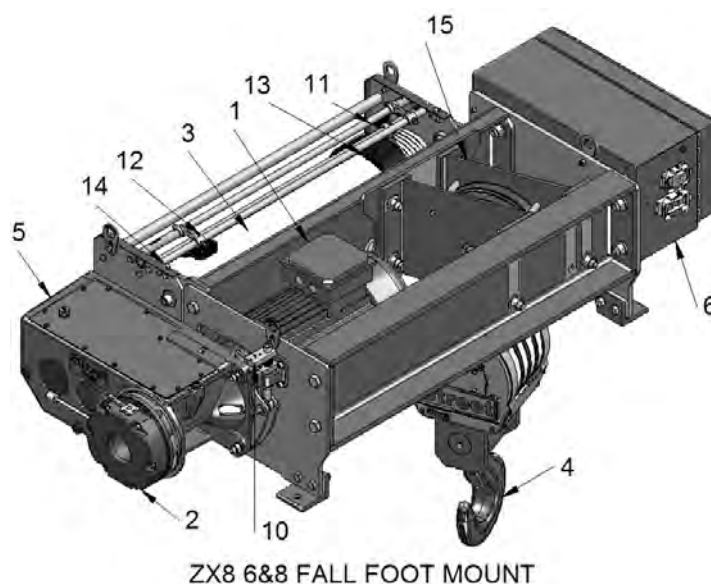
ZX8 6&8 FALL CRAB



ZX8 2&4 FALL FOOT MOUNT



ZX6 2&4 FALL FOOT MOUNT



2.1 HOIST NAMEPLATE

The hoist nameplate is located on the hoist end frame and contains the following information:

- The hoist model code.
- The manufacturers name.
- The serial number.
- The year of manufacture.
- Hoist classification.
- Mechanism classifications.

The information on this nameplate will be required when ordering replacement parts and when assessing the remaining service life of the hoist. Further information on the hoist model code can be found in section 7.3.

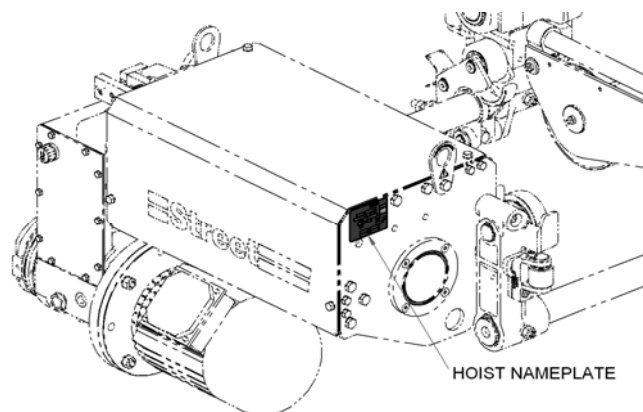


Figure 1 – Hoist Nameplate Location

2.2 LIMITING DEVICES

Each hoist is fitted with upper and lower limits and a rated capacity limiter (RCL). These are essential items for the safe operation of the hoist. Additional limiting devices may be fitted if deemed necessary by the risk assessment.

2.2.1 Hoisting and lowering limits

Hoisting and lowering limit switches are fitted to all hoists to prevent the hook from going too high and damaging the hoist and from going too low so as to allow the ropes to go slack. These are safety devices and should **NOT** be used as a normal method of stopping the hoist. Movement in the opposite direction, at the speed selected by the operator (slow or fast) is still possible after the normal limit has been triggered.



Certain crane configurations allow the upper hook position to be set at a higher level than the underside of the bridge girders (double girder cranes). In such instances the operator must take extreme care when lifting to ensure that adequate clearance is maintained between the load or lifting attachment and the hoist or crane structure.

An optional second hoist upper limit or ultimate limit may also be fitted if deemed necessary by the user risk assessment.

The ultimate limit is an emergency limit employed only if the normal upper limit fails. Once tripped, the limit must be manually re-set by service or maintenance personnel and will require the hook block to be lowered manually and the limit re-set. If the second hoist upper limit operates, the hoist should be taken out of service until the reason for the normal upper limit switch failure has been investigated. The failure should be rectified before putting the hoist back into service.

The second hoist upper limit, when tripped, will prevent movement from all hoist and traverse motions. The travel motion (long travel) will remain fully operable.

A red warning light on the base of the control panel will illuminate to indicate when the second ultimate limit has been activated.

2.2.2 Rated capacity limiter (RCL)

All hoist units are fitted with a rated capacity limiter (RCL) to prevent the lifting of loads beyond the capacity of the hoist / crane. If the RCL is tripped the hoist motion will stop and it will then only be possible to move in the lower direction.

2.2.3 Travel / Traverse limits (optional)

Limit switches at the extremes of long and cross travel are optional based on the user's risk assessment. There are three types:-

1. On reaching the limit the crane or hoist travel motion will stop altogether.
2. On reaching the limit the crane or hoist will change from fast to slow speed and proceed at slow speed until the end stop is reached.
3. If a two stage limit is fitted, on reaching the first stage the motion will reduce to slow speed. On reaching the second stage the motion will stop.

Operation of the limit does not have any effect on other crane motions. Movement in the opposite direction, at the speed selected by the operator (slow or fast) is still possible after the limit has been triggered.

3 INSTALLATION AND COMMISSIONING INSTRUCTIONS

Installation and commissioning of the hoist must be carried out by a competent person(s). We recommend that installation and commissioning are carried out by Street Crane Company or their approved agents.

Immediately report any damage which may have occurred during transit. Consult with the manufacturer / supplier and repair the equipment before installation. Do not install damaged equipment. Use only original Street Crane spare parts for repairs. Do not carry out any alterations or modifications to the hoist either prior to or during installation.

If the hoist is located outdoors we recommend that a small cover (roof) is fitted to the runway beam to protect the hoist at its parking position.

3.1 TRAVERSE END STOPS

Single girder **2 & 4 fall** low head hoists require end stops to be mounted on either end of the runway and include rubber buffers as shown. Weld on end stops can be provided by Street Crane. (Part No. 270-31).

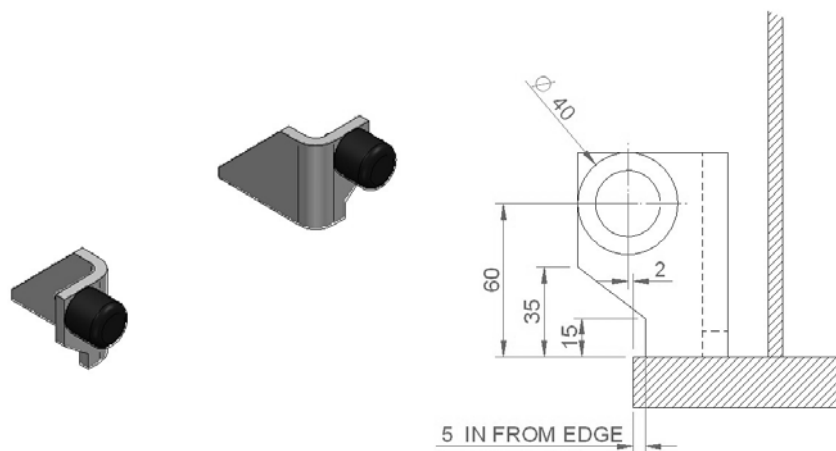


Figure 2 – Single Girder 2 & 4 Fall Traverse End Stops

Single girder **6 & 8 fall** low head hoists are supplied fitted with rubber buffers. Suitable end stops should be positioned at either end, central on the underside of the runway. Weld on end stops can be provided by Street Crane. (Part No. 27-20061).

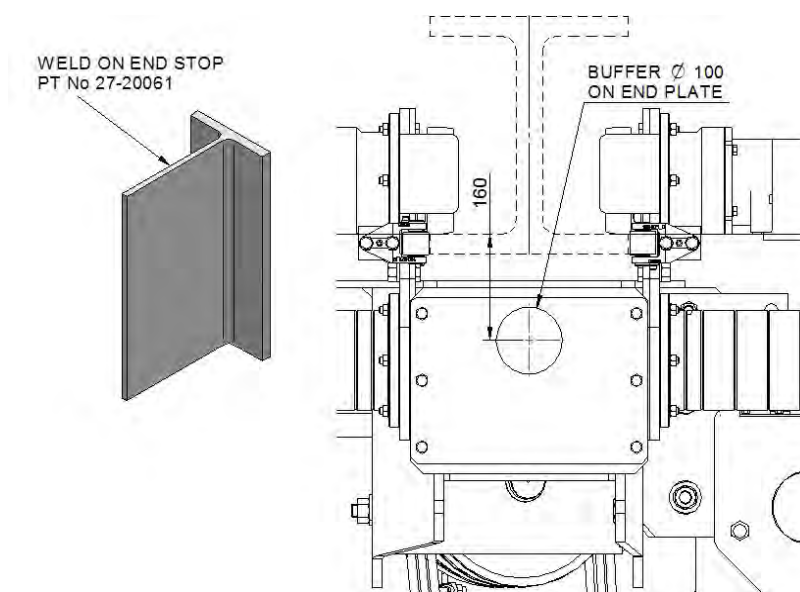


Figure 3 – Single Girder 6 & 8 Fall Traverse End Stops

Double girder crab units are supplied fitted with rubber buffers. Suitable end stops should be positioned at either end of the crab rails. Weld on end stops can be provided by Street Crane. (Part No. 27-20061).

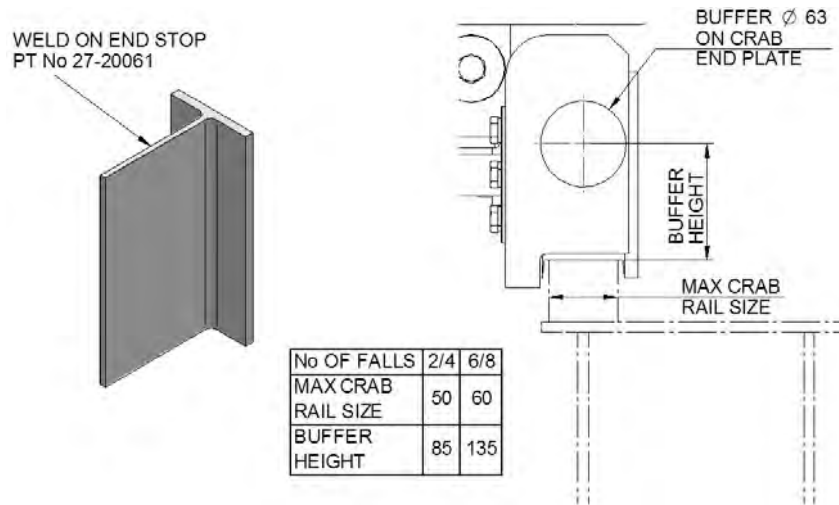
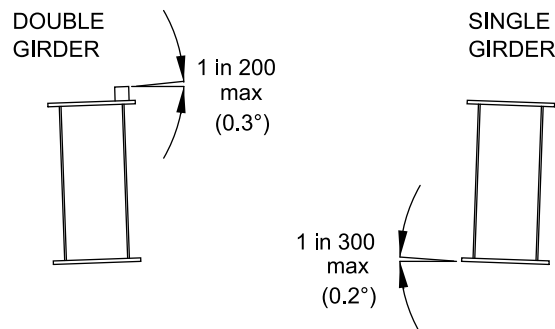


Figure 4 – Double Girder Traverse End Stops

3.2 RUNNING & MOUNTING SURFACE TOLERANCES AND FINISHES

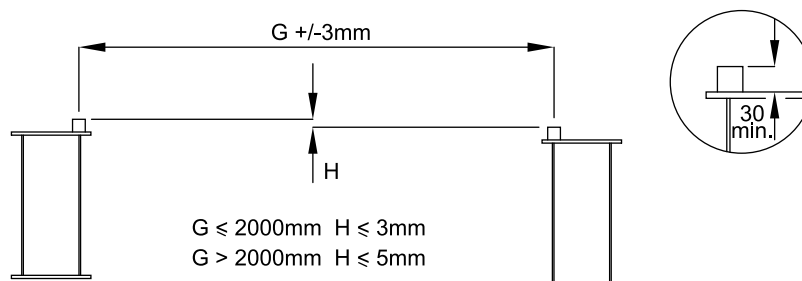
3.2.1 Tolerances on the Inclination of the Running Surface

The angle of inclination of the running surface for the hoist should not exceed the values shown.



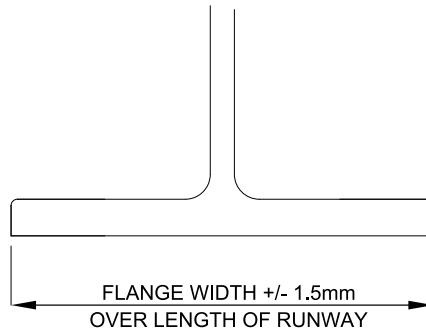
3.2.2 Tolerances on Crab Rail Gauge & Rail Height

The gauge shall not deviate from the nominal by more than 3mm. The difference in rail height shall not exceed 3mm for gauges up to and including 2000mm or 5mm for gauges greater than 2000mm. Rail height should be a minimum of 30mm.



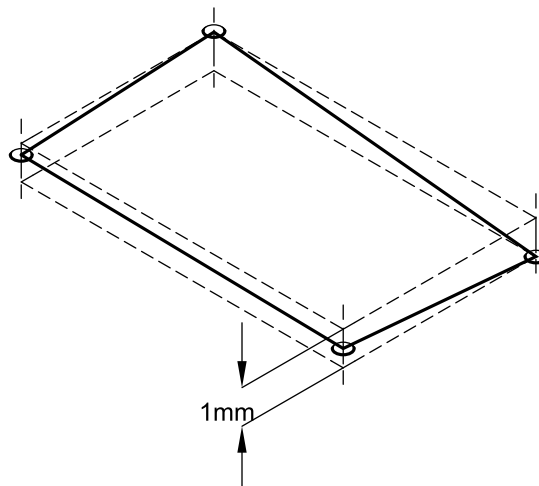
3.2.3 Tolerances on Single Girder Runway Flange Width

The variation in the width of a single girder runway flange should be no greater than 3mm over its entire length.



3.2.4 Tolerances on Mounting Surface for Foot Mounted Hoists

The vertical misalignment between all mounting holes shall not exceed 1mm.



3.2.5 Tolerance on misalignment of rail joints, wheel running surfaces and guidance surfaces

The running surface for the hoist wheels and guide rollers (single girder hoist only) should be free from obstructions and left unpainted. These surfaces should also be free from damage, pitting, weld beads or other surface defects.

Surfaces should be aligned to provide a smooth transition path for the wheels between track sections.

- Gaps in any joints ('J') should be no greater than 2mm.
- There should be no step in the running or guidance surface ('h') greater than 0.5mm.
- Lateral misalignment in double girder rail joints ('L1') should not exceed 1mm.

NOTE: Runway joint splice plates on the bottom flange are not possible with ZX6 & ZX8 single girder low headroom hoists because of the hoist reaction roller.

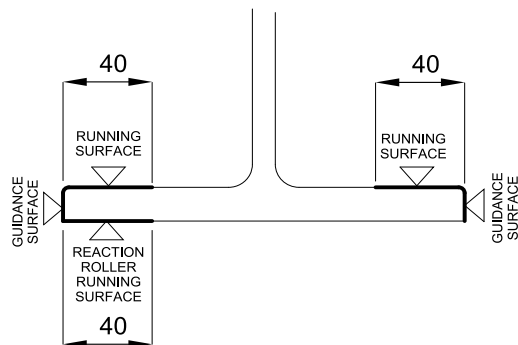


Figure 5 – Single Girder Runway Tolerances

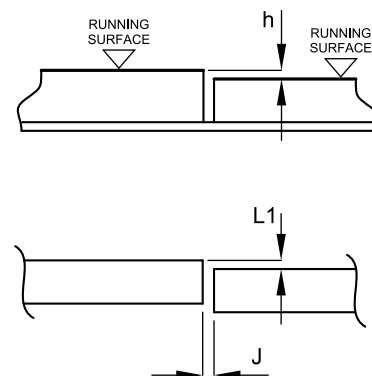


Figure 6 – Double Girder Runway Tolerances

3.3 HOIST WEIGHTS AND LIFTING POINTS

3.3.1 Low Headroom

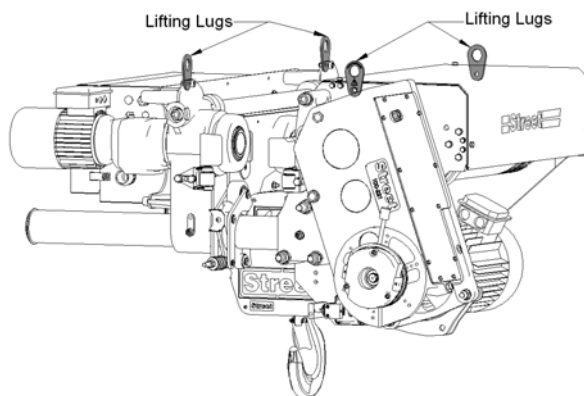


Figure 7 – Low Headroom 2&4 Fall Lifting Points

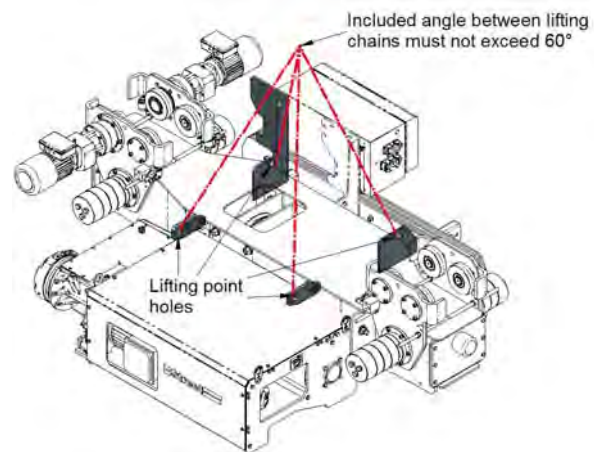


Figure 8 – Low Headroom 6&8 Fall Lifting Points

3.3.1.1 Table of weights- Low Head Hoists

	2 Fall				4 Fall				6 Fall			8 Fall	
	NB	LB	ELB	VLB	NB	LB	ELB	VLB	NB	LB	ELB	LB	ELB
ZX6	329	362	410	---	350	386	439	---	---	---	---	---	---
ZX8	861	983	1255	1385	928	1011	1190	1376	1867	2104	2328	2244	2453

Weights shown for each model in kg do not include any optional extras



The lifting lugs fitted to the hoist unit are designed for lifting the mass of the hoist unit ONLY (including any transportation feet).

3.3.2 Double Girder Crab

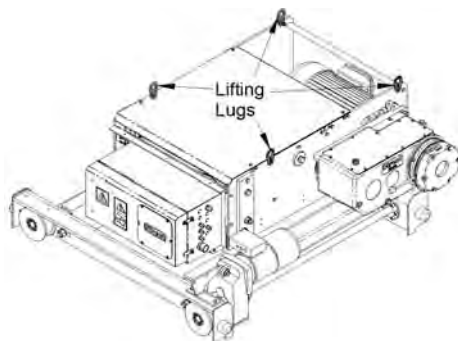


Figure 9 – Double Girder Crab Lifting Points
– 2 & 4 fall units

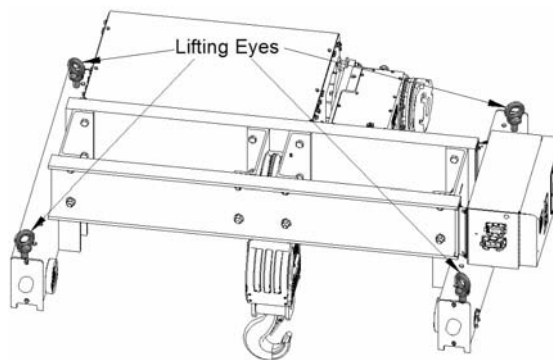


Figure 10 – Double Girder Crab Lifting Points
– 6 & 8 fall units

Double girder crab units having 2 or 4 falls should be lifted using the lifting points fitted to the hoist end frame see Figure 9. Crab units with 6 or 8 falls should be lifted using the eyebolts fitted to each corner of the crab frame see Figure 10.

Before the 6 and 8 fall units can be lifted, the top section of the hoist cover should be removed to allow lifting chains to access to the eyebolt. Remove the four M8 setscrews and washers see Figure 11.

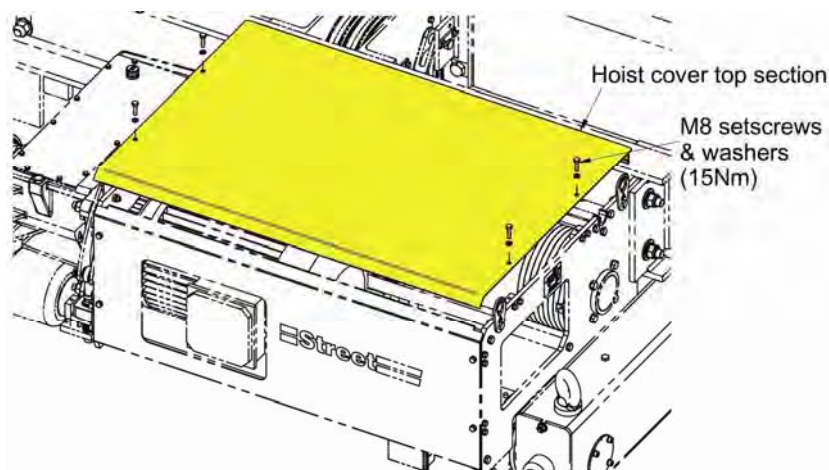


Figure 11 – Removing Hoist Cover on 6 & 8 fall Double Girder Crabs

Leg of lifting chain can now pass through aperture in end frame sideplate see Figure 12

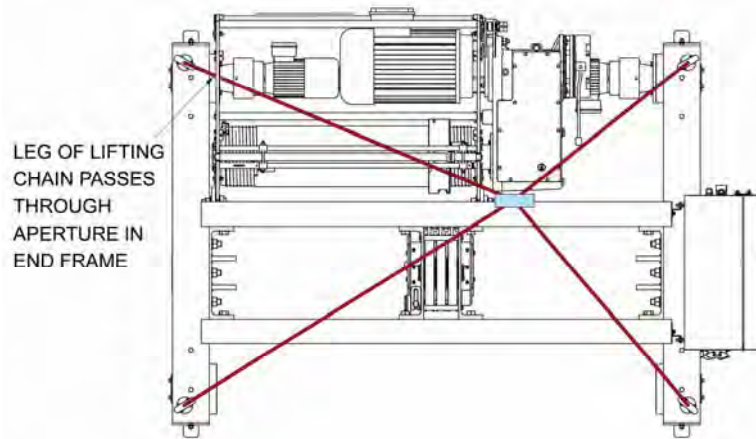


Figure 12 – Lifting 6 & 8 fall Double Girder Crabs

After lifting is completed, refit the hoist cover top section and tighten setscrews to 15Nm.

3.3.2.1 Table of weights- Double Girder Crab

	2 Fall			4 Fall			6 Fall			8 Fall		
	NB	LB	ELB	NB	LB	ELB	NB	LB	ELB	NB	LB	ELB
ZX6	423	477	566	446	502	596	---	---	---	---	---	---
ZX8	PARALLEL ARRANGEMENT (...CRB...)											
1400 GAUGE	1002	1104	1329	1078	1185	1419	1292	1410	1669	---	1496	1753
ZX8	PERPENDICULAR ARRANGEMENT (...CRE...)											
1400 GAUGE	1002	---	---	1078	---	---	1219	---	---	---	---	---
2000 GAUGE	1039	1123	1398	1116	1204	1398	1234	1300	---	---	1406	---
2600 GAUGE	1076	1161	1346	1153	1241	1436	1284	1350	1494	---	1555	1665

Weights shown for each model in kg do not include any optional extras

3.3.3 Foot Mounted

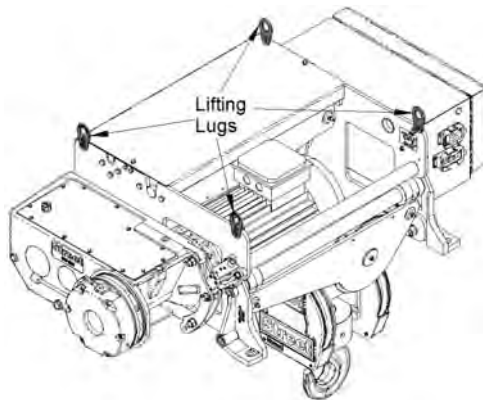


Figure 13 – Foot Mounted Lifting Points

3.3.3.1 Table of weights- Foot Mounted

	2 Fall			4 Fall			6 Fall		8 Fall	
	NB	LB	ELB	NB	LB	ELB	LB	ELB	LB	ELB
ZX6	267	304	355	289	327	384	---	---	---	---
ZX8	637	716	889	722	809	998	889	1063	941	1114

Weights shown for each model in kg do not include any optional extras



The lifting lugs fitted to the hoist unit are designed for lifting the mass of the hoist unit **ONLY**.

3.4 INSTALLATION OF LOW HEAD 2&4 FALL SINGLE GIRDER HOIST

- Measure the runway flange width.
- Whilst the hoist is on the floor and stood on the packing feet, slacken the 4-M12 locking grub screws that secure the panel side trolley frame to the legs (do not release any fixings on the hoist barrel side).
- Open the trolley frame until the gap between the ends of the wheel axles is at least 20mm wider than the width of the runway flange (see Figure 14). Do not remove the circlips on the ends of the legs.

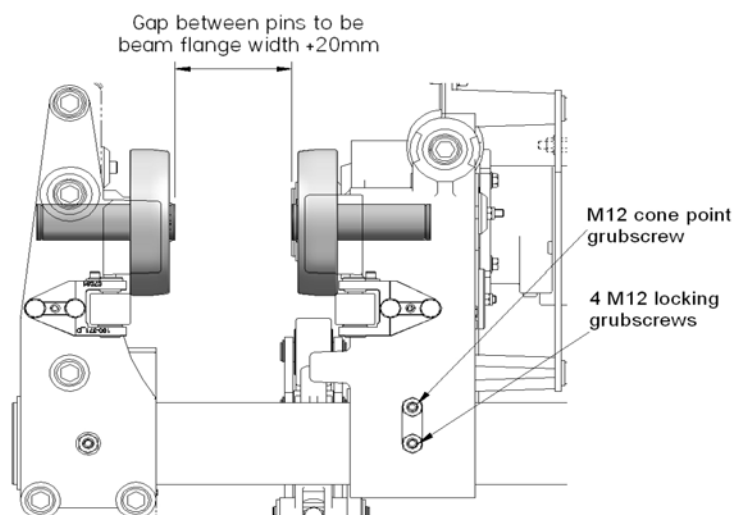


Figure 14 – Installing the Low Headroom Trolley

- Disconnect the reaction roller assembly from the wheel support casting by removing the circlip and washer on the end of the pin.
- Withdraw the reaction roller assembly from the wheel support casting (see Figure 15).

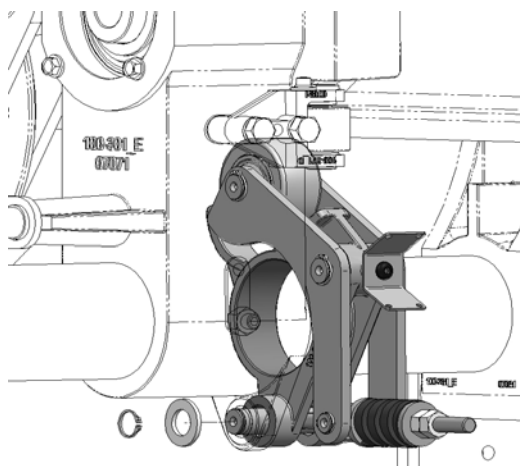


Figure 15 – Withdrawing the Reaction Roller

- Raise the hoist to runway level, use the lifting lugs provided see Figure 7.
- Push the barrel side trolley onto the runway flange until the hoist side guide rollers touch the toe of the runway. Secure the barrel side frame against moving. Ensure that the reaction roller is held in the correct orientation with the spring pointing outwards, horizontally.
- Push the panel side trolley onto the runway (tap with rubber / nylon mallet as necessary) until the gap between guide roller and toe of flange is between 3 and 5mm (see Figure 16). Check that the gap is the same at both ends.

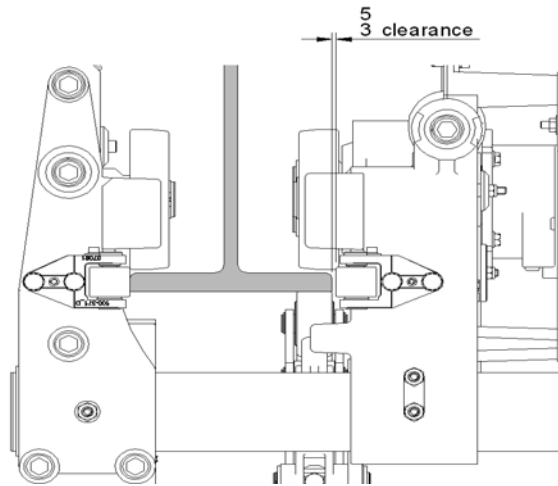


Figure 16 – Low Headroom Runway Clearance

- Lower the hoist unit so that the wheels are touching the beam flange ensuring that the 3-5mm clearance gap is maintained.



Do not remove the hoist lifting tackle until the hoist is fully secured on the runway.

- Remove each of the four M12 locking grub screws from the panel side trolley castings.
- Using the single cone point setscrew, screw into each hole in turn and tighten until a 'centre-pop' indent is made in the hoist legs.
- Using a 10mm diameter drill, drill a full cone of 10mm diameter into both legs at four positions (see Figure 17).
- Remove any swarf from the holes using a magnet.
- Replace cone point setscrew in its storage position, securing with the locknut.

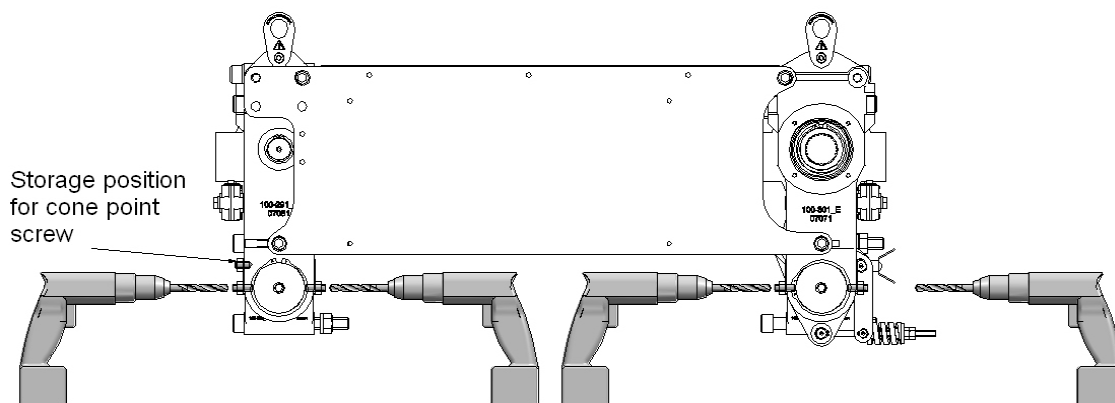


Figure 17 – Setting the Low Headroom Legs

- Replace each of the four M12 locking grub screws and tighten to 40Nm. Secure each grub screw with locknut tightened to 40Nm.
- Replace the reaction roller assembly on the wheel support casting. Set the reaction roller as per section 3.4.1.
- Remove the four blue transportation feet from the hoist legs (Figure 18).

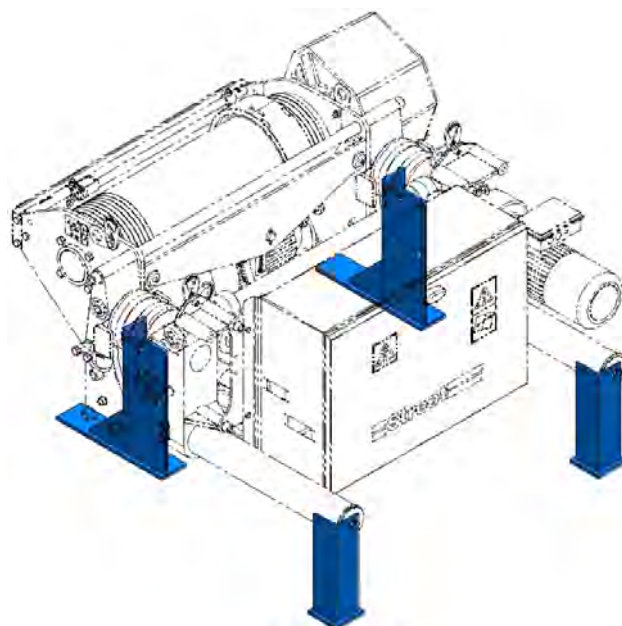


Figure 18 – Low Headroom Hoist Transportation Feet

3.4.1 Setting the Reaction Roller

Before setting the reaction roller ensure that the side guide rollers on the panel side trolley frame, i.e. the guide rollers on the same side as the reaction roller assembly, are in contact with the toe of the runway beam flange. For the setting operation the clearance between the side guide rollers and the runway flange must be on the barrel side (note this is on the **opposite** side to that shown in Figure 16).

The reaction roller fitted to low headroom hoist units runs on the underside of the runway beam directly below the traverse drive wheel.

If the roller assembly has not been replaced, rotate the assembly until the location pin aligns with the hole in the body casting (red adjusting spring facing horizontally outwards). Push the pin into the hole and attach the washer and circlip, the washer sits directly behind the circlip.

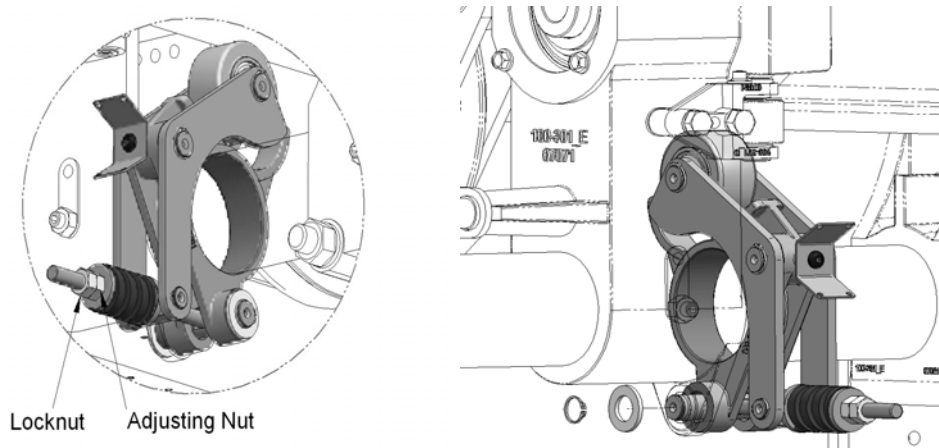


Figure 19 – Reaction Roller

- Ensure that the travel drive wheel is in contact with the runway flange. Turn the reaction roller adjusting nut until the roller just touches the underside of the runway.
- Turn the adjusting nut an additional five (5) full turns and then lock in position using the locknut. Hold the adjusting nut and tighten the locknut to 81Nm.



Five full turns of the adjusting nut is important to achieve correct compression on the reaction roller spring.

3.5 INSTALLATION OF LOW HEAD 6 & 8 FALL SINGLE GIRDER HOIST

3.5.1 Adjusting the CT and Non CT trolley widths- runway width 300-700mm

3.5.1.1 Disassembly of the CT & Non CT Trolley Plate Assemblies

- Measure the runway flange width.
- If the runway is 300mm, adjustment of the Trolley Plate Assemblies is not required, see 3.5.2.
- Whilst the hoist is on the floor and stood on its delivery feet, identify M16 Hex screws (3) and M20 Socket Cap screw (1) (view through access hole), on CT trolley and non CT trolleys on Electrical Panel Side only (see Figure 20).
- Using a 17mm AF Allen key ensure M20 Socket Cap screw (1) is fully screwed in, turning the screw clockwise.

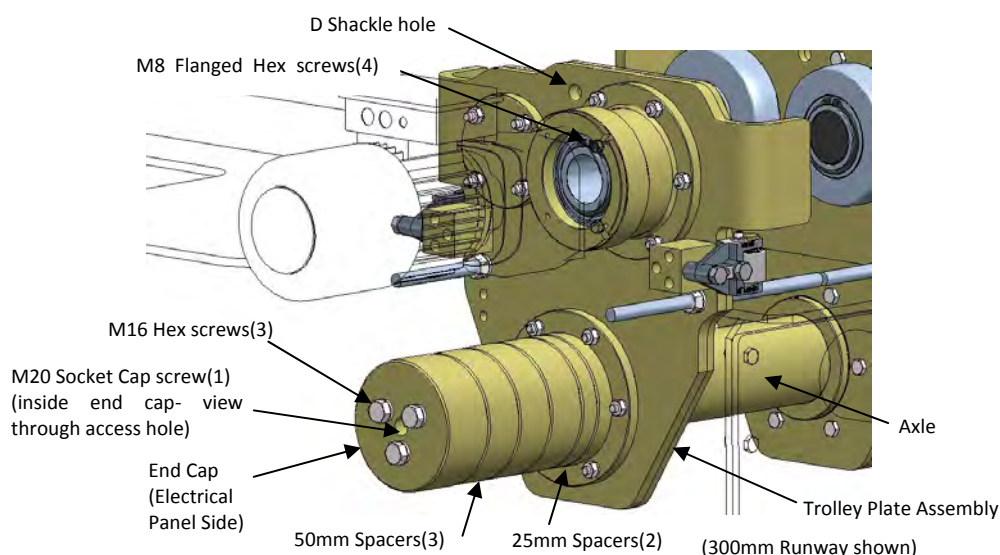


Figure 20 –CT Trolley Plate Assembly 'Electrical Panel side'



To adjust the CT and Non CT trolley assemblies for 350-700mm runways removal of the CT motors and Trolley Plate assemblies is required, suitable lifting equipment is necessary.

- Remove both CT motors, loosen and remove M8 Flanged Hex screws(4). Place aside onto a suitable surface, taking care not to strain the electrical cable.
- Remove the Endcap 'Electrical Panel Side', loosen and remove M16 Hex screws(3), see Figure 20.
- Remove the 50mm spacers(3) and 25mm spacers(2) from the axle and place aside.
- Remove/slide the Trolley Plate Assembly off from the axle, see Figure 20. Use the D shackle holes to attach suitable lifting equipment (70 kg), place aside.
- Remove/slide the complete Trolley Plate Assembly 'Hoist Side', See Figure 21, including the axle and spacers from the hoist. Place aside onto a suitable surface. Use the D shackle holes for suitable lifting equipment (150 kg), place aside.



It is important that the 'Hoist Side' M16 Hex screws(3) are NOT adjusted or loosened, See Figure 21, this ensures correct assembly when the Trolley Plate Assemblies are re-assembled.

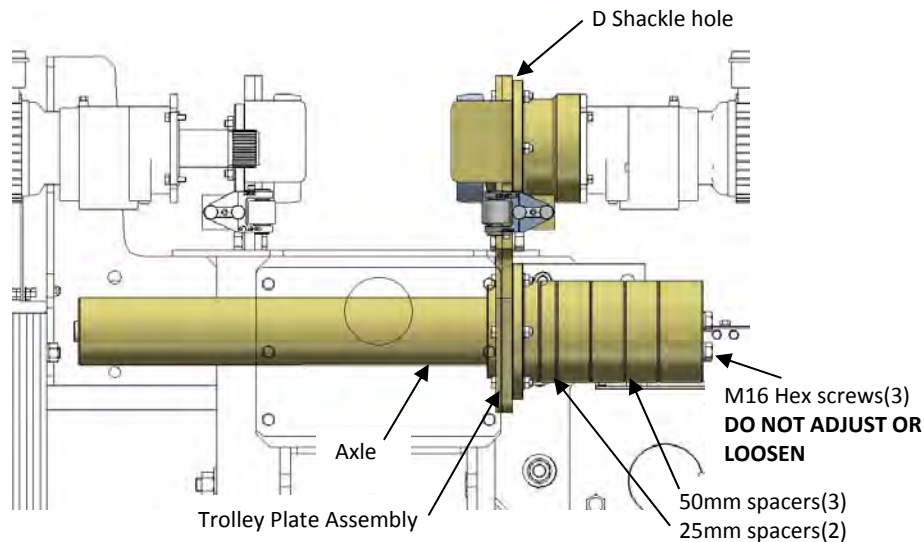


Figure 21 –CT Trolley Plate Assembly- Hoist Panel side

3.5.1.2 Adjusting the Trolley plate, spacer and safety bars positions

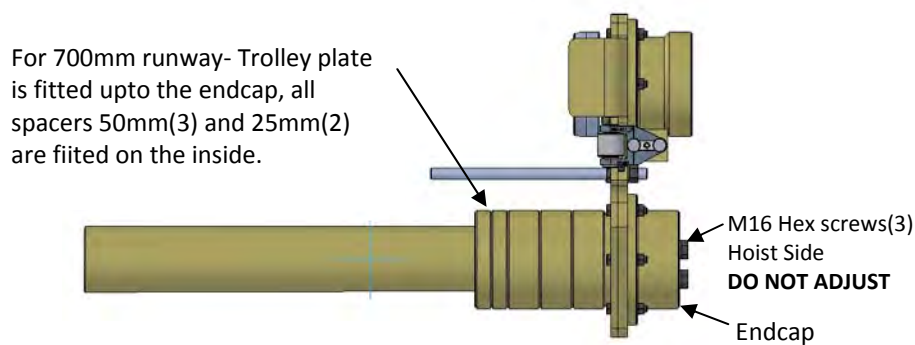


Figure 22 – Trolley Plate Assembly fitted for 700mm runway

- Holding the Trolley Plate Assembly 'Hoist side', push the axle through and remove the 50mm(3) and 25mm(2) spacers, see Figure 21.
- If the runway is 700mm refit the Trolley Plate Assembly upto the endcap, and fit the spacers on the inside, see Figure 22.
- For other runway widths see the below table for positions of the spacers Figure 23.

Runway Width (mm)	Spacers upto Endcap	Spacers on the inside
300	50mm(3) 25mm(2)	None
350	50mm(3) 25mm(1)	25mm(1)
400	50mm(3)	25mm(2)
450	50mm(2) 25mm(1)	50mm(1) 25mm(1)
500	50mm(2)	50mm(1) 25mm(2)
550	50mm(1) 25mm(1)	50mm(2) 25mm(1)
600	50mm(1)	50mm(2) 25mm(2)
650	25mm(1)	50mm(3) 25mm(1)
700	None	50mm(3) 25mm(2)

Figure 23 – Runway width spacer positions

- Adjust all the trolley safety bars for the runway flange width as Figure 24 below. The safety bar is to give support to the Trolley Plate Assembly upon fitting to the hoist.

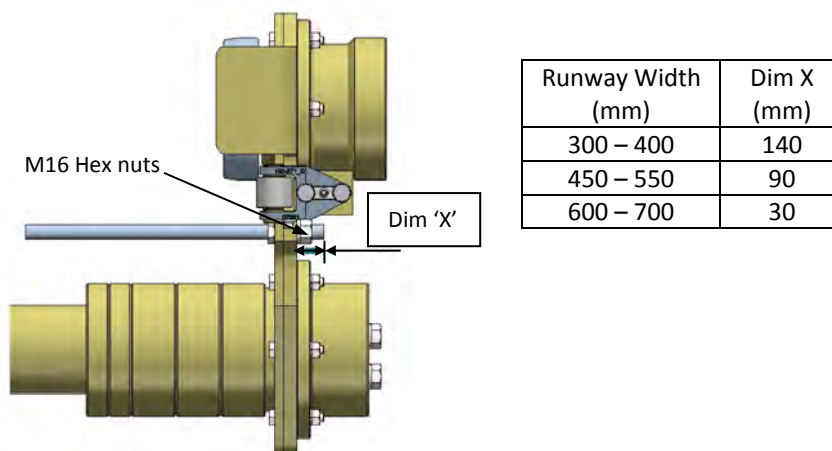


Figure 24 – Safety Bar Position

3.5.1.3 Refitting the Trolley Plate Assemblies to the hoist

- Refit the complete Trolley Plate Assembly 'Hoist Side' including the axle and spacers (see Figure 22) into the hoist beam, use D shackle hole for suitable lifting equipment (Weight-150 kg).
- Ensure the safety bars (see Figure 25) are in contact with the top of the beam and release.
- Refit the Trolley Plate Assembly 'Electrical Panel Side' and spacers onto the axle, mirroring the positions on the hoist side, refer to Figure 23 for the correct positions.



It is very important that the positions of the trolley plate assemblies and spacers are mirrored exactly, ensuring the beam is central, see Figure 25.

- Refit the Endcap 'Electrical Panel Side', fit and tighten M16 Hex Screws (3) to 20 Nm. Refit the CT motors, and tighten M8 Flanged Hex screws (4) to 24Nm, see Figure 25.

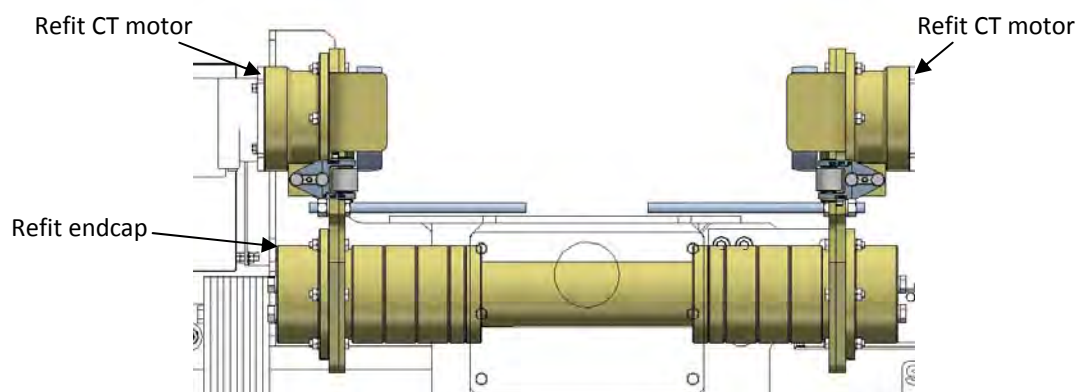


Figure 25 – Endcap refitted

3.5.2 Installing the hoist onto the runway

3.5.2.1 Lifting the hoist to the runway

- Remove the Endcap 'Electrical Panel Side', loosen and remove the M16 Hex screws(3)
- Refit the Endcap but in reverse, see Figure 26 below, tighten the M16 Hex screws (3), torque 20Nm. This gives space on the axle to allow the Trolley Plates to be positioned wider than the beam flange.



It is very important that the Hoist Side M16 Hex screws(3) are **NOT** adjusted or loosened.

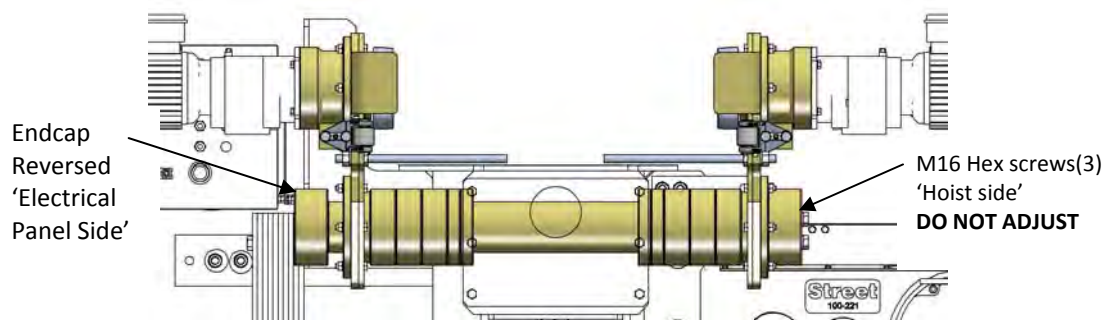


Figure 26 – Endcap reversed and refitted

- See Figure 27 fit suitable lifting chain hook to lifting point holes.



Fit suitable lifting equipment to the lifting point holes ensuring that the included angle between chains does not exceed 60° and lift the hoist upto the runway level, ensuring the width of the trolleys is sufficient to clear the beam runway width.

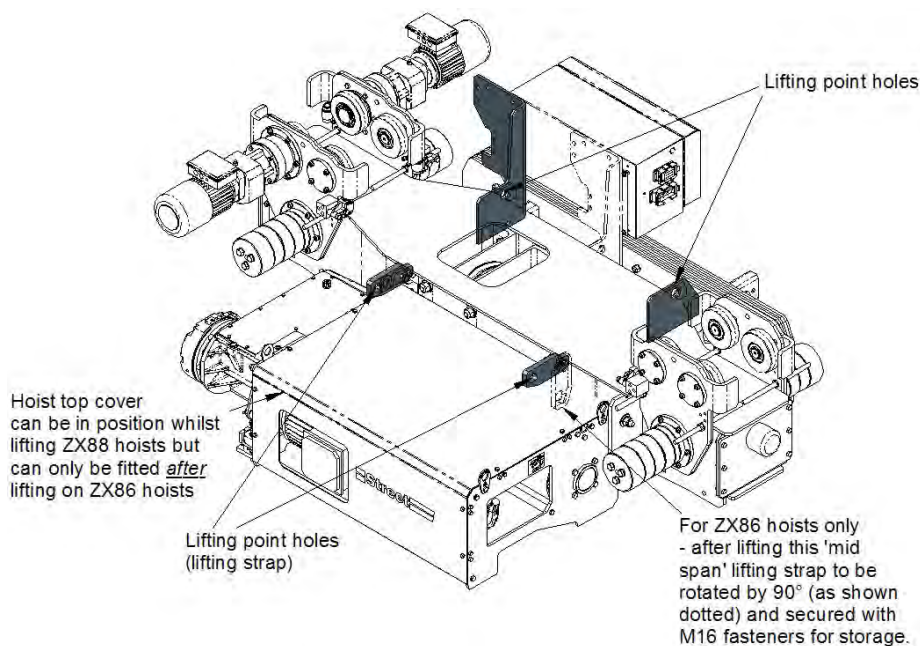


Figure 27 – Lifting the hoist to the runway

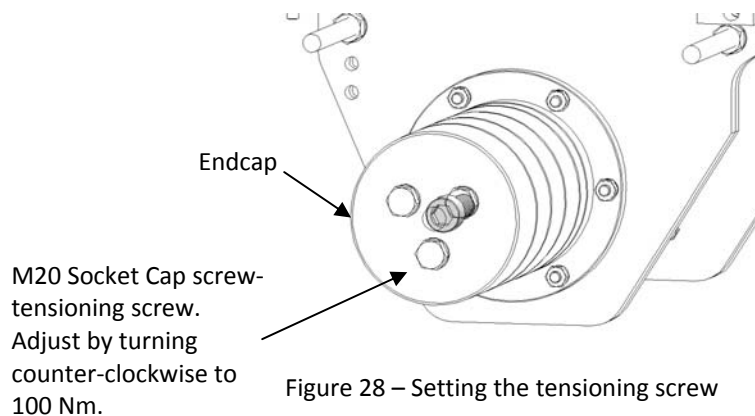


For 6 Fall hoists to allow the fitting of the hoist cover, rotate 'mid span' lifting strap by 90° and secure with 1 off M16 fastener (the 2nd M16 fastener is to be retained in the unused hole for future lifting requirements) Figure 27.

3.5.2.2 Setting the Trolley Plates and wheels onto the runway

- Position the hoist ensuring the Trolley Plate Assembly 'Hoist side' and trolley wheels are over the runway and that the side rollers are in contact with the side of the beam flange.

- Supporting the Trolley Plate Assembly 'Hoist side', push the Trolley Plate Assembly 'Electrical panel side' trolleys over the runway flange. Ensure the trolley plate is in contact with the inside spacers and that the side rollers are in contact with the side of the beam flange.
- Remove the reversed Endcap 'Electrical Panel Side', loosen the M16 Hex screws(3).
- Replace any removed spacers and refit the Endcap 'Electrical Panel Side', tighten the M16 Hex screws(3) to 20 Nm.
- To allow the Trolley Plate Assemblies to pivot, the tensioning screw requires adjustment, see Figure 28. Using a 17mm AF Allen-key unscrew the M20 Socket Cap head (counter-clockwise) until it makes contact with the endcap.
- Using a suitable torque wrench with a 17mm AF Allen-key Socket apply 100 Nm of torque (counter-clockwise) to the M20 Socket Cap head, see Figure 28.
- Test the pivot of the trolley assemblies using hand force only.



- Lower the hoist onto runway flanges, ensuring that all the wheels are in contact with the beam.
- Remove the safety bars (8) from both trolley plate assemblies, release M16 nuts and unscrew, see Figure 24.
- Remove the transportation feet from the hoist.
- For 6 Fall hoists the lifting straps require removal and fitting into the storage position, see Figure 27, to allow the fitting of the hoist top cover, refit the hoist cover.

3.6 INSTALLATION OF FOOT MOUNTED HOIST



The ZX6 & ZX8 foot mounted hoist units are designed for mounting horizontally with the feet at the bottom of the unit. The hoists are not suitable for mounting suspended upside down or in any other orientation other than as shown.

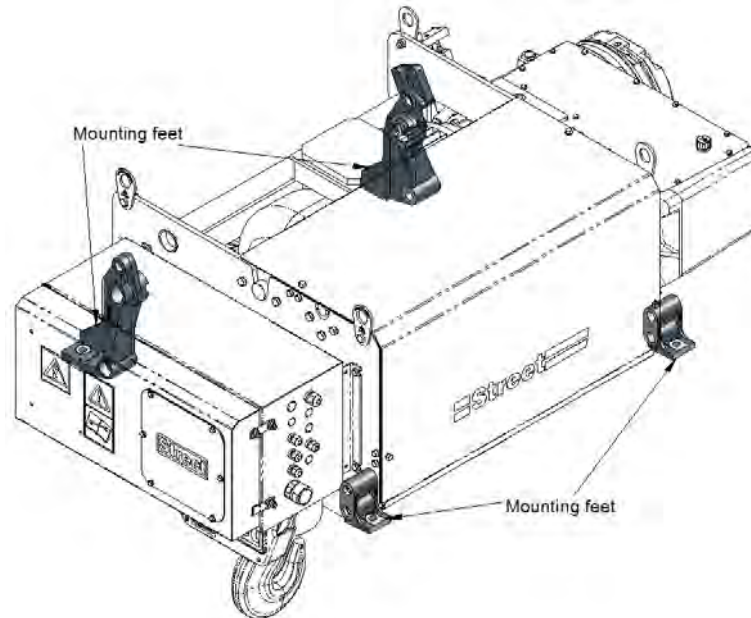


Figure 29 – Installation of Foot Mounted Hoist

Foot mounted hoist units are supplied with four mounting feet.

On 2&4 fall units each foot has a single 18mm diameter hole. They should be secured to a suitable supporting structure using four M16 fixings with minimum grade of 8.8.

On 6&8 fall units each foot has a single 22mm diameter hole. They should be secured to a suitable supporting structure using four M20 fixings with minimum grade of 8.8.



The supporting structure should be suitably designed to support both the mass of the hoist unit together with its rated capacity plus dynamic effects. Tolerances on the mounting surface should be in accordance with 3.2.4.

3.7 SETTING THE UPPER AND LOWER LIMIT SWITCHES – Standard Environment

Each hoist is fitted with an upper and lower level hoist limit switch. The limit switches are activated by contact with the travelling rope guide bush/retainer. These are safety switches and should not be used as the normal method for stopping the hoist. When activated, each switch will only allow travel in the opposite direction. Remove the hoist cover to gain access to the limit switches.

NOTE: The limit spacer tubes are designed to prevent the switches from being placed outside the normal range of operation. Do not remove or modify these tubes.



Incorrect setting of the limit switches may cause serious accidents and damage to the hoist unit.

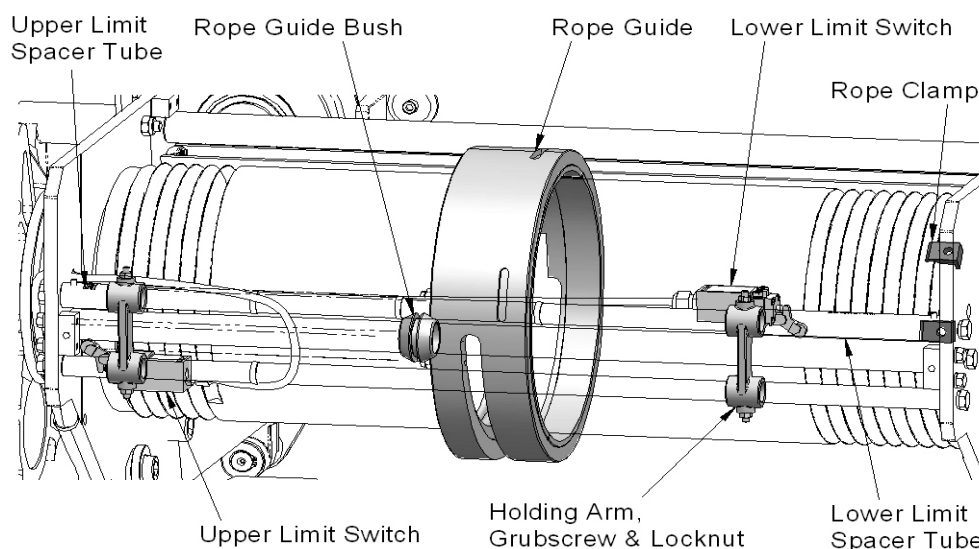


Figure 30 – Hoist Limit Switches – Standard Environment

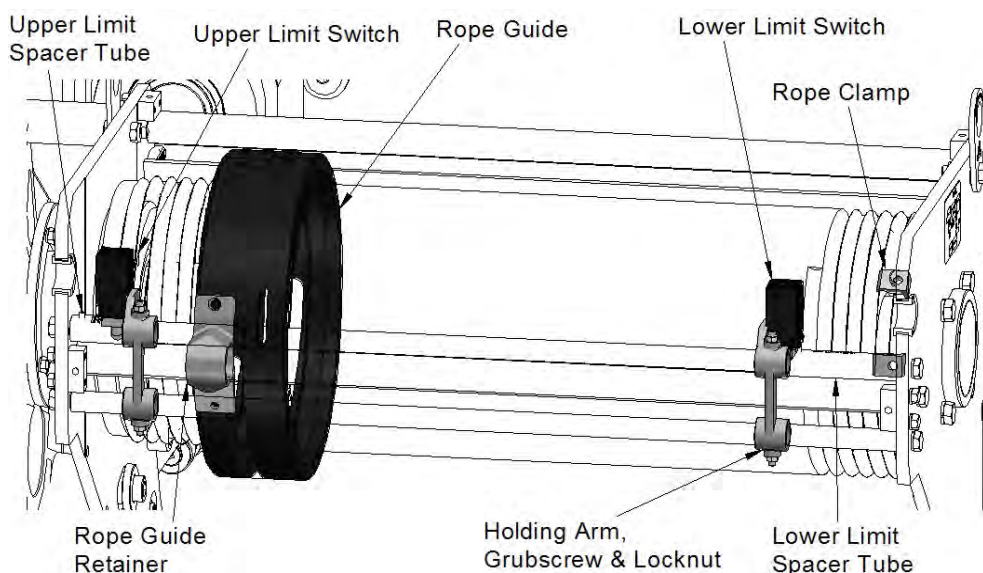


Figure 31 – Hoist Limit Switches – Standard Environment Rv-1 (see hoist nameplate for revision)

3.7.1 Setting the lower limit

- Release the grub screws that secure the holding arm to the limit bars and slide the switch towards the end of the hoist.
- Lower the hook to the desired lowest operating position. Do not let the hook touch the floor such that it would cause the ropes to go slack.

- NOTE: The clearance between the rope guide and the rope clamps should not be less than 10mm when the hook is at its lowest position.
- Slide the limit switch up to the rope guide bush/retainer until the switch is activated. Tighten the grub screws holding the arm to the limit bar.
- Test that the limit operates satisfactorily firstly at slow speed and then at fast speed. Re-adjust if necessary. When the adjustments are complete, replace the hoist cover.

3.7.2 Setting the upper limit

- Release the grub screws that secure the holding arm to the limit bars and slide the switch towards the end of the hoist.
- Raise the hook to the correct operating position.



The upper hook level for low headroom hoists vary with the runway flange width. The hoist will be seriously damaged if the hook is set higher than the values indicated in section 3.11.

- Slide the limit switch up to the rope guide bush/retainer until the switch is activated. Tighten the grub screws holding the arm to the limit bar.
- Test that the limit operates satisfactorily firstly at slow speed and then at fast speed, stopping at the correct distance from the underside of the beam. Re-adjust if necessary. When the adjustments are complete, replace the hoist cover.

3.8 SETTING THE UPPER AND LOWER LIMIT SWITCHES – Galvanising/Aggressive Environments

Each hoist is fitted with an upper and lower level hoist limit switch. The limit switches are activated by contact with the travelling rope guide follower. These are safety switches and should not be used as the normal method for stopping the hoist. When activated, each switch will only allow travel in the opposite direction. Remove the hoist cover to gain access to the limit switches.

NOTE: The guide rail has a stop tab at each end which ensures that the limit switch brackets are not placed outside the normal range of operation of the switches. Do not remove or modify these stop tabs.



Incorrect setting of the limit switches may cause serious accidents and damage to the hoist unit.

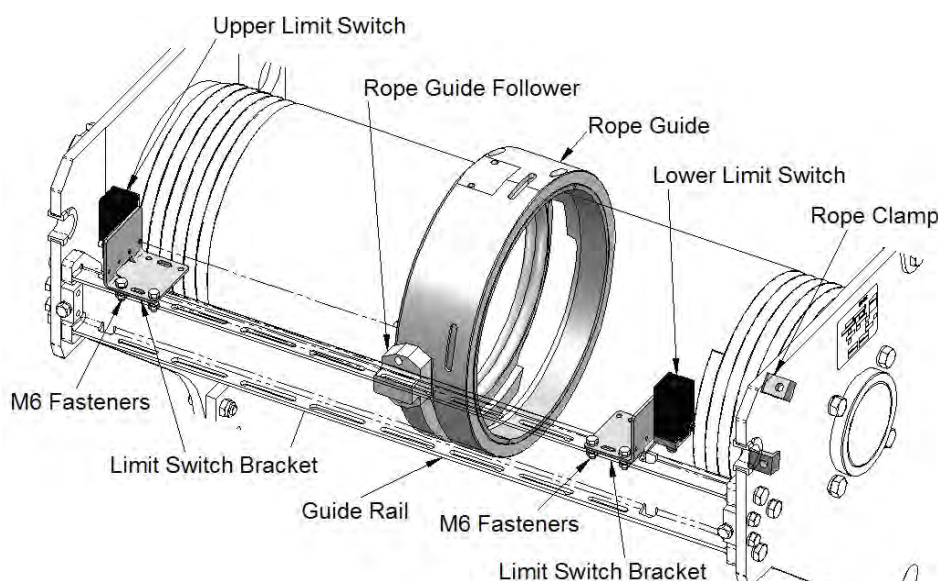


Figure 32 – Hoist Limit Switches – Galvanising/Aggressive Environment

3.8.1 Setting the lower limit

- Remove the M6 fasteners that secure the limit switch bracket to the guide rail and position the switch towards the end of the hoist.
- Lower the hook to the desired lowest operating position. Do not let the hook touch the floor such that it would cause the ropes to go slack.
- NOTE: The clearance between the rope guide and the rope clamps should not be less than 10mm when the hook is at its lowest position.
- Position the limit switch bracket such that the limit switch is activated by the rope guide follower. Refit and tighten the M6 fasteners securing the bracket to the guide rail.
- Test that the limit operates satisfactorily firstly at slow speed and then at fast speed. Re-adjust if necessary. When the adjustments are complete, replace the hoist cover.

3.8.2 Setting the upper limit

- Remove the M6 fasteners that secure the limit switch bracket to the guide rail and position the switch towards the end of the hoist.
- Raise the hook to the correct operating position.



The upper hook level for low headroom hoists vary with the runway flange width. The hoist will be seriously damaged if the hook is set higher than the values indicated in section 3.11.

- Position the limit switch bracket such that the limit switch is activated by the rope guide follower. Refit and tighten the M6 fasteners securing the bracket to the guide rail.
- Test that the limit operates satisfactorily firstly at slow speed and then at fast speed, stopping at the correct distance from the underside of the beam. Re-adjust if necessary. When the adjustments are complete, replace the hoist cover.

3.9 ULTIMATE UPPER LIMIT SWITCH - ROTARY (OPTIONAL)

When specified, an ultimate upper limit may be fitted to the hoist unit to prevent the bottom block from damaging the hoist should the normal upper limit switch fail. It should be set to activate at the upper level given in section 3.11. The normal limit should then be set to activate approximately 75-100mm below the ultimate limit. A red warning light on the base of the control panel will illuminate to indicate when the second ultimate limit has been activated.

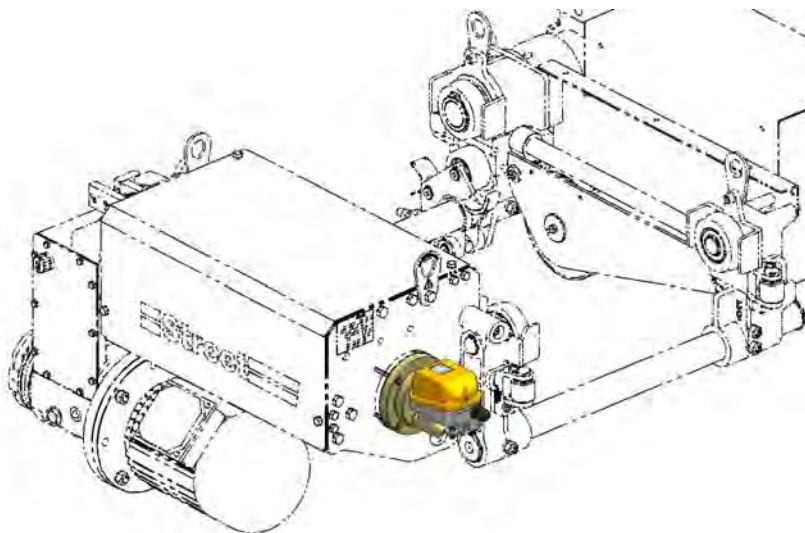


Figure 33 – Ultimate Upper Limit Switch – Rotary Type

3.9.1 Setting the ultimate upper limit



Extreme care must be exercised when testing the ultimate limit switch as it is necessary to bypass the normal upper limit.

- Reposition the normal upper limit such that the ultimate limit is the first to operate.
- Raise the hook to the desired operating position at slow speed with no load attached allowing an additional 50mm for a fast speed approach.



The upper hook level for low headroom hoists vary with the runway flange width. The hoist will be seriously damaged if the hook is set higher than the values indicated in section 3.11.

- Remove the lid from the second upper limit and loosen the central clamp screw (see Figure 34).
- Turn cam no.2 adjustment screw until cam no. 2 is positioned just before it operates the micro switch.
- Re-tighten the central clamp screw.
- Test the operating position in slow speed at first repeating the test in fast speed adjusting the trip position where necessary. Replace limit switch lid.
- Check that the red warning light in the base of the control panel illuminates.
- Set the normal upper limit so that it operates approximately 75-100mm below the ultimate upper limit (see 3.7.2 / 3.8.2).

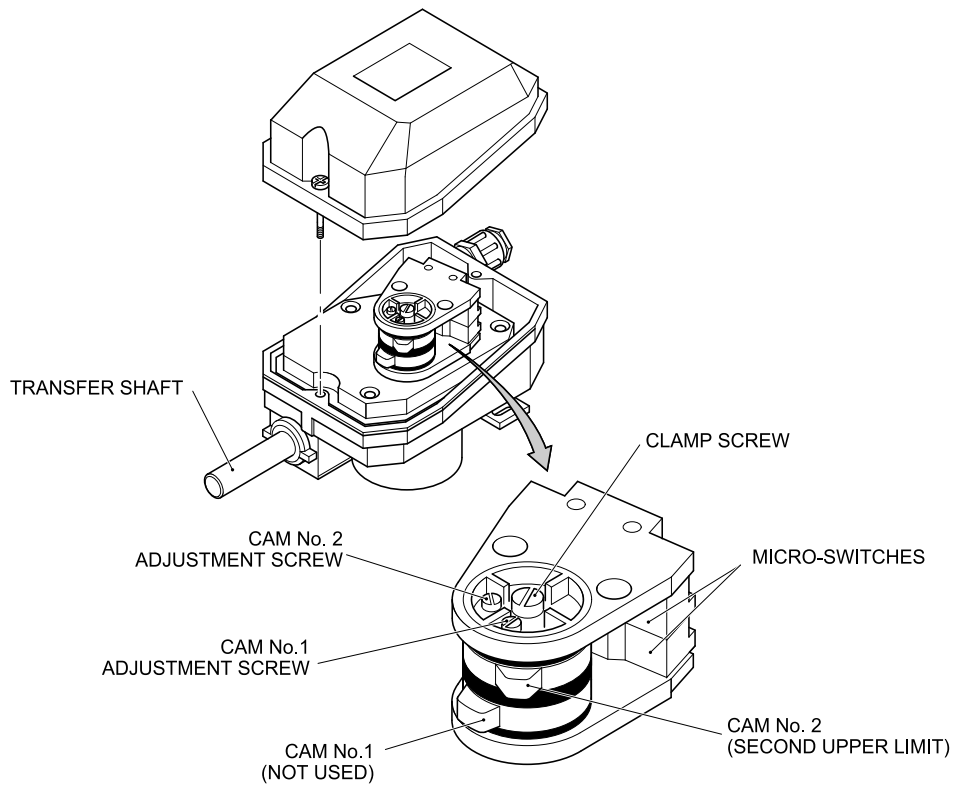


Figure 34 – Setting the Ultimate Upper Limit Switch – Rotary Type

3.10 ULTIMATE UPPER LIMIT SWITCH – HOOK BLOCK OPERATED (OPTIONAL)

When specified, an ultimate upper limit may be fitted to the hoist unit to prevent the bottom block from damaging the hoist should the normal upper limit switch fail. It should be set to activate at the upper level given in section 3.11. The normal limit should then be set to activate approximately 75-100mm below the ultimate limit. A red warning light on the base of the control panel will illuminate to indicate when the second ultimate limit has been activated.

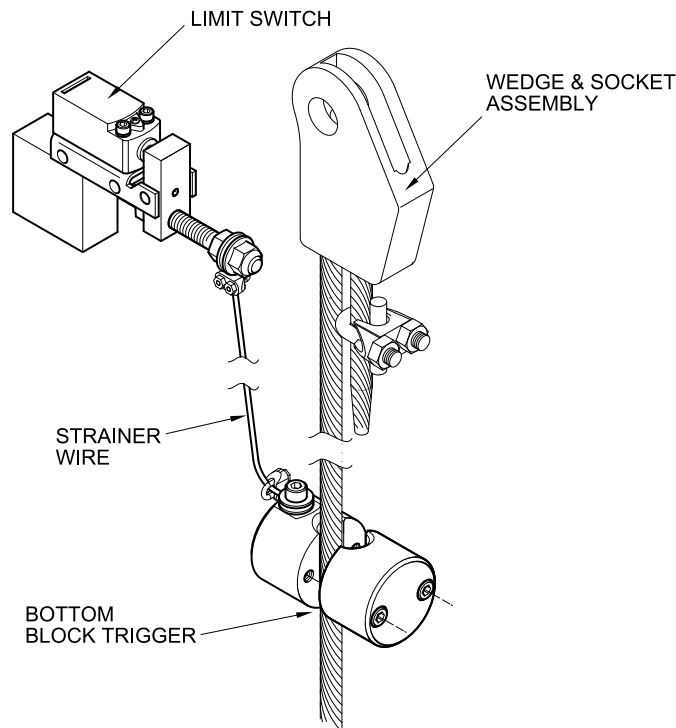


Figure 35 – Ultimate Upper Limit Switch – Hook Block Type

3.10.1 Setting the ultimate upper limit



Extreme care must be exercised when testing the ultimate limit switch as it necessary to bypass the normal upper limit.

- Reposition the normal upper limit such that the ultimate limit is the first to operate.
- Raise the hook to the desired operating position at slow speed with no load attached allowing an additional 50mm for a fast speed approach.



The upper hook level for low headroom hoists vary with the runway flange width. The hoist will be seriously damaged if the hook is set higher than the values indicated in section 3.11.

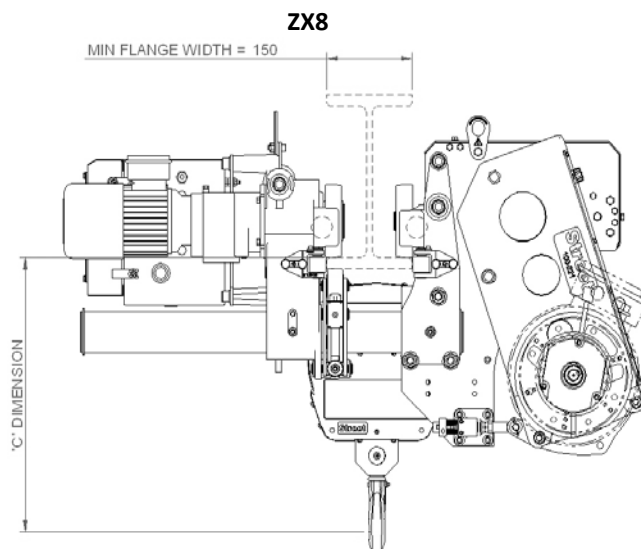
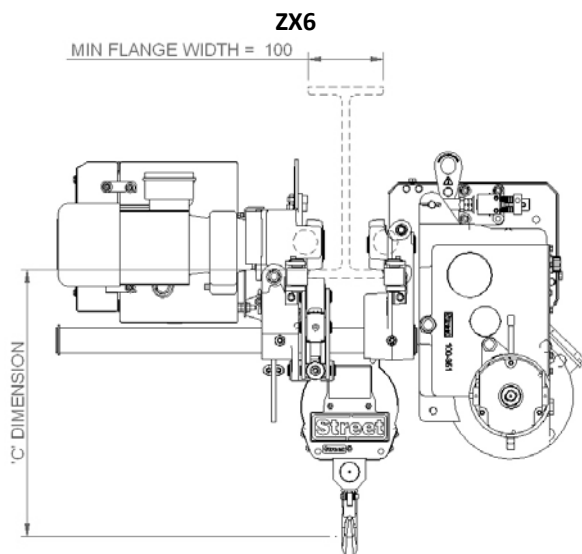
- Remove the bottom block trigger fixings such that the bottom block trigger can be split in two.
- Position the bottom block trigger around the hoist rope.



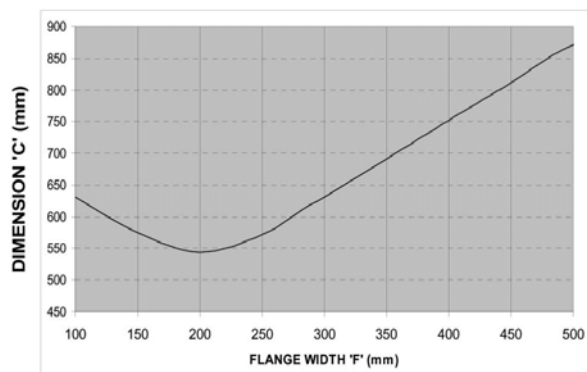
The bottom block trigger must be positioned around the fixed rope on the reeving arrangement i.e. the rope which terminates at the wedge and socket see Figure 35.

- Replace block trigger fixings.
- Adjust the length of the strainer wire and position of the bottom block trigger such that the limit switch operates
- Test the operating position in slow speed at first repeating the test in fast speed raising / lowering the bottom block trigger where necessary.
- Trim or secure any excess strainer wire.
- Check that the red warning light in the base of the control panel illuminates.
- Set the normal upper limit so that it operates approximately 75-100mm below the ultimate upper limit (see 3.7.2 / 3.8.2).

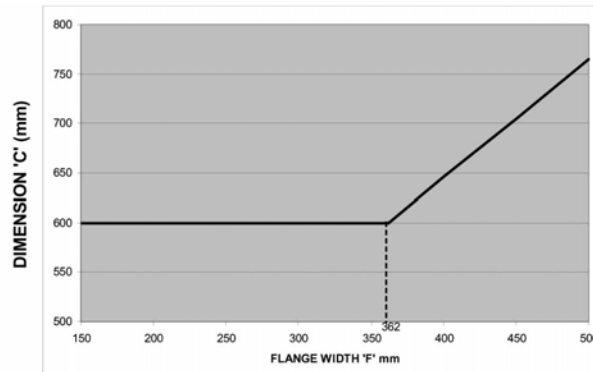
3.11 LOW HEADROOM HIGHEST HOOK POSITION- 2 FALL & 4 FALL



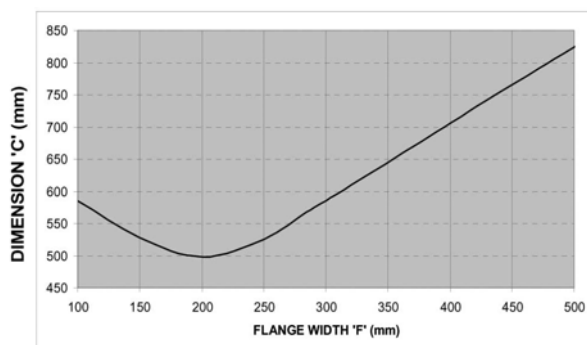
ZX6 - 2 FALL



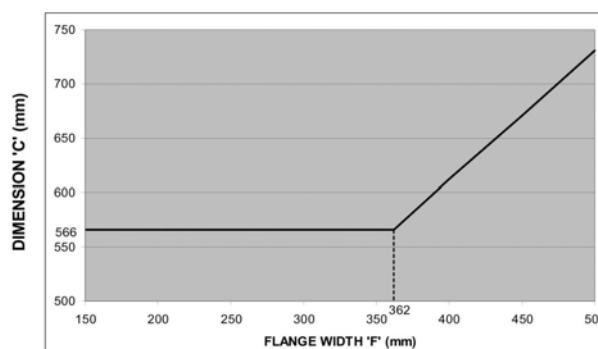
ZX8 - 2 FALL



ZX6 - 4 FALL

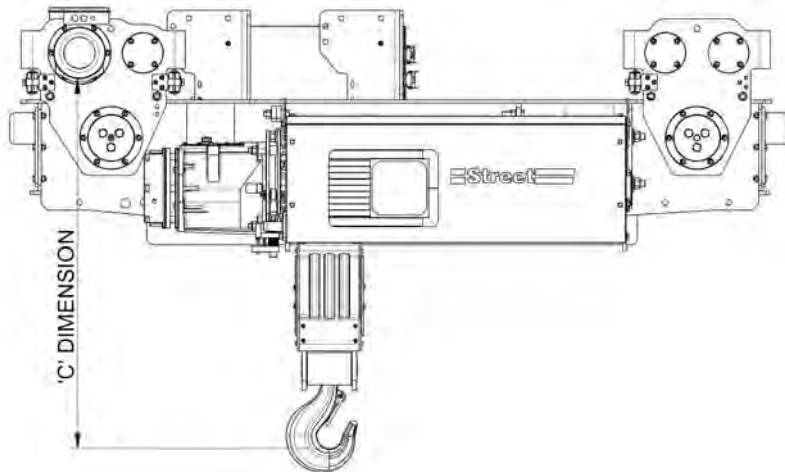


ZX8 - 4 FALL



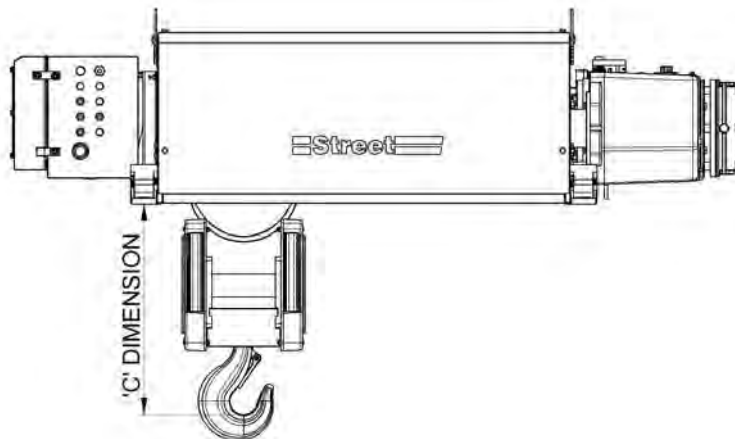
To prevent accidental damage to the hoist unit, all low headroom hoists are despatched from Street Crane with upper and lower limit switches set to suit a 500mm runway flange. As part of the commissioning procedure, the upper and lower limit switches should be adjusted to achieve the optimum C-DIMENSION for the runway flange width (see 3.7 / 3.8).

3.12 LOW HEADROOM HIGHEST HOOK POSITION- ZX8 6 FALL & 8 FALL



ZX8 LOW HEADROOM 6 & 8 FALLS					
HOIST	FALLS	RUNWAY WIDTH (mm)	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX8	6	300 -700	NB, LB, ELB	1175	DZX-1109
ZX8	8	300 -700	LB,ELB	1282	DZX-1110

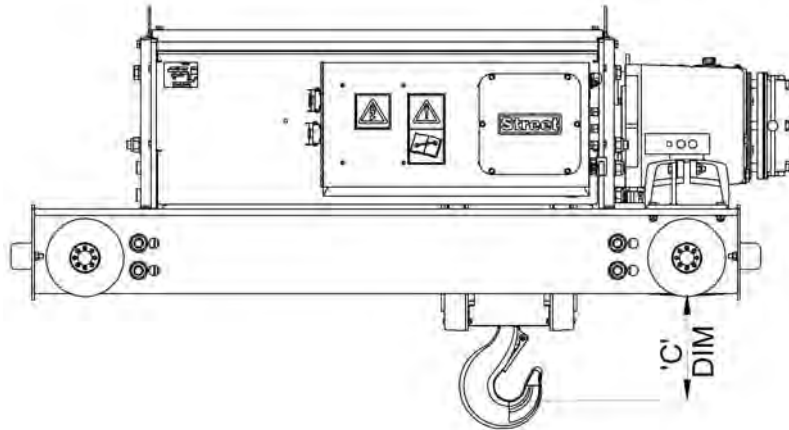
3.13 FOOTMOUNT HIGHEST HOOK POSITION- ZX6 & ZX8



ZX6 FOOTMOUNT				
HOIST	FALLS	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX6	2	NB, LB, ELB	526	DZX-1051
ZX6	4	NB, LB, ELB	495	DZX-1054

ZX8 FOOTMOUNT				
HOIST	FALLS	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX8	2	NB, LB, ELB	585	DZX-1151
ZX8	4	NB, LB, ELB	550	DZX-1154
ZX8	6	LB, ELB	645	DZX-1157
ZX8	8	LB, ELB	637	DZX-1160

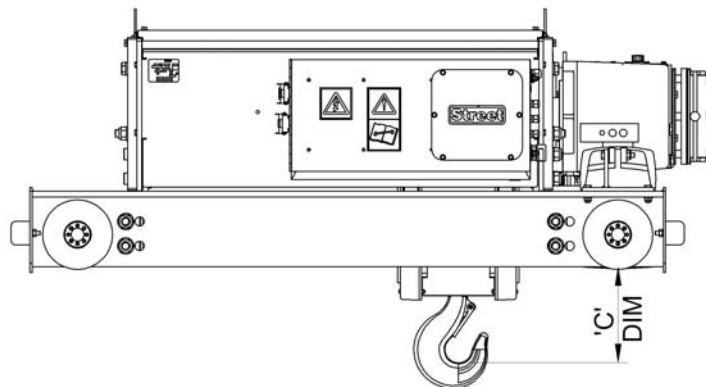
3.14 DOUBLE GIRDER PARALLEL CRAB HIGHEST HOOK POSITION- ZX6 & ZX8



ZX6 DOUBLE GIRDER PARALLEL CRAB- 900mm GAUGE				
HOIST	FALLS	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX6	2	NB, LB, ELB	104	DZX-1016
ZX6	4	NB, LB, ELB	71	DZX-1019

ZX8 DOUBLE GIRDER PARALLEL CRAB- 1400mm GAUGE				
HOIST	FALLS	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX8	2	NB, LB, ELB	295	DZX-1116
ZX8	4	NB, LB, ELB	260	DZX-1122
ZX8	6	NB, LB, ELB	372	DZX-1128
ZX8	8	LB, ELB	421	DZX-1134

3.15 DOUBLE GIRDER PERPENDICULAR CRAB HIGHEST HOOK POSITION- ZX8



ZX8 DOUBLE GIRDER PERPENDICULAR CRAB- 1400-2600mm GAUGE				
HOIST	FALLS	BARREL	'C' DIMENSION (mm)	DATASHEET
ZX8	2	NB, LB, ELB	295	DZX-1119
ZX8	4	NB, LB, ELB	260	DZX-1125
ZX8	6	NB, LB, ELB	555	DZX-1131
ZX8	8	LB, ELB	547	DZX-1137

3.16 CHECKING / ADJUSTING THE RATED CAPACITY LIMITER

The rated capacity limiter is used to prevent the hoist from lifting a load in excess of the rated capacity (safe working load). If the hoist is overloaded, the limit switch will trip and the UP direction will become inactive. The hoist will be allowed to lower only. Once the load has been removed then the limit switch will automatically reset and all motions will become active again.

The rated capacity limiter is pre-set at the factory prior despatch and is set to rated capacity +7.5%. Checking of the rated capacity limiter will require calibrated test weights equal to the rated capacity of the hoist and rated capacity plus 10%, (SWL and SWL+10%). Lift the load just clear of the floor with the test load attached. The limit does not require any adjustment if the hoist picks up its rated capacity (SWL) but does not lift the rated capacity + 10% (SWL+10%). If the limit trips either below or above these limits, adjust the limit by turning the grub screw.

3.16.1 Adjusting the Rated Capacity Limiter for Proof Loading

For proof load testing of a hoist or crane at a load greater than the rated capacity, proceed as follows:-

- Release the grub screw by approximately half a turn.
- Carry out the proof load tests on the hoist / crane as required.
- Attach a calibrated test load to the hook of (Rated Capacity + 10%). Lift the load just clear of the floor and tighten the grub screw until the limit switch just operates.
- Lower the load to the floor and repeat the lift several times at slow hoisting speed making sure that the limiter trips each time. Repeat the test at rated capacity, this time ensuring that the limiter does not activate.

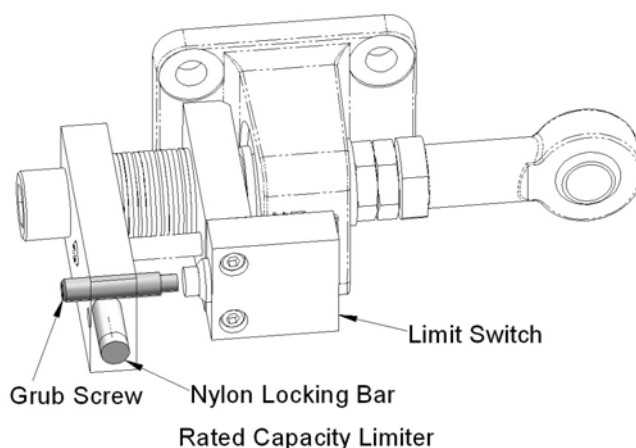


Figure 36 – Rated Capacity Limiter

3.17 TRAVERSE LIMITS (OPTIONAL)

The traverse limit arrangement employs either a one or two stage cruciform switch depending on the type of stopping arrangement. Be sure of the type that is fitted to your hoist.

- A single stage limit switch (type PF33710100) is employed to stop the motion completely when the limit is reached or to allow the hoist to proceed at slow speed only until the end stop is reached. The single stage limit employs one actuating arm at each end of travel.
- The two stage switch (type PF26755100) is employed to firstly slow the speed from fast to slow and then to stop the motion completely on reaching the second stage. The two stage limit employs two actuating arms at each end of travel.

NOTE: On each of the above, when the limit is tripped, normal operation is available in the opposite direction. Reversing away from the stop is at the speed selected by the operator (slow or fast).

3.17.1 Setting traverse limits

To ensure reliable operation of the switch, the actuating arm should be positioned to strike the limit bar as shown in Figure 37. The arm should be positioned so that the switch rotates through 90° each time it passes an arm.

The short bar on the switch occupies the mid (0°) position when the switch is between the two actuating arms. The bar on the switch will then rotate through 90° clockwise or anti-clockwise each time it passes an actuating arm.



Failure to set the switch and actuating arms, as shown, will result in permanent damage to the switch.

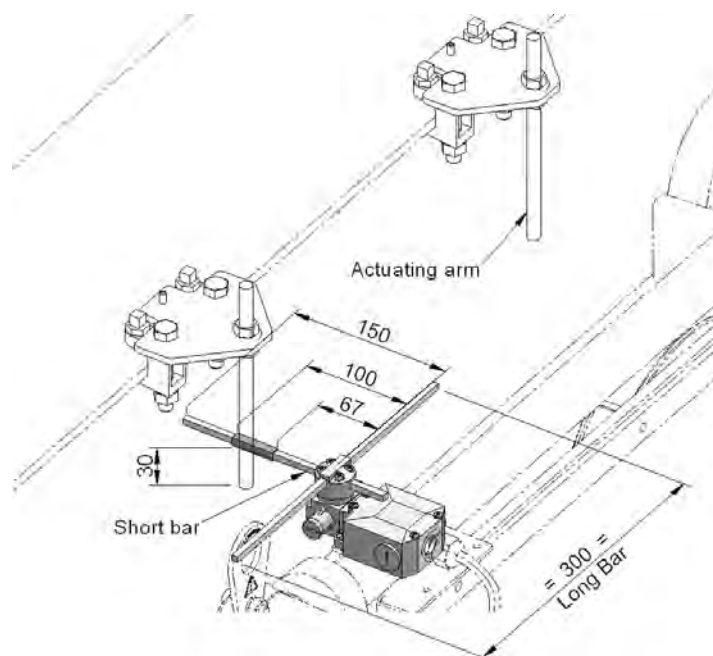


Figure 37 – Setting the Traverse Limit - Single Girder Arrangement

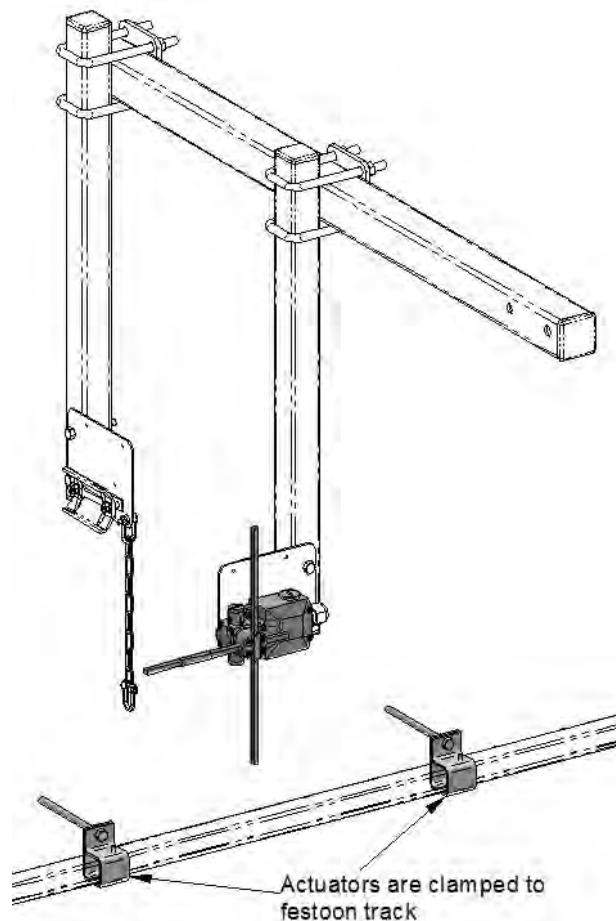


Figure 38 – Traverse Limit Double Girder arrangement
(See Figure 37 for setting dimensions)

When setting the point of operation for the limit switch, account should be taken of the hoist speed and the stopping distance. The point of operation should be set to allow a fully loaded crane / hoist to stop from fast speed before reaching the required position.

3.18 CONNECTING THE POWER SUPPLY



Connection of the power supply must be carried out by a competent person. Ensure that the supply to the hoist matches the information in the hoist technical data and on the hoist nameplate. Also ensure that the supply has been correctly installed and protected, i.e. voltage, phase, frequency, fuse size, cable/conductor size. Check that the voltage at the point of supply is within the tolerance of $\pm 5\%$ and the nominal frequency is within the tolerance of $\pm 1\%$ of the rated values.

3.18.1 Supply cables / fuses

The size of the supply cables to the hoist must be selected in accordance with the table in section 7.6. Terminals must be of a size appropriate to the cable size and securely fixed. Selection of a suitable size of mains fuse is given in section 7.5. Fuses of class gL/gG should be used (or type 'J' for CSA installations).

3.18.2 Main isolator – supply switch (by others)

The main isolator (supply switch) must disconnect all phases of the supply to the hoist, must be clearly marked and located in an easily accessible position. The switch should be capable of being locked in the OFF position whilst any maintenance work is being carried out. The main isolator, if reasonably accessible, may also be used for emergency stop or emergency off purposes. NOTE a separate emergency stop is located on the hoist controller see 4.4.5.

3.18.3 Connecting to the mains supply

Connect the cables in accordance with the circuit diagrams via the plug and socket located on the side of the hoist control panel.

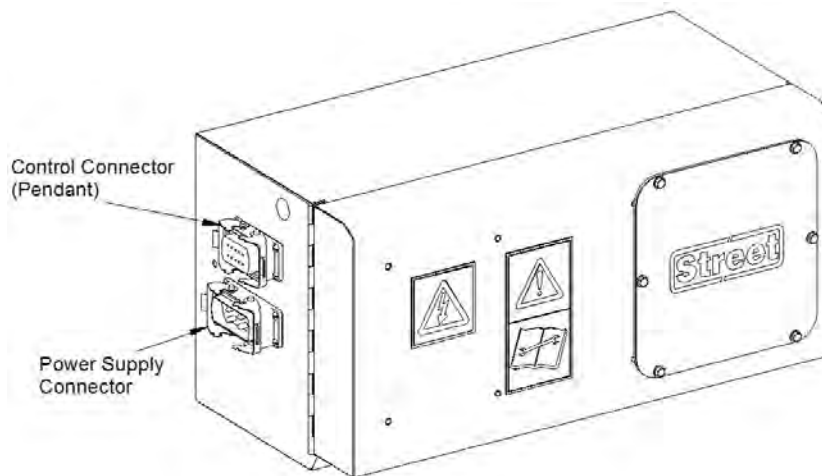
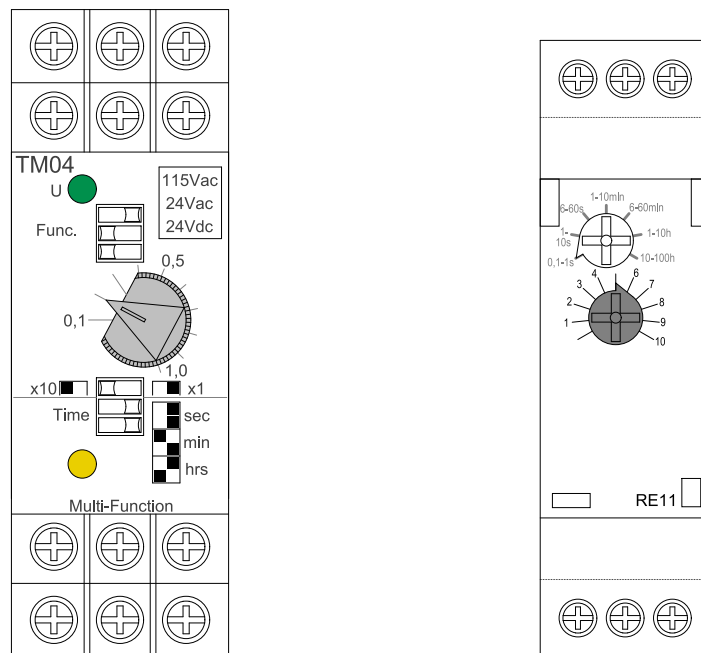


Figure 39 – Hoist Electrical Connections

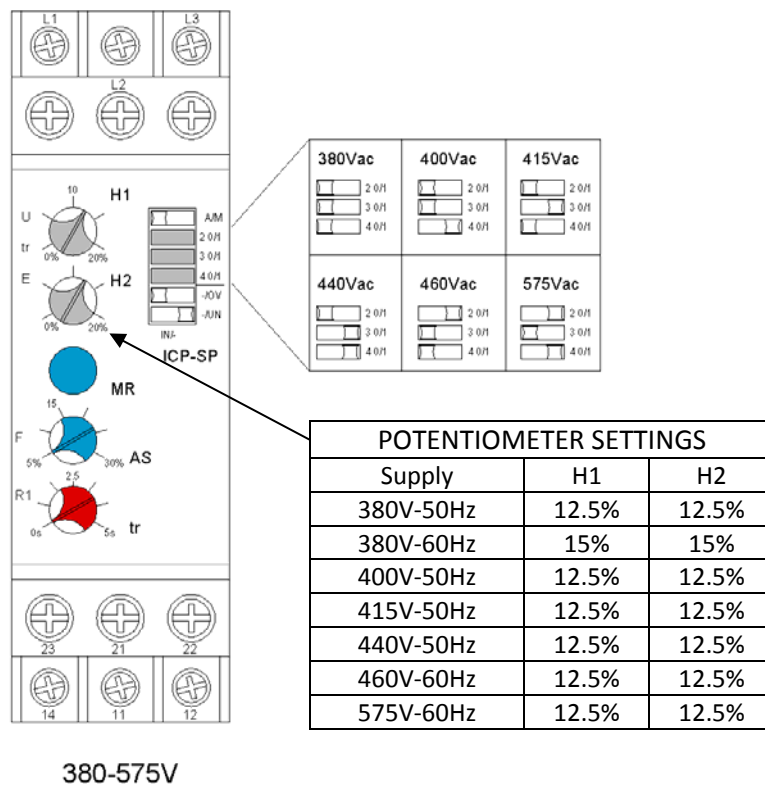
- Check the setting of both the Traverse Fast to Slow and the Hoist Slow to Fast speed delay timers. These should correspond with the settings in Figure 40.
- Check the settings on the Phase Failure Relay correspond with Figure 41.
- Check that the connections to the control transformer match the supply voltage (see Figure 42).
- Before switching the power on carry out Earth continuity and insulation resistance tests on the completed installation.



Traverse Fast-Slow

Hoist Slow-Fast

Figure 40 – Delay Timers



380-575V

Figure 41 – Phase Failure Relay

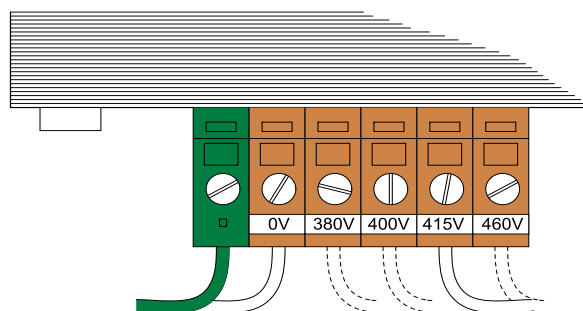


Figure 42 – Control Transformer Connections

3.18.4 Electromagnetic compatibility

The hoist itself complies with the requirements of BS EN 61000-6-2/4 with regard to EMC. The user should take care to ensure that the remainder of the installation meets these requirements.

3.18.5 Connecting the Pendant controller – Low Headroom

Where a control pendant is to be attached directly to a low headroom hoist, it must be supported by the two strainer wires on either side of the pendant cable. The electrical cable or terminals must not support any load. Connect the two pendant strainer wires to the M6 screws on the suspension bracket as shown. Tighten the M6 fixings to 9Nm. Connect the plug on the end of the pendant cable to the socket on the side on the hoist control panel.

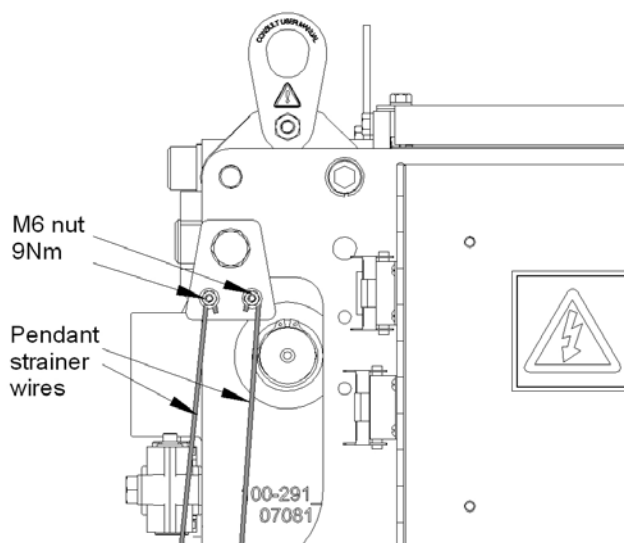


Figure 43 – Strainer Wire Connections

3.19 COMMISSIONING PROCEDURE



Checks to be carried out before switching on the power supply.

- Check that the hoist installation is complete and all fixing screws are secure.
- Check that the correct end stops are in place.
- Check that the electrical installation is complete and installed as section 3.18. Ensure that the Earth continuity and insulation resistance tests were satisfactorily carried out.



Once power supply is connected:-

- Check that the emergency stop functions correctly.
- Check each motion by first moving at SLOW speed and moving the minimum possible distance also ensuring that the direction of movements correspond to the legends on the controller.
- Double girder – Travel the crab unit the full length of the crane to ensure that there is sufficient clearance between the wheel flanges and the rail.
- Single girder - Travel hoist full length of runway to ensure that adequate clearance exists between guide rollers and runway. Check that the clearance does not become excessive. Check that the reaction roller operates satisfactorily.
- Check that the runway end stops function correctly.
- Set and check the upper and lower limits (section 3.7).
- Set the ultimate upper limit (rotary type see section 3.9, block operated type see 3.10) and the traverse limit (section 3.17) if fitted.
- Check and adjust, if necessary, the rated capacity limiter (see section 3.12). If the hoist is to be subject to a proof load test as part of a crane or runway installation, see the instructions for by-pass of the RCL in section 3.16.1.
- Run the hoist several times under light load (approx 10% of SWL) and at slow speed to allow the wire rope to bed down and improve its service life. After the running in period, check that the wedge and rope has seated correctly in the socket. Remove any twist imparted in the rope during installation, see section 5.8.2.4.

The hoist is now ready for proof load and performance testing as required.

Confirm that commissioning has been duly carried out and complete the test logbook in section 7.7.

3.20 DISMANTLING / REMOVAL OF THE HOIST

The following hoist dismantling and removal procedure assumes that the hoist is still in its original condition and working in the same environment.

If the hoist has been modified such that it no longer resembles the original installation, the competent person may decide on an alternative method of removal and dismantling.

- Raise the hook to its upper level. Alternatively the hook and rope may be removed if required. See 5.8.2.1
- Electrically isolate the crane, disconnect all electrical cables.
- Remove any attachments such as limit brackets, cable towing arms, pendant etc.
- Support the weight of the hoist at its appropriate lifting points. See 3.3
- Double Girder Crabs can be lowered to the ground.
- For Foot Mounted Hoists remove the foot bolts and check there is no adhesion of the foot plates before lowering to the ground.
- For 2&4 Fall Low Head Hoists:-
 - Release the reaction roller. See 3.4.1
 - Remove the locking grub screws. See 3.4
 - Open the low head trolley frame until the wheels clear the runway flange.
 - Lower to the floor.
- For 6&8 Fall Low Head Hoists:-
 - Remove trolley spacers. See 3.5
 - Open the low head trolley frame until the wheels clear the runway flange.
 - Lower to the floor.
- If the hoist is not to be re-used, dispose of in an environmentally friendly manner.

4 OPERATING INSTRUCTIONS

4.1 INTENDED USE

The crane / hoist is designed for lifting, moving and lowering loads, up to the rated capacity of the equipment, by means of a hook or other similar load handling device. The equipment should not be modified or any additions made without the approval of Street Crane Co Ltd.

- The equipment is not intended for transporting any persons either suspended in a basket from the hoist or for persons travelling on the crane bridge.
- The crane / hoist is not intended for pulling loads at an angle and not for towing or dragging loads along the floor. The hoist is designed for lifting a load in a vertical path only.
- Ensure that the hoist is always operated within its rated capacity (SWL). The weight of any lifting gear should be taken into account when assessing the load on the hoist. It may also be necessary to allow for any adhesion between the load and its supports.



Overloading can lead to a possible failure of some of the load carrying parts. Overloading the crane / hoist may start a defect, which could lead to future failure even at less than the rated capacity.

- Do not use the crane / hoist for pulling loads loose, i.e. pulling components from moulds and always make necessary allowances for any adhesion between the load and its supports.
- The end of travel limits, (hoist or travel), are not intended to be a regular method of stopping the motion. They are safety devices and they should be approached with caution.
- The hoist is not intended to operate with a slack rope.

4.2 DUTIES OF THE OPERATOR / SAFE HOISTING PRACTICES

At the start of each working day or shift, carry out the daily pre-use checks see section 5.4. Do not work with any crane or hoist if any defects are found which may compromise safety.

The following information serves as a guide for safe hoisting practices and an operator adhering to these will quickly find that he / she is able to work both smoothly and quickly, without prejudicing safety and equipment.

1. Know where the safety, fire and first aid equipment is located and how to use it.
2. Ensure that no one is working on the crane track, crane platform (if fitted) or where they could be struck by the crane / hoist.
3. Before using the crane / hoist make a full visual inspection to ascertain that the equipment is in good working order, paying particular attention to the rope and hook. See 5.4 Daily pre-use inspections.
4. Do not use the crane for anything other than its intended purpose.
5. Ensure the crane is properly maintained and that all the necessary examination and maintenance records are up to date.
6. All relevant accident prevention, safe lifting and slinging procedures should be obeyed.
7. Constantly monitor all crane and hoist movements and be ready to activate the emergency stop should any abnormal circumstances arise. Be especially aware of instances where the crane / hoist may fail to stop when the push button/joystick is released or if the crane / hoist moves unexpectedly.
8. Always operate the crane with care and consideration. Care should be taken to avoid the swinging of loads.
9. Ensure that the SWL data plates are clearly visible to the operator at all times.
10. Centre the hoist over the load before lifting. Do not side pull as this can damage the hoist and endanger the operator.
11. Do not lower the hook / bottom block so far as to allow the hoist ropes to become slack.



If this does happen, the operator should satisfy himself that the rope is correctly reeved on the system of sheaves & hoist barrel before continuing to operate the crane.

12. Do not lift a load unless you can see it is securely slung with "suitable" lifting tackle.



Lifting tackle should only be deemed “suitable” if in accordance with LOLER 98. (Other national regulations may apply).

13. Always gently ‘inch’ the hoist into the load.



Running into the load at full hoist speed imposes excessive overloads on the hoist and could result in failure of parts and/or supporting structure.

14. Do not ‘inch’ the hoist unnecessarily. Excessive stopping and starting causes high temperatures in the motor and brake and may result in overheating or burnout of the component if continued to excess.
15. Do not try and move in the opposite direction until the crane/ hoist has come to a complete stop.



Do not stand below a suspended load or allow any other personnel to do so.

16. Prior to operating the travel or traverse motion, the operator should make personnel aware of approaching loads using audible warnings where necessary.



Do not move the loads over the heads of other personnel.

17. Do not run the hoist or crane into the travel stops at full speed. Ensure that the rubber buffer is in place and not damaged.
18. Ensure that adequate clearance is maintained between the load or lifting attachment and the hoist or crane structure. See Figure 44.

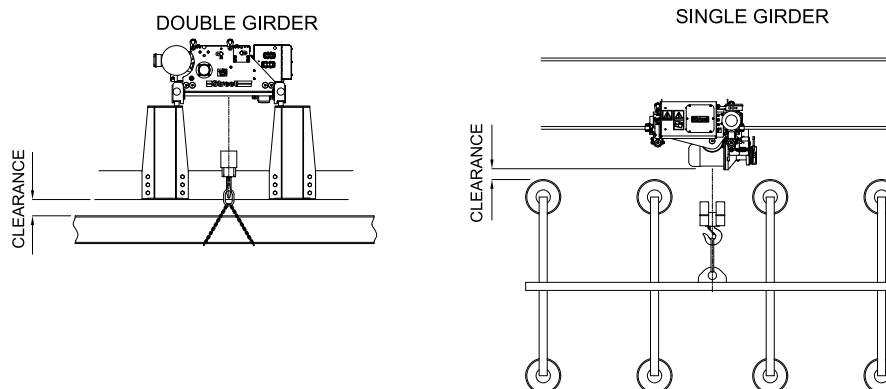


Figure 44 – Clearances to consider when lifting

19. Ensure that you can see the hook or load clearly at all times or are receiving signals from someone who can. Ensure that both parties know the full meaning of the hand signals for operating the crane / hoist. See Figure 45 for recommended hand signals.
20. Do not continue to travel or traverse once the crane or hoist has come to a stop against the endstops. This will cause localised damage to the rail or runway beam.
21. Never leave a load suspended in the air unsupervised.
22. Do not park the crane over fumes, steam or dangerous processes. For outdoor cranes/hoists, park in a sheltered area where possible.
23. Do not leave outdoor cranes/hoists unattended for long periods without applying the storm anchors.

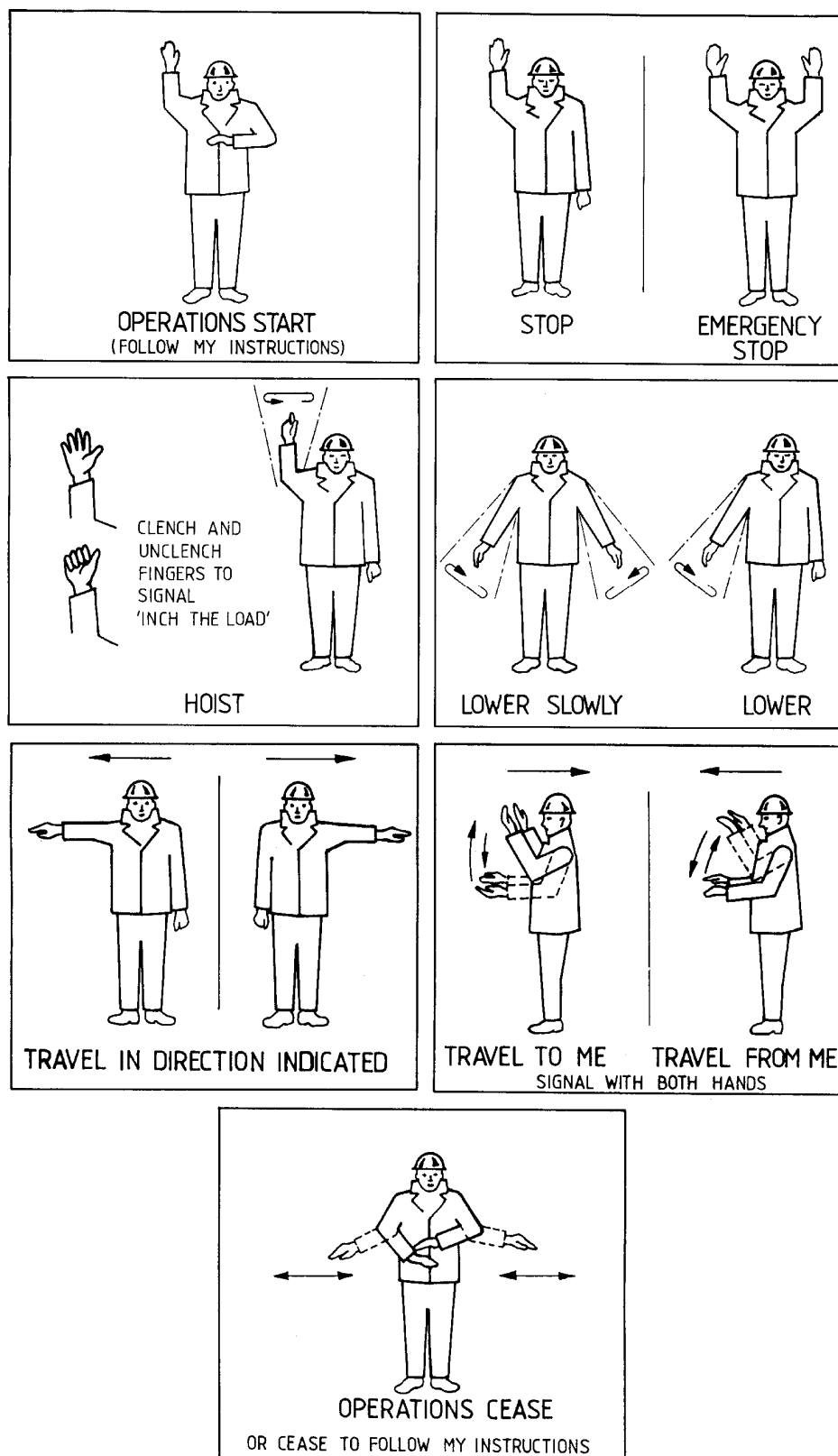


Figure 45 - Recommended Hand Signals

4.3 REMOTE CONTROLLED CRANES / HOISTS

To prevent unauthorised use, the operator should either retain the transmitter in their possession or remove the key from its key lock switch and, for short periods, retain the key in their possession. For longer periods, or when the crane is not in use, the transmitter should be deposited in a designated safe storage place.

When the transmitter is fitted with a belt or harness, the operator should be wearing the harness before switching the transmitter on. This will prevent accidental operation of the crane / hoist whilst fitting. The transmitter should also be switched off before removing the harness.

Ensure that the identification tag on the radio security key matches the identification number on the radio transmitter and the identification number on the crane.

4.4 CONTROL STATION OPERATING INSTRUCTIONS

The control station may be fitted with either push buttons or joysticks. Pendants will be push button operated, remote control stations may be either push button or joystick. In all cases the push button or joystick is spring applied, which, when released, will return to the neutral position, the motion will stop and the relevant brake will automatically apply.

4.4.1 Legend Nomenclature

A legend corresponding to the direction of motion is located next to each of the control devices, (push button or joystick). The legend plates may be in either English (words) or International symbols.

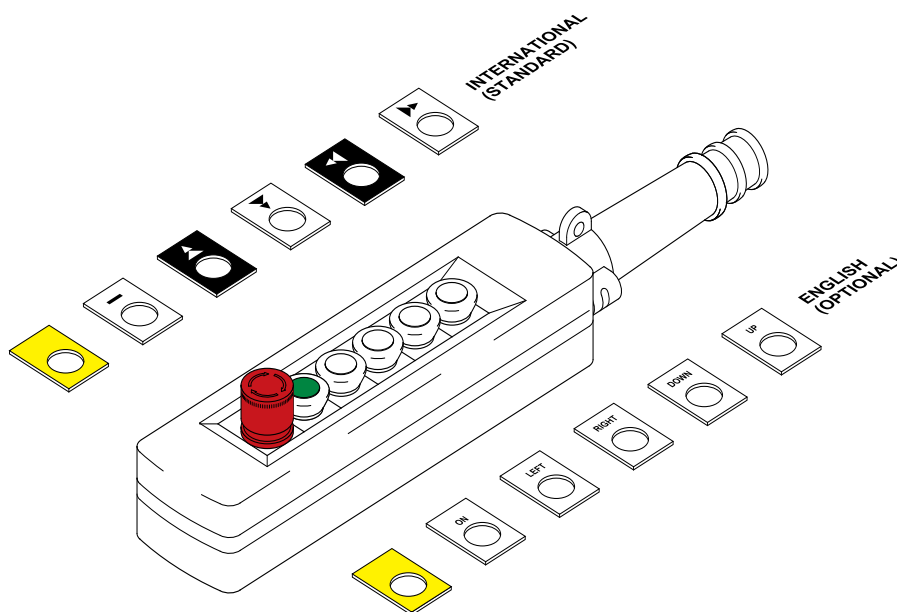


Figure 46 – Control Pendant Legends

To improve safety in operation, there are directional identification legends on the crane that correspond to the legends on the controller.

4.4.2 Switch ON

- Establish power supply to the conductors via the main isolator (this may be located on a wall or supporting column).
- Release the emergency stop button on the controller.
- Momentarily depress the ON pushbutton. This will energise the crane / hoist main contactor and allow subsequent motions to take place.

4.4.3 Push button operation

1. The operating controls (push button) must **never** be mechanically blocked in an ON position.
2. All opposing functions are mechanically interlocked e.g. hoist function cannot be operated at the same time as the lower function.
3. All control pendants are fitted with dual pressure, two stage, pushbuttons to control hoist and crane motions. Remote control stations may be fitted with either push buttons or joysticks. For push button operation depress the required pushbutton and the crane / hoist will move in the corresponding direction.
 - Select the direction of motion required.
 - **Slow Speed.** To operate slow speed of a dual speed motion, press the button in to the first stage.
 - **Fast Speed.** To operate fast speed of a dual speed motion, press the button fully in (i.e. to the second stage).

- **Change Speed from Slow to Fast.** To change from slow speed to fast speed depress the pushbutton fully in to the second stage.
 - **Change Speed from Fast to Slow – travel / traverse motions.** To change from fast speed to slow speed, reduce pressure on push button and allow it to come out to the first stage.
 - *Switchgear controlled* - The motion will first stop and then continue at slow speed.
 - *Inverter controlled* - The motion will decelerate to slow speed.
 - **Change Speed from Fast to Slow - Hoist.** To change from fast speed to slow speed, remove pressure on push button completely and then engage slow speed.
 - **Single Speed.** For cranes / hoists that are only single speed, press the button to either the first or second pressure.
4. To maintain the selected motion the pushbutton must be held depressed. Releasing the push button will stop the motion.
 5. Press the EMERGENCY STOP pushbutton if no further actions are to be taken.

4.4.4 Joystick operation

1. The operating controls (joystick) must **never** be mechanically blocked in an ON position.
2. All opposing functions are mechanically interlocked e.g. hoist function cannot be operated at the same time as the lower function.
3. Control joysticks normally have two stages to control the hoist and crane motions, the first stage being slow speed and the second stage fast speed. However, three or four stage units may be supplied as an option. Move the required joystick forward and the crane / hoist will move in the corresponding direction. The speed of the motion will be proportional to the stage selected.
 - Select the direction of motion required.
 - **Slow Speed.** To operate slow speed of a dual speed motion, move the joystick to the first stage.
 - **Fast Speed.** To operate fast speed of a dual speed motion, move the joystick directly to the second stage.
 - **Change Speed from Slow to Fast.** To change from slow speed to fast speed, move the joystick from the first stage to the second stage.
 - **Change Speed from Fast to Slow – travel / traverse motions.** To change from fast speed to slow speed, return the joystick to the first stage.
 - *Switchgear controlled* - The crane will first stop and then continue at slow speed.
 - *Inverter controlled* - The crane will decelerate to slow speed.
 - **Change Speed from Fast to Slow – Hoist.** To change from fast speed to slow speed, release joystick completely and then engage slow speed.
 - **Single Speed.** For cranes / hoists that are only single speed, move the joystick to any of the joystick stages.
4. To maintain the selected motion the joystick must be held in the selected position. Releasing the joystick will stop the motion.
5. Press the EMERGENCY STOP pushbutton if no further actions are to be taken.

4.4.5 Emergency Stop



Before starting work it is imperative to check the correct operation of the emergency stop button. It is important that the operator is constantly aware and monitoring all crane and hoist movements and ready to activate the emergency stop should any abnormal circumstances arise or situations occur that may endanger the safety of personnel working in the vicinity. Be especially aware of instances where the crane / hoist may fail to stop when the push button / joystick is released or the crane / hoist starts or moves unexpectedly.

1. Depressing the EMERGENCY STOP push button will cause all motions to stop and all brakes to engage.
2. The emergency stop will lock all controls in the off position.
3. If the button is used in an emergency stop situation, ensure that any faults are reported and rectified before re-establishing the power supply.
4. Twist to release the EMERGENCY STOP button. No functions will be operative until the emergency stop is unlatched and the ON pushbutton operated.

4.5 LEAVING THE CRANE / HOIST UNATTENDED



It is essential that a crane / hoist operator is present when a load is suspended from a hoist. When the crane / hoist are left unattended, even for a short period, it is essential that:-

1. The crane / hoist is parked away from any local sources of heat, fumes, condensation or damp conditions.
2. Any slings or lifting tackle have been removed from the hook and the hook is raised to a safe position.
3. The **Remote control** transmitter (where fitted)
 - Should always be kept in the authorised storage place when not required for immediate use.
 - The Emergency Stop and/or transmitter key must always be turned OFF when not in use and the key removed.
 - For short periods, the operator should either retain the transmitter in their possession or remove the key from its key lock switch and retain the key in their possession.
4. The **Pendant control** :-
 - Should be left in a safe location.
 - Must always be turned OFF by pressing the emergency stop button.
5. The **Joystick control ('ride-on' or cab)** :-
 - The cab must be parked at the authorised access / egress point.
 - Must always be turned OFF by pressing the emergency stop and removing the key. For short periods, the operator should either retain the key in their possession or for longer periods, the key should be placed at the authorised storage point.
6. For long periods and for out-of-service conditions, switch the mains isolator to the OFF position.
7. For outdoor cranes / hoists, attach the storm anchors.

4.6 POWER FAILURE

The appointed person should establish a safe operating procedure in the event of a power failure. If the appointed person does not have such a procedure the following is recommended: -

1. Switch off the power supply to the crane / hoist at the main isolator until the electrical supply is restored.
2. If a load is suspended from the hoist, fence off a safe area immediately below / around the load and clear all personnel from that area.
3. A load left suspended in mid-air is considered to be a hazard it should be lowered to the floor using the hand brake release lever.
 - Fence off and clear all personnel from the area under the load.
 - Follow the appropriate Health and Safety regulations and procedures.
 - Obtain the necessary authorisation / permit for access to the hoist brake.
 - Carefully lower load to the floor using the hand release on the hoist brake.



The load must be lowered under strict control only a few inches at a time before re-applying the brake. Serious damage and subsequent failure, of the gearbox may result if the load is allowed to 'run away'.

- When load is firmly supported at ground level, re-apply the brake mechanism.

When the electrical supply is restored, re-establish the crane power supply and carry out the daily pre-use inspections in section 5.4.

5 INSPECTION AND MAINTENANCE INSTRUCTIONS

To ensure that your hoist and / or overhead travelling crane continues to be safe in operation and operates as efficiently as possible, a regular planned inspection and preventative maintenance programme of the equipment is essential. Preventative maintenance, including lubrication, should be undertaken at pre-set intervals, depending on the crane / hoist duty, with the objective of keeping the equipment in a serviceable condition.

5.1 REPORTING OF DEFECTS AND INCIDENTS

The competent person should have a recognised procedure for reporting defects and incidents. The procedure should include the immediate notification of the following:-

1. Any defects found during the daily checks.
2. Defects found at any other time.
3. Incidents or accidents, however slight.
4. Shock loads however they occur.
5. Dangerous occurrences or reportable incidents.

5.2 SPECIAL KNOWLEDGE

Some equipment, such as a frequency inverter, may be fitted to the crane / hoist. This equipment requires special knowledge and should only be maintained by persons who are trained and competent in the use of such equipment.

5.3 KEEPING OF RECORDS

Accurate recording of the crane / hoist performance can provide useful information in regulating maintenance procedures and control of replacement stock. Record the date and reading on the hours-in-service meter each time a component is replaced and the reason for replacement. See section 7.8.

5.4 DAILY PRE-USE INSPECTIONS (at the start of each day/shift)

Part of the crane operator's training should be to make them aware of potential malfunctions requiring adjustments or repairs and the need to bring these to the attention of the competent person for corrective action.

The crane / hoist and associated equipment should undergo daily visual and functional checks to ensure that they operate correctly. These can be executed by the operator from floor level.



In the event of a malfunction of equipment or unusual occurrences, the operator should immediately REPORT the fault(s) to the competent person. The crane should be taken out of service until the fault(s) have been rectified by the appropriately qualified personnel.

1. Ensure that a "Men Working Overhead" or a "Permit to Work" is not in force.
2. Check all round visibility and carefully note both permanent and temporary hazards.
3. Check that the ropes are correctly seated in the rope grooves of drum and sheaves and have not been displaced. The rope should be free of kinks, protrusions, broken wires and other obvious defects.
4. Check the safety latch on the hook for damage.
5. Check that no electrical equipment is exposed to contamination by oil, grease, water or dirt.
6. Check that any audible and visual warning devices operate correctly.
7. Ensure that each function button or joystick, including the emergency stop, on the controller performs its stated operation, (without a load attached) and that each button or joystick returns to the neutral position when released (except emergency stop). Exercise caution whilst making these checks in case of a malfunction.
8. Check that the hoisting and lowering limit switch device operates correctly. To do this, raise or lower the empty hook slowly into the limit position to test its operation.



Extreme care should be taken when performing this test. Should the upper limit fail then there is a possibility of damaging the hoist.

9. Check the operation of any travel and / or traverse limit switches and brakes.



Do not use ANY limit switch as a regular method of stopping the motion. They are intended as emergency devices and are for the safety of personnel.

10. Check the operation of the hoist brake. To do this lift a load clear of the ground and release the UP pushbutton. The hook should remain in position with no run-back.

5.5 HOISTS THAT HAVE BEEN UNUSED FOR AN EXTENDED PERIOD

In cases where the crane / hoist has been out of use for an extended period of time the user should ensure that the competent person specifies a special programme of pre-use checks. The extent of the checks depends on the length of time the crane has been out of service and the location of the crane during that period.

As a minimum the pre-use checks should include the daily pre-start inspections mentioned above plus the following:-

1. Check all ropes for signs of corrosion / degradation and damage and that there is still adequate rope lubricant. Check the entire length of the rope.
2. Check that the RCL (rated capacity limiter) is functioning correctly.
3. Check for corrosion on the structure and mechanisms.
4. Check for damage and missing components or legends.
5. Test every motion for several minutes without load ensuring all brakes work satisfactorily.

The extended period of time should be determined by the competent person and will depend on the conditions and location. As a minimum, we would recommend that operations 1 to 4 above are carried out at least once every 6 months, and operation 5 is carried out monthly.

5.6 INSPECTION AND MAINTENANCE INTERVALS


In addition to the pre-use inspections listed above, a regular thorough inspection and maintenance programme is important. The following recommended intervals may vary depending on any other statutory requirements, environmental conditions or results of previous examinations. The competent person may deem it necessary to reduce these recommended periods between examinations.

INSPECTION AND MAINTENANCE INSTRUCTION	Duty	INTERVAL				
		A	B	C	D	E
WIRE ROPE The rope is regarded as an expendable item requiring replacement when examination shows its strength to have diminished to the point where its further use would be unwise. The entire length of rope should be inspected with particular attention being paid to areas where deterioration will be at its highest, for example where the rope enters or leaves sheaves and at rope anchor points. Assessment of Wire Rope Condition The continued safe use of wire ropes depends on assessment of the condition. Instructions on wire rope examination and discard can be found in BS ISO 4309:2004 and BS 7121: Part 2:2003.	M3			*		
	M4			*		
	M5			*		
	M6		*			
	M7		*			
	M8		*			
WIRE ROPE ANCHOR Rope terminations are as important as the rope itself. Check for mechanical damage to clevis pins, elongation of holes and damage to rope thimbles. Inspect wedge and socket anchorages for rope damage as it emerges from the socket, condition of the socket and security and tightness of the wedge fitting. Check the security of the rope anchors on the barrel. Replace any damaged parts.	M3			*		
	M4			*		
	M5			*		
	M6		*			
	M7		*			
	M8		*			
ROPE GUIDE Examine for signs of wear or damage particularly around the rope exit/entry point. Check security of guide bar and other fixings. Ensure that the guide bush travels freely and operates the upper and lower hoist limit switches correctly.	M3				*	
	M4				*	
	M5				*	
	M6			*		
	M7			*		
	M8			*		
BOTTOM BLOCK Check for cracks, cold deformation, wear and freedom of rotation of the sheaves and hook. Ensure hook safety catch operates correctly. Check security of the hook nut, and the securing grub screw. Replace any covers that may be damaged. Ensure the information labels are still legible (See section 5.12).	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7			*		
	M8			*		
HOIST AND TRAVEL BRAKE Carry out a functional (load) check of each of the motion brakes to ascertain that they operate efficiently. Check the output from the brake rectifier. Clean the brake, check the air gap and adjust and renew worn parts where necessary. In particular check wear on the rotor (disc), and the condition of the spline on both rotor and hub. Also check the condition of the hub key and keyway.	M3				*	
	M4				*	
	M5				*	
	M6			*		
	M7			*		
	M8			*		
HOIST AND TRAVEL GEARBOX Inspect around gearbox casing, filler and drain plugs and around oil seals for signs of lubrication seepage. Clean ventilation plug. Check security of fixings and renew seals if necessary. Apply gasket glue to hoist gearbox seal. When gearbox oil is drained during oil replacement, remove the gearbox inspection cover and visually check the gear teeth for wear. Check keys and keyways for security.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	

Inspection and Maintenance Intervals: - A = Weekly, B = Monthly, C = 6 Monthly, D = Annually, E = Every 5 Years

INSPECTION and MAINTENANCE INSTRUCTION	Duty	INTERVAL				
		A	B	C	D	E
HOIST MOTOR AND COUPLING Clean motor fins and fan cowling. Check security of motor and coupling fixings. Check coupling and coupling element (see section 5.13). There is an inspection aperture for the coupling located in the underside of the gearbox casing.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
BARREL AND ROPE SHEAVES Examine the rope groove for wear or damage due to rope indentations. Rope sheaves must be replaced if the groove profile is not within tolerance. See section 5.9.1 Check that all sheaves are free running and that the sheave saddle is free to tilt.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
TRAVEL / TRAVERSE DRIVE COMPONENTS Check the condition of the wheels for signs of wear on the tread and flanges. Inspect the condition of any geared pinions and wheels for damage and wear. Ensure correct engagement of gear teeth. Low Headroom Hoist - Check the condition of the guide rollers and that they are set correctly. Adjust the reaction roller if required (see 3.4.1). Double Girder Crab 2&4 fall - Check security of the wheel locking rings.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
END STOPS AND DRIVE TORQUE ARM BUFFERS (where fitted) Check the condition of the end stops and rubber buffers. Replace if damaged.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
HOIST STRUCTURE Visually inspect overall structure for damage and unusual rubbing marks. Check rail for wear or localised damage. Check security of a reasonable quantity of the bolts in particular those that are not pen marked or where the pen mark has been disturbed. Check security of the grub screws on the hoist low head frame trolley legs see Figure 17. Visually examine welds for signs of cracks. Clean off any corrosion and apply an approved protective treatment to the surface.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
PENDANT AND / OR REMOTE CONTROLLER Check that the controller casing, pushbuttons / joysticks and their rubber seals are undamaged. In particular check the operation of the Emergency Stop button. Check that the Pendant strainer wire fixings are secure and the cable entry seal is undamaged. Check that all legends on the controller and hoist are clear and legible. For radio controlled units, check for any corrosion caused by faulty batteries.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7			*		
	M8			*		
ELECTRICAL CABLES Check for damage, loose connections and loose / damaged cable entry points. Check cable insulation for signs of brittleness (does not crack when flexed) or overheating (discolouration). Replace where necessary. Check the condition of the strainer wire on Pendant cable and the wire clamp points.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	

Inspection and Maintenance Intervals: - A = Weekly, B = Monthly, C = 6 Monthly, D = Annually, E = Every 5 Years

INSPECTION and MAINTENANCE INSTRUCTION	Duty	INTERVAL				
		A	B	C	D	E
CURRENT COLLECTORS / BUSBAR Inspect collector arms and carbon shoes for signs of damage or wear. Replace where necessary. Check joints and insulation for signs of arcing. Rectify as necessary.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
DISCONNECT SWITCH AND MAIN ISOLATOR Check for damage and satisfactory operation.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
ELECTRICAL PANELS  Inspect relays, contactors and wiring for security and physical damage. Renew if signs of damage or overheating are apparent. Ensure panel door closes securely. Lightly lubricate panel hinges. Clean /replace enclosure filters where fitted. Check that isolating switch operates correctly. Remove any dirt or debris from the panel.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7			*		
	M8			*		
EARTH CONTINUITY AND INSULATION RESISTANCE Carry out earth continuity and insulation resistance tests on the installation.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
HOIST AND LOWER LIMIT SWITCHES Inspect for wear or damage. Check for correct operating position. Check that the limit bush travels satisfactorily along the limit bush bar (see section 3.7) Check the operation of the second upper limit (where fitted) (see section 3.9)	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7			*		
	M8			*		
TRAVEL / TRAVERSE LIMIT SWITCHES Inspect for wear or damage and security of fixings. Check for correct operating position.	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7			*		
	M8			*		
RATED CAPACITY LIMITER Physically check the components in the RCL for wear or damage. Check security of cables, connections and mounting. Test the operation of RCL by applying the necessary calibrated load (see section 3.12).	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	
SERVICE LIFE Establish the remaining service life of the hoist (see section 7.2).	M3				*	
	M4				*	
	M5				*	
	M6				*	
	M7				*	
	M8				*	

Inspection and Maintenance Intervals: - A = Weekly, B = Monthly, C = 6 Monthly, D = Annually, E = Every 5 Years

5.7 LUBRICATION



Always follow the safety instructions provided by the lubricant manufacturer. Some general precautions are as follows:-

- Always be aware of the risk of fire. Keep the lubricant away from heat and open fires. Do not smoke. Have the relevant fire extinguish media to hand.
- Keep any containers closed and always store in the manner recommended by the manufacturer. Soak up any spillage immediately.
- Avoid prolonged and frequent contact with skin, wear gloves or use oil repellent barrier creams. Keep away from food and drink. Do not inhale any fumes. Do not swallow. Wear eye protection. Always wash hands thoroughly after use. Obtain first aid treatment for any injury, however slight.
- Dispose of the lubricant and its containers in the recommended manner. Do not allow the lubricant to contaminate water supplies.

General

- All gearboxes must be at standstill when oil filling.
- Use only fresh oils / greases
- Do not mix oils and greases of different types and manufacturers.
- Re-fit all plugs and covers etc. and check for leaks afterwards.
- Remove any excess lubricant.
- Note: too much grease can cause a bearing to over heat and reduce the life of the bearing.



= Oil Ventilation / filler plug

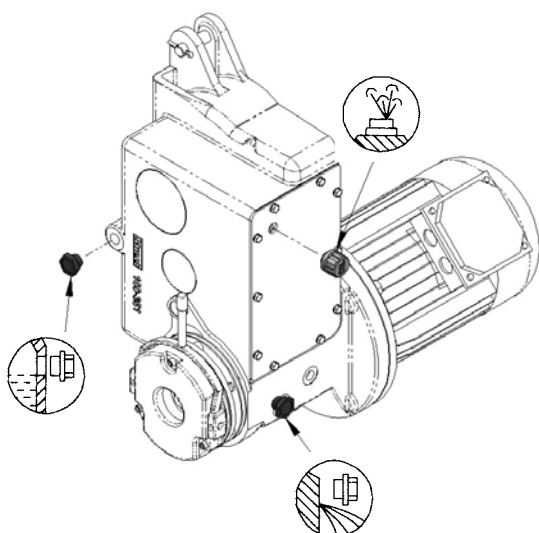


= Oil level plug

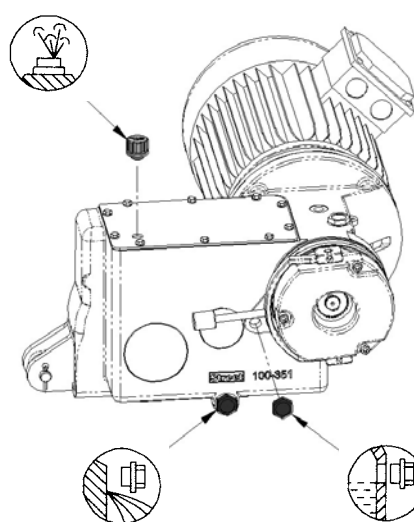


= Oil drain plug

THE ABOVE SYMBOLS APPLY TO Figure 47 & Figure 48

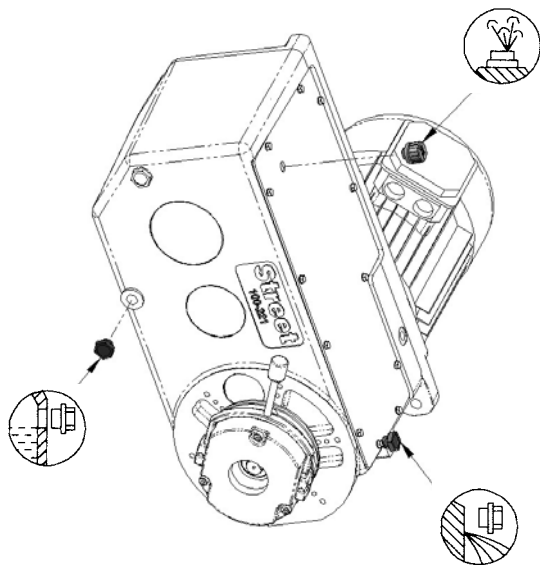


ZX6 Hoists with vertical position gearbox

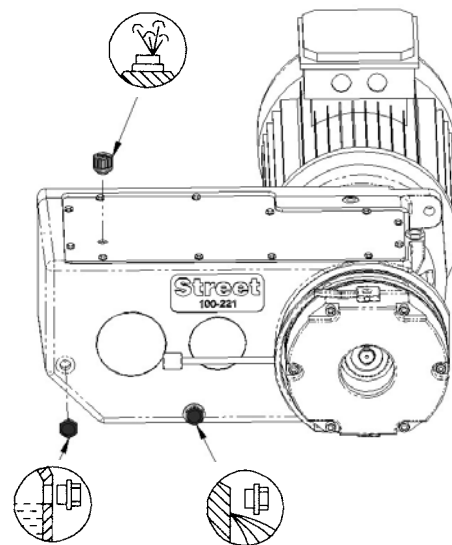


ZX6 Hoists with horizontal position gearbox

Figure 47 – ZX6 Gearbox oil fill & level plug locations



ZX8 Hoists with angled position gearbox



ZX8 Hoists with horizontal position gearbox

Figure 48 – ZX8 Gearbox oil fill & level plug locations

5.7.1 Lubrication Schedule

Intervals of lubrication are given for general guidance. Special applications and/or experience may show alternative intervals to be more appropriate.

ITEM and LUBRICATION INSTRUCTION	Duty	INTERVAL					LUBRICANT										
		A	B	C	D	E											
ZX HOIST GEARBOX First oil change is due at 500 hours of operation. Thereafter replace the oil every 3000 operating hours or every 5 years. Fill to the level plug. See Figure 47 & Figure 48 <table><tr><td>Gearbox Size</td><td>Quantity (litres)</td></tr><tr><td>ZX6 low head</td><td>2.5</td></tr><tr><td>ZX6 foot mount/crab</td><td>2.5</td></tr><tr><td>ZX8 low head</td><td>9.20</td></tr><tr><td>ZX8 foot mount/crab</td><td>4.91</td></tr></table>	Gearbox Size	Quantity (litres)	ZX6 low head	2.5	ZX6 foot mount/crab	2.5	ZX8 low head	9.20	ZX8 foot mount/crab	4.91	M3					*	ISO VG460 mineral oil for ambient operating temperatures of -10 to +60°C
Gearbox Size	Quantity (litres)																
ZX6 low head	2.5																
ZX6 foot mount/crab	2.5																
ZX8 low head	9.20																
ZX8 foot mount/crab	4.91																
	M4					*											
	M5					*											
	M6					*											
	M7					*											
	M8					*											
HOOK BLOCK THRUST BEARING Grease nipple for the thrust bearing. (Note: The ZX hook block sheave bearings are ‘sealed for life’ and do not require any further lubrication throughout the design lifetime of the hoist).	M3					*	NLGI grade 2 grease with EP additives and oxidation inhibitors. Viscosity : 1000 cSt at 40°C 58 cSt at 100°C Drop point : >180°C Operating temperature range : -10 to +120°C										
	M4					*											
	M5					*											
	M6			*													
	M7			*													
	M8			*													
HOIST ROPE Clean the rope surface before applying new lubricant. This is particularly important in environments containing abrasive particles. For maximum effect the lubricant is best applied to the rope where it ‘opens up’ as it travels over a sheave or winds on the barrel. Intervals of lubrication are given for general guidance. Special applications and/or experience may show alternative intervals to be more appropriate. As a general rule the dressing should be re-applied at regular intervals and before the rope shows signs of corrosion or dryness.	M3					*	“Street-Drako Compound” or similar oil based rope lubricant with additives for good penetration, adherence and corrosion protection. Effective temperature range -20 to +60°C										
	M4					*											
	M5			*													
	M6			*													
	M7		*														
	M8		*														
ROPE GUIDE Smear the inner groove of the rope guide with the rope lubricant each time a new hoist rope is fitted.	M3						“Street - Drako Compound” or similar oil based rope lubricant with additives for good penetration, adherence and corrosion protection. Effective temperature range -20 to +60°C.										
	M4																
	M5																
	M6																
	M7																
	M8																

Inspection and Maintenance Intervals: - A = Weekly, B = Monthly, C = 6 Monthly, D = Annually, E = Every 5 Years

ITEM and LUBRICATION INSTRUCTION	Duty	INTERVAL					LUBRICANT
		A	B	C	D	E	
SHEAVE SADDLE PIVOT POINTS AND HOIST LIMIT BUSH GUIDE BAR Spray into the end pivot points of the sheave saddle.	M3				*		Multi-purpose liquid aerosol lubricant/penetrant. (WD40).
	M4				*		
	M5				*		
	M6				*		
	M7				*		
	M8				*		
TRAVERSE DRIVE GEARBOX First oil change is due at 500 hours of operation. Thereafter replace the oil every 3000 operating hours or every 5 years. Fill to the level plug. See table below for lubricant quantity.	M3					*	ISO VG220 mineral oil for ambient operating temperatures of –10 to +40°C. ISO VG220 synthetic oil for ambient operating temperatures of –25 to +80°C.
	M4					*	
	M5					*	
	M6					*	
	M7					*	
	M8					*	

Traverse Drive Gearbox Ref. (see nameplate)	Lubricant Qty (litres)
SK01	0.25
SK172	0.35
SK250	1.4
SK373	0.55
SK2282	1.65

Inspection and Maintenance Intervals: - A = Weekly, B = Monthly, C = 6 Monthly, D = Annually, E = Every 5 Years

5.8 INSPECTION AND MAINTENANCE – WIRE ROPE



Failure of a wire rope may cause death or serious injury. A wire rope will fail if worn out, shock loaded, overloaded, miss-used, damaged, abused or improperly maintained. Information on care, maintenance, installation, examination and discard of wire ropes can be found in BS ISO 4309:2004 and / or BS 7121-1:2006. The competent person should hold a copy of these documents.



Do not replace a rope or any rope fittings with anything other than to the original specification. This applies equally to the rope length as well as its construction.

The Rope Data Plate is located in the vicinity of the Hoist Nameplate (see 2.1) and contains all the required rope replacement information.

5.8.1 Offloading and Storage

Care of a new rope begins immediately upon receipt. Use wide textile webbing slings or lift on the rope drum to avoid direct contact with the rope. Inspect the rope upon receipt and ensure that the details on the certificate and other documents are correct. Clearly label the rope and ensure that it is traceable to its certificate and / or other documents.

Steel wire ropes should be stored in a clean, cool, dry place, indoors and away from corrosive and damp atmospheres. Do not let the rope rest directly on the floor allow air to circulate around the reel. Cover with a breathable cover that prevents condensation. Inspect the rope periodically and if necessary, apply a suitable dressing that is compatible with the manufacturer's lubricant see section 5.7.1.

When removing from storage, check that no accidental damage has occurred and that there are no signs of corrosion. Ensure the rope certificate is available and retain this in a safe place, it will be required when periodic examinations are carried out.

5.8.2 Replacing the Wire Rope



Removal and replacing the wire rope is most effectively carried out with the power to the hoist unit switched ON so all work must be carried out with extreme care. Suitable safety precautions should be made to ensure that other motions are not accidentally activated, i.e. isolate any travel motions. It may be necessary to adjust the lower limit to allow the block to lower to ground level. NOTE: The upper and lower limit will require resetting after completion of new rope installation.

5.8.2.1 Removing the Rope and Rope Guide

- Lower the bottom block down to the lowest possible level and allow the block to rest on a solid support (floor or platform).
- Remove the rope guide plate from the side of the rope guide and release the four screws in the rope guide joint. Take care to ensure the lower half of the guide does not fall.
- Release the two screws joining the two halves of the inner band and remove the inner band. Retain all screws, washers, spacers and springs.
- Remove the pin holding the wedge and socket to the hoist frame, noting the orientation of the pin in relation to the frame.
- Remove the wire rope grips from the end of the rope and release the end of the rope from the socket.
- Run the remaining rope off the barrel and through the sheaves keeping tension on the rope as it is being run off.
- Release the rope anchors on the barrel.

5.8.2.2 Fitting New Wire Rope



Fitting the wire rope is most effectively carried out with the power to the hoist unit switched ON so all work must be carried out with extreme care. Suitable safety precautions should be made to ensure that other motions are not accidentally activated, i.e. isolate any travel motions.

Fitting of a new rope must be carried out by a competent person. Before installation check that all sheaves are free running and rope grooves in sheaves and drums are in good condition. Groove profiles should be circular, smooth and free from ridges (see 5.9.1).

Check that the correct rope has been ordered / taken out of storage. Examine the rope visually to ensure that there is no damage or corrosion on the rope. Prepare a safe and clean working area to avoid contaminating the rope with any dirt or moisture.

To prevent the possibility of kinking or imparting any twist into the rope, it should be uncoiled without slack and in a straight line. Short lengths of rope can be uncoiled along the ground (see Figure 49). If the coil is too large to handle, place on a turntable and pull the outside end of the rope allowing the coil to rotate.

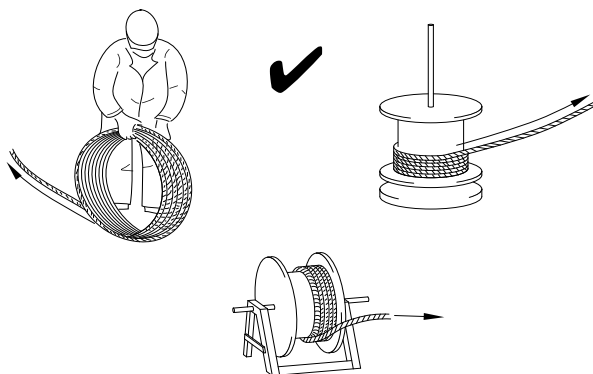


Figure 49 – Correct Uncoiling of Wire Ropes

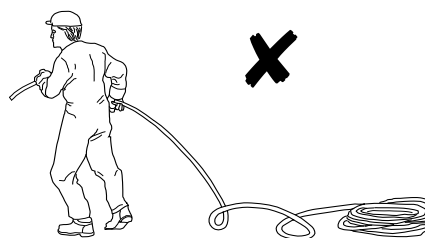


Figure 50 - Incorrect Uncoiling of Wire Ropes

Do not pull the rope away from a stationary coil. This will induce twist and possibly kinks in the rope that will seriously impair its performance and result in premature failure (see Figure 50).

If it is not possible to uncoil the rope prior to fitting, the rope may be transferred directly from the reel to the hoist barrel. Place the reel on a suitable stand and ensure that the reel can rotate freely. When winding from reel to barrel the rope should be bent in the same direction. Wind from top of reel to top of barrel or from bottom of reel to bottom of barrel (see Figure 51).

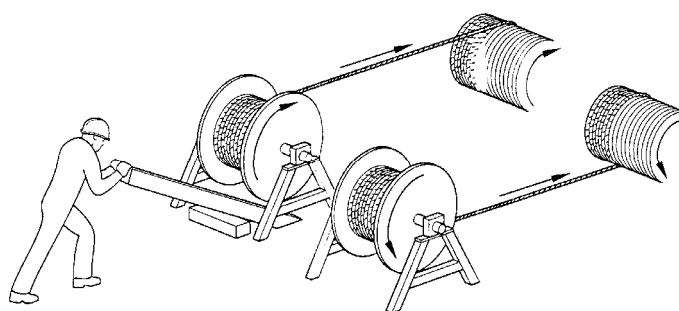


Figure 51 – Winding of new wire ropes

- Anchor one end of the rope to the hoist barrel using the rope clamps and tighten each clamp bolt to 13Nm. The clamp should engage on the section of rope of full nominal diameter and not on the fused and tapered section at the end. There should be a spring washer fitted under the bolt head.
- Transfer the new rope onto the hoist barrel. Ensure that sufficient tension is applied to the reel to prevent loops from forming. Tension can be applied with suitably gloved hands or with a brake on the reel (see Figure 51). During installation, also ensure that the fleet angle 'θ' does not exceed $1\frac{1}{2}^\circ$, (see Figure 52).

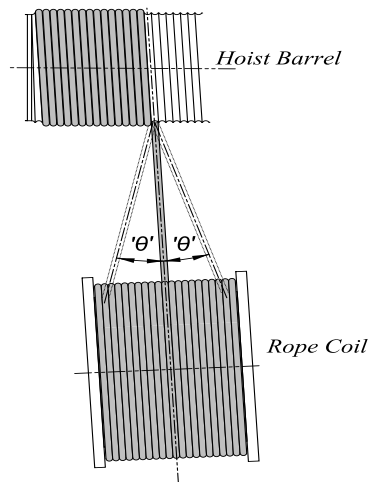


Figure 52 - Fleet angle

- Wind approximately 15 scrolls of rope onto the barrel and then fit the rope guide as per section 5.8.3
 - Wind the remainder of the rope onto the barrel leaving approximately 4 scrolls uncovered again keeping tension in the rope during the transfer operation.
 - Pass the free end of the rope through the sheave system as shown in Figure 53 to Figure 57. Ensure there are no obstructions which may cause twisting of the rope and monitor the rope carefully as it is being pulled through the sheave system. Unwind rope from the barrel as necessary but ensure tension is maintained on the rope as it leaves the barrel.
 - Fit the free end of the rope into the wedge and socket (see section 5.8.4).
 - Locate the wedge and socket assembly into the hoist frame and secure with the pin and split pin.
- NOTE: Ensure the pin is fitted with the split pin nearest the runway beam.

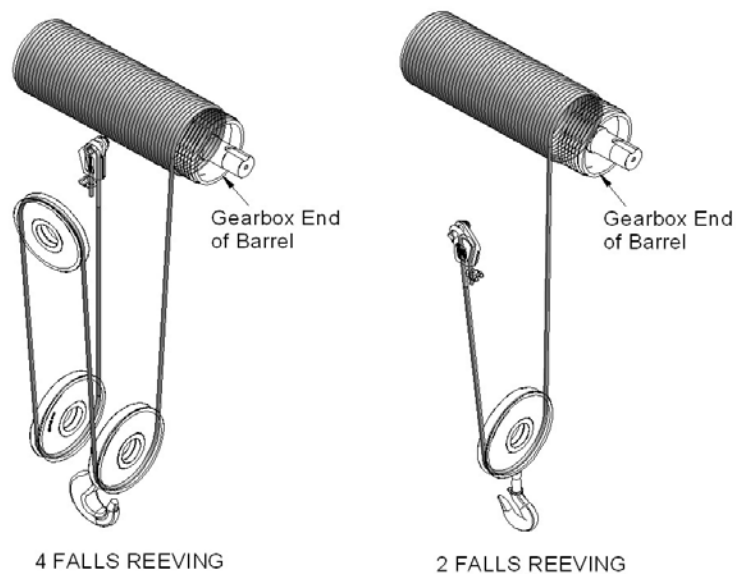


Figure 53 – Reeving Diagrams for ZX6 & ZX8 2&4 Fall Low Head & Crab Hoists
 Low Head Hoists: ZX062-LHR / ZX064-LHR / ZX082-LHR / ZX084-LHR
 Crab Hoists: ZX062-CRB/ZX064-CRB / ZX082-CRB/ZX082-CRE / ZX084-CRB/ZX084-CRE

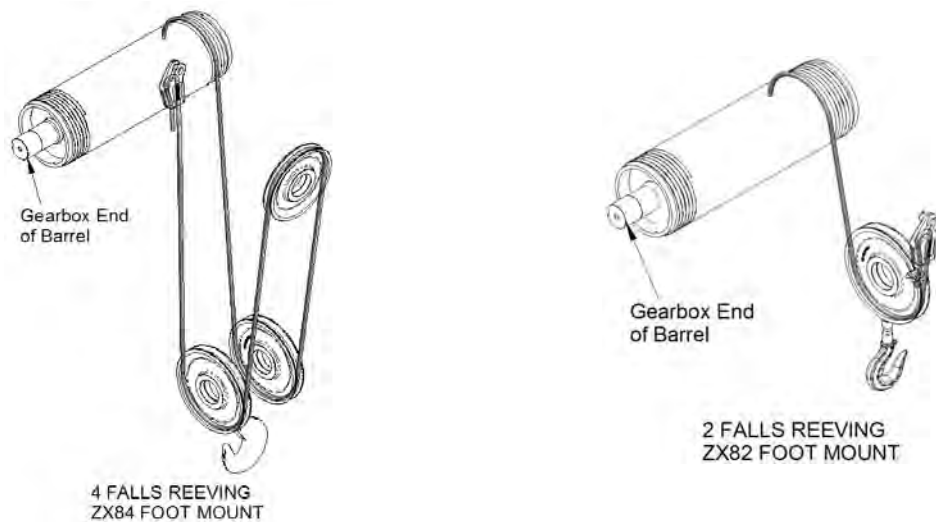


Figure 54 – Reaving Diagrams for Foot Mount Hoists: ZX082-FTM / ZX084-FTM



Figure 55 – Reaving Diagrams for Foot Mount Hoists: ZX062-FTM / ZX064-FTM

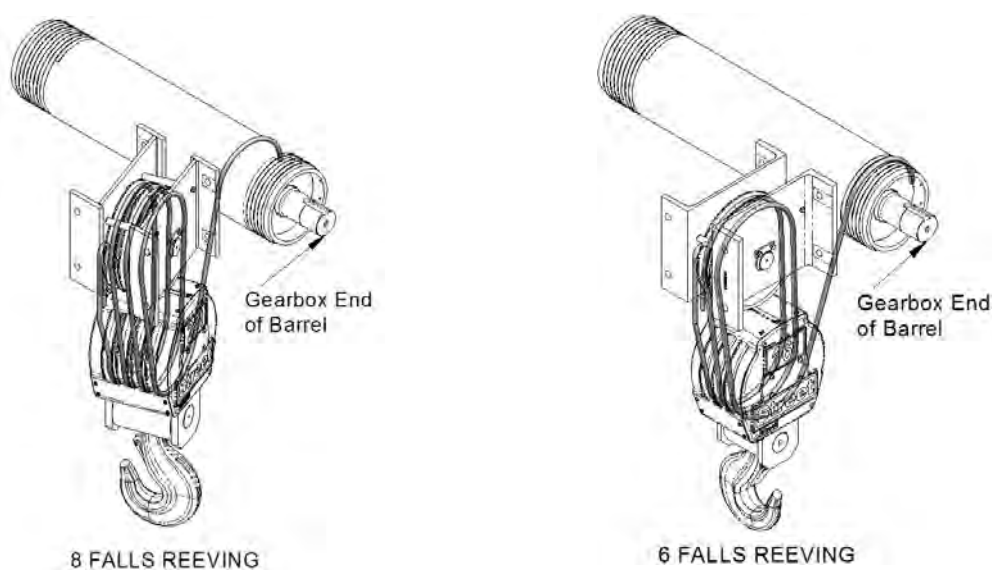


Figure 56 – Reaving Diagrams for ZX8 6&8 Fall Low Head & Crab Hoists :-

Low Head Hoists: ZX086-LHC / ZX088-LHC

Crab Hoists: ZX086-CRB / ZX086-CRE / ZX088-CRB / ZX088-CRE

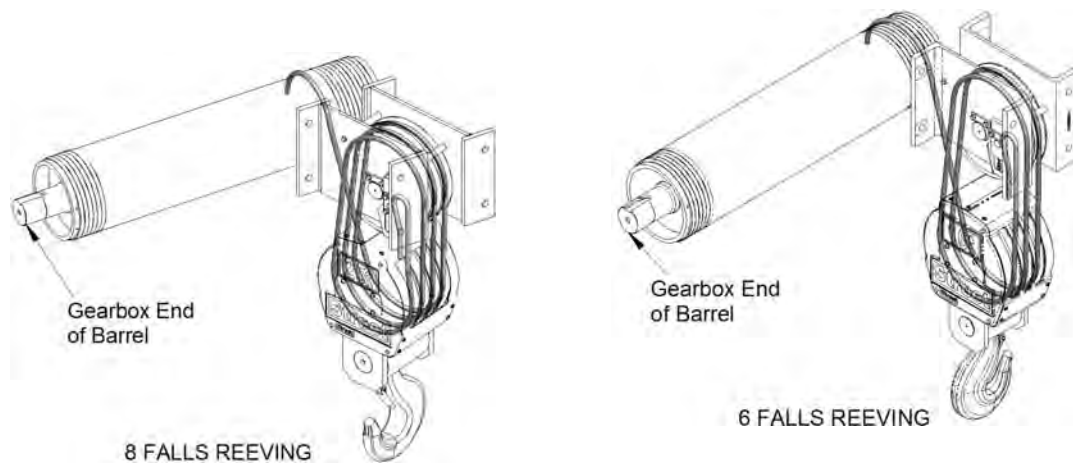


Figure 57 – Reeving Diagrams for Foot Mount Hoists: ZX086-FTM / ZX088-FTM

5.8.2.3 Running In

After installation of a new rope the hoist should be run several times under light load (approx 10% of SWL) and at slow speed to allow the wire and strands of the rope to align themselves and bed down. This can greatly increase the rope life. After the running in period, check that the wedge and rope have seated correctly in the socket.

5.8.2.4 Removing twist

If any twist is imparted in the rope during installation the bottom block will rotate, particularly with no load attached. If twisting does occur, remove the rope from the hoist and untwist by letting the rope hang freely or laying the rope out on the floor.



Remove any twist before the hoist is subject to any further load. The rope may otherwise be permanently damaged.

5.8.3 Fitting the Rope Guide

- Fit the top and bottom halves of the rope guide inner band over the rope ensuring correct orientation. NOTE: the reduced diameter of the guide faces away from the gearbox end of the hoist, **EXCEPT** for ZX8 foot mount hoists where the reduced diameter of the guide faces **TOWARDS** the gearbox end of the hoist

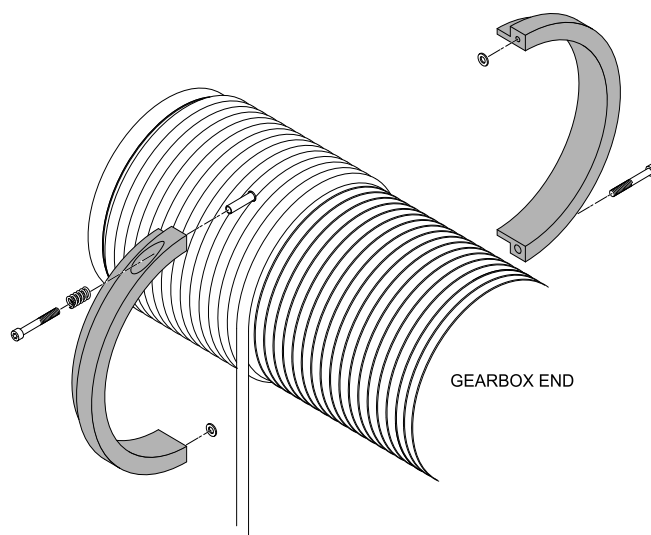


Figure 58 –Fitting Top and Bottom Halves of Rope Guide Inner Band

- Fit the socket head capscrew and spring into the deep counterbore and place the sleeve and washer over the screw as shown in
- Figure 59 . Loosely tighten the socket head capscrew.

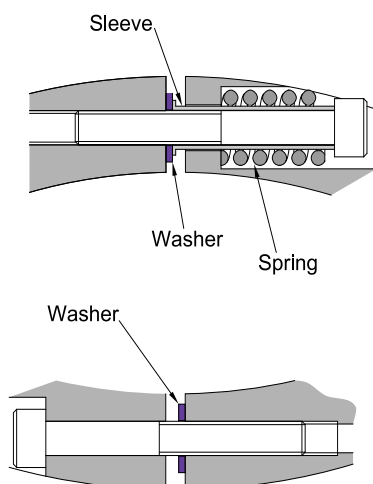


Figure 59 – Rope Guide Inner Band Spring and Sleeve Arrangement

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- Fit the socket head capscrew to the non-spring side inserting the plastic washer between the two halves of the rope band. Tighten to 1.5Nm.
- Position the inner band assembly over the rope such that 2 free rope coils remain unclamped and tighten the capscrew on the spring side 1.5Nm (see Figure 60).



Ensure all slack rope is removed prior to tightening inner band fixings. It should not be possible to slide or rotate the inner band over the rope without using excessive force. If the inner band is moved easily, remove one or both plastic washers from the inner band joint.

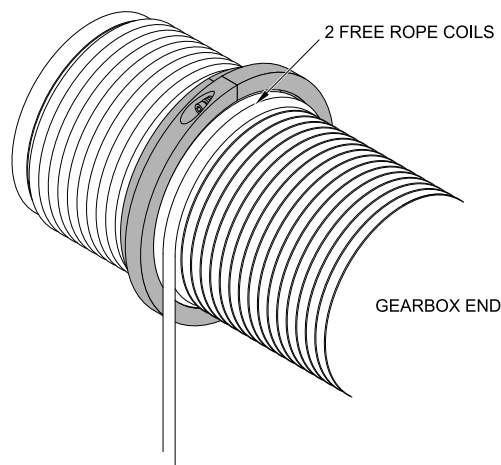


Figure 60 – Rope Guide Inner Band Fitted

- Lightly lubricate the location groove on both halves of the outer band (see section 5.7.1).
- Fit the bottom half of the outer band (tapped joint holes) over the inner band and rotate until it is on the underside of the barrel ensuring that the slot collects the rope which leaves the barrel (see Figure 61).

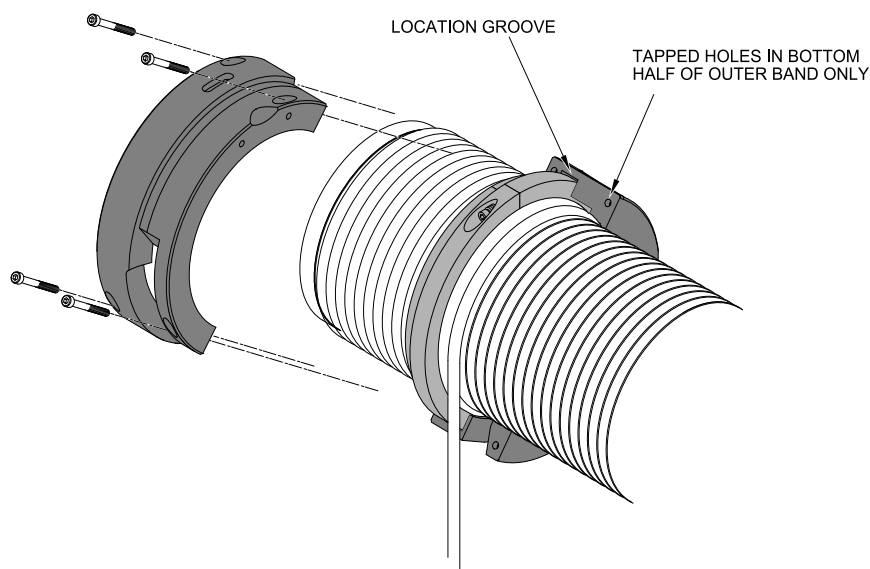


Figure 61 – Fitting Rope Guide Outer Band

- Fit the top half of the rope guide over the inner band. Insert the four socket head capscrews and screw two halves together. Tighten to 1.5Nm.
- FOR STANDARD ENVIRONMENT ROPE GUIDES :- Fit the rope guide plate into the slot on the rope guide bush and attach the guide plate to the side of the rope guide. Tighten the screws to 8Nm (see Figure 62).
- FOR STANDARD ENVIRONMENT ROPE GUIDES type Rv-1:- Fit the rope guide retainer to the face of the rope guide. Tighten the screws to 8Nm (see Figure 63).

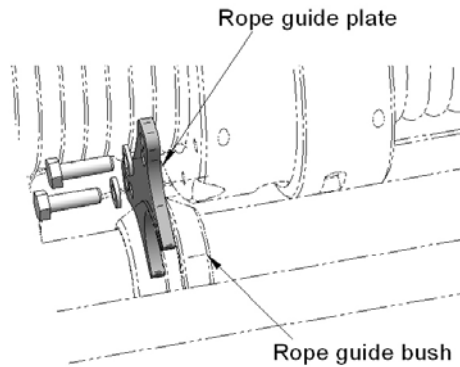


Figure 62 – Fitting Rope Guide Plate – Standard Environments

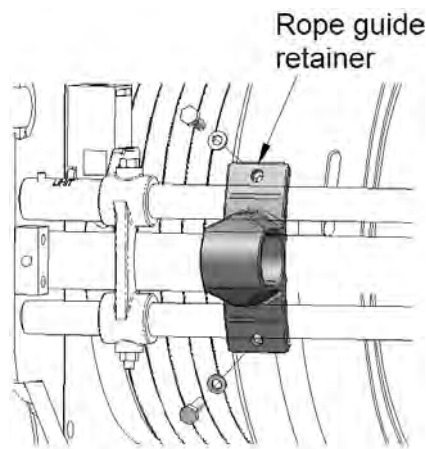


Figure 63 – Fitting Rope Guide Retainer – Standard Environments Rv-1 (see hoist nameplate for revision)

- FOR GALVANISING/AGGRESSIVE ENVIRONMENT ROPE GUIDES :- Place 2 off M5 cap screws in the counterbores of the rope guide follower and slide follower along guide rail aligning the screws with the tappings in the rope guide. Tighten the M5 cap screws to 3Nm
- Fit the rope guide plate to the rope guide and the rope guide follower using 3 off M6 setscrews. Tighten the M6 setscrews to 8Nm. (see Figure 64).

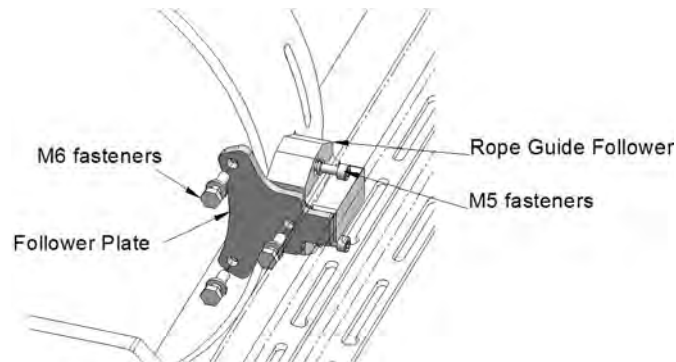


Figure 64 – Fitting Rope Guide Plate – Galvanising/Aggressive Environments

- Set the upper and lower limit switches (see section 3).

5.8.4 Wedge and Socket Termination



It is essential to use only a wedge and socket of the correct dimensions and strength for the particular rope. Do not mix components or replace with anything other than to the original Street Crane specification.

The rope should be fitted so that the loaded part of the rope is not kinked where it leaves the socket, but pulls directly in line with the point of attachment of the socket, see Figure 65.

When terminating a rope with a wedge and socket, ensure that the rope tail cannot withdraw through the socket by securing a clamp to the tail. Fit a wire rope grip and short length of bar of the same diameter as the rope as shown. The wire rope grip should be attached to a section of rope of full nominal diameter and not encroach on the fused and tapered section. Tighten the nut on the wire rope grip to 24Nm.

After the wedge and socket termination has been made, make sure the wedge and rope is properly seated in the socket. Upon fitting to the hoist fit a new split pin to retain the anchor pin, see below for the specification.

Split pin- Diameter 3/16" X 1 1/2" long or Diameter 5mm x 40mm long zinc plated to ISO 1234, DIN-94, BS-1574.



It is essential that the split pin is renewed. Do not re-use the old pin.

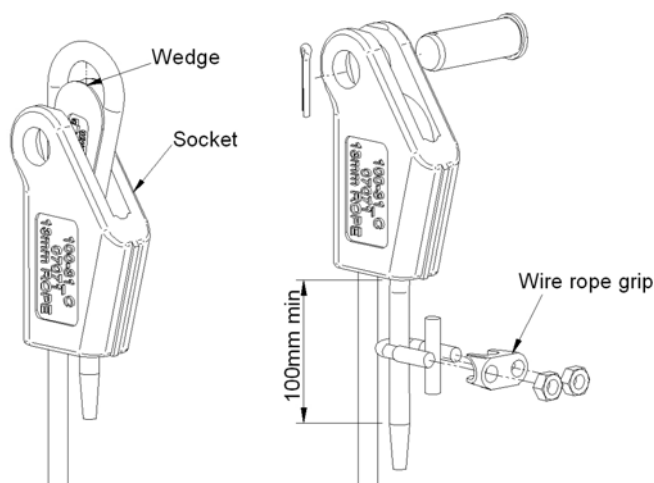


Figure 65 – Wedge and Socket Termination

5.9 INSPECTION AND MAINTENANCE- HOIST / CRAB FRAME

Periodically inspect the frame in accordance with recommended intervals given in the inspection and maintenance programme (see 5.6). Check the security of a reasonable quantity of the bolts in the hoist frame in particular those that are not pen marked or where the pen mark has been disturbed.

5.9.1 Sheaves

Check all rope sheaves for wear and for free running. The sheaves should rotate freely when rotated without load.

The sheave must be replaced if the wear on the groove side wall or the groove base is significant. Measure the thickness of the side wall and groove depth as shown and replace the sheave if the wear exceeds the values given.

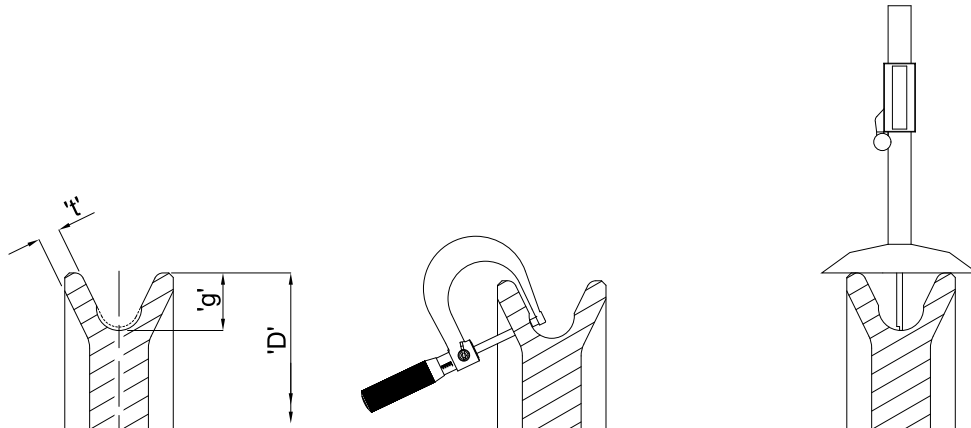


Figure 66 - Sheave characteristics

Hoist Type	Sheave Casting Identification	Diameter 'D' (mm)	't' (mm)		'g' (mm)	
			new sheave	minimum	new sheave	minimum
ZX6	100-181	192	5	4.5	12	13.2
ZX8	100-271	289	10.6	9.5	19.5	21.5
ZX8	100-361	319	10.6	9.5	19.5	21.5

The sheave must also be replaced if the radius in the bottom of the groove has become too large. The rope may become flattened and distorted under load, thus resulting in premature failure. Minor impressions of the rope profile in the bottom of the groove are acceptable.

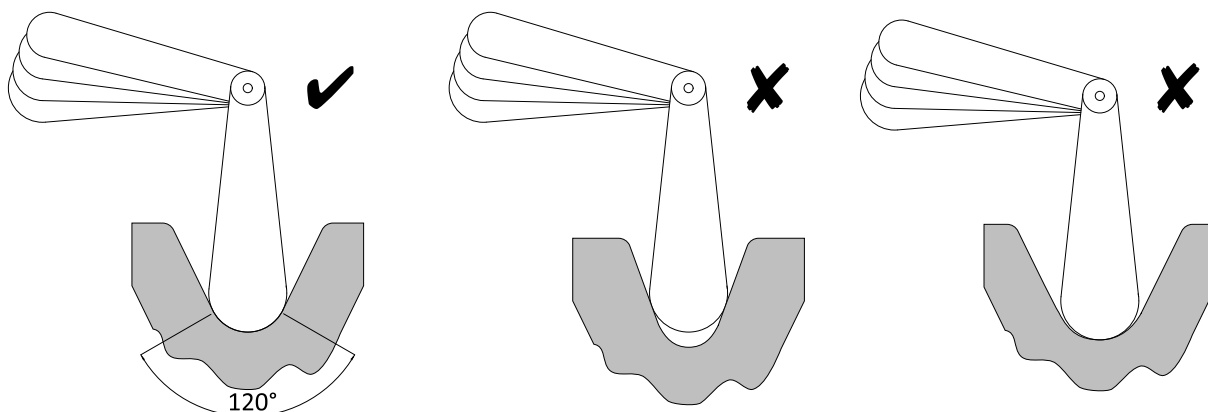


Figure 67 - Sheave and barrel groove inspection

Nominal Rope Diameter "d" (mm)	Minimum Groove Diameter (mm)	Maximum Groove Diameter (mm)
8.0 (ZX6)	8.4	9.0
13.0 (ZX8)	13.6	14.6

5.9.2 Single Girder Wheels

Visually inspect the wheels, the guide rollers and the reaction roller for wear. When the diameter has reduced to the value given in the table below, replace the wheels / roller.

Wheel		Low Head Hoist Reaction Roller		Guide Roller	
Original diameter (mm)	Replacement diameter (mm)	Original diameter (mm)	Replacement diameter (mm)	Original diameter (mm)	Replacement diameter (mm)
100	< 96	75	< 72	40	< 37
160	< 152				

If a trolley wheel or roller needs replacing, consult Street Crane.

5.9.3 Double Girder Crab Wheels (Double Flange)

Visually inspect the wheels for wear. When the diameter has reduced to the value given in the table below, replace the wheels.

Wheel		Flange Thickness	
Original diameter (mm)	Replacement diameter (mm)	Original thickness (mm)	Replacement thickness (mm)
125	< 119	10	< 5
160	< 152	10	< 5
200	< 190	18	< 9

If a trolley wheel needs replacing, consult Street Crane.

5.10 INSPECTION AND MAINTENANCE – HOIST BRAKE

The main hoist brake is a spring applied disc brake. The brake is electro-magnetically released by the application of DC to the brake coil in the stator. The size of the brake fitted to your hoist is indicated within the hoist model code see 7.3.

When inspecting the brake, particular attention should be made to checking the air gap and the condition of the rotor (brake disc) spline.

5.10.1 Hoist Brake Components

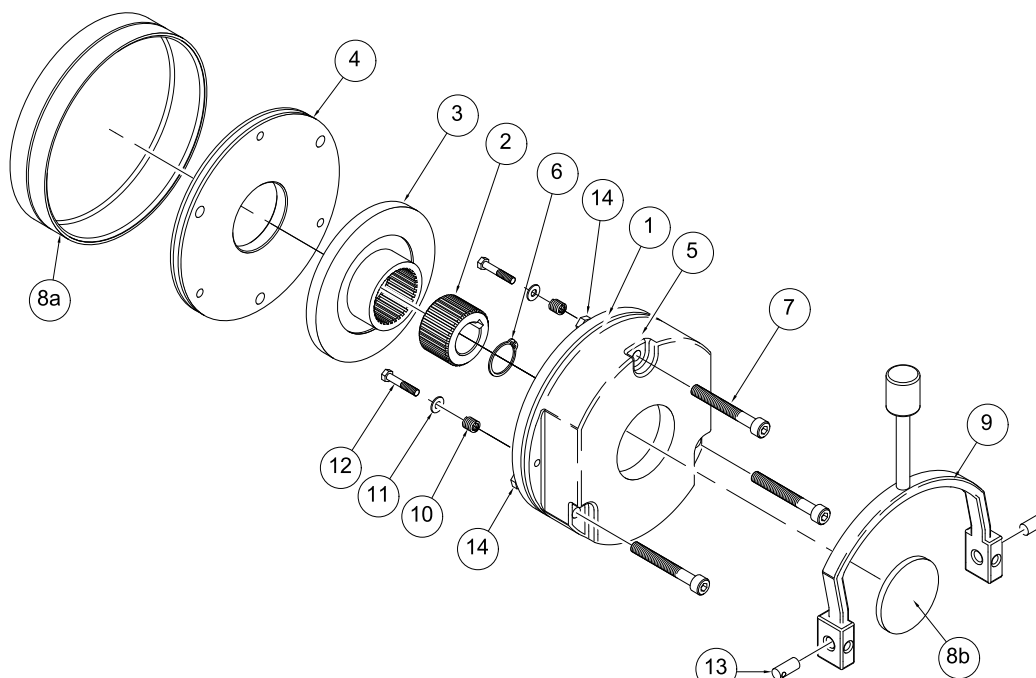


Figure 68 – Hoist Brake Components

Ref	Description
1	Armature plate
2	Brake hub
3	Brake disc (rotor)
4	Mounting Flange
5	Stator
6	Hub circlip
7	Assembly screws
8a	Outer brake seal (optional kit)

Ref	Description
8b	Stator brake seal (optional kit)
9	Hand release mechanism
10	Hand release spring
11	Washer
12	Hand release fixing
13	Barrel nuts
14	Adjustment tubes

5.10.2 Hoist Brake Data

Hoist Brake Size (see model code section 7.3)	1	2	3	4	5	6	7	8	9
Nominal air gap 'a' (mm) (+0.1, -0.05mm)	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Maximum air gap 'a' (mm)	0.45	0.75	0.75	0.75	0.75	1.0	0.6	1.0	0.6
Maximum rotor thickness (mm)	10.0	10.0	10.0	10.0	11.5	13.0	16.0	16.0	16.0
Minimum rotor thickness (mm)	8.3	7.5	7.5	7.5	8.0	10.0	12.4	12.0	12.4
Rotor outside diameter (mm)	115	124	124	124	149	174	206	206	206
Maximum adjustment / admissible wear (mm)	1.7	2.5	2.5	2.5	3.5	3.0	3.6	4.0	3.6
Tightening torque of assembly fixings (Nm)	9.5	23	23	23	23	23	46	46	46
Tightening torque of hand release lever (Nm)	4.8	12	12	12	12	23	23	23	23
Hand release clearance 's' (mm)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0



Before adjusting the brake or changing the disc, lower the bottom block to a suitable level (floor or platform) and allow it to rest on a solid support. Disconnect the power supply to the hoist and to the brake.

5.10.3 Brake Disc (Rotor) Spline

Check the brake disc and hub for wear on the spline teeth. The end of the spline can be viewed from the end of the brake shaft. If the brake is fitted with the seal end cap (8b), this will have to be removed before inspection. For a more detailed inspection the brake disc will have to be removed. If the spline appears replace the brake disc and/or hub immediately.

5.10.4 Checking / Adjusting the Air Gap

To inspect the air gap it may be necessary to lift or remove the outer brake seal (8a), where fitted. Adjustment of the hoist brake will require total removal of the outer brake seal.

The air gap 'a' (between the stator (5) and the armature plate (1)) should be checked in at least three positions around the circumference of the brake using non-magnetic feeler gauges (see Figure 69). The air gap should not exceed the maximum air gap figure given in the above table.

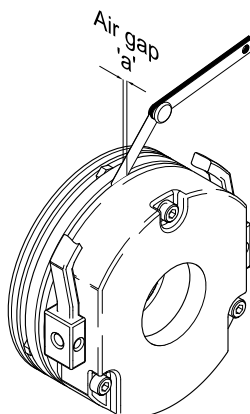


Figure 69 – Checking Hoist Brake Air Gap

Where adjustment is required, slacken the assembly screws (7). Adjust the air gap by turning the adjustment tubes (14) until the nominal air gap 'a' is reached (see Figure 70).

- If the air gap is too large, screw the three adjustment tubes (14) into the stator. If the air gap is too small, screw the adjustment tubes out of the stator.
- NOTE : 1/6 turn adjusts the air gap by approx. 0.15mm
- Re-tighten the assembly fixings to the recommended torque value (see table in 5.10.2).
- Re-check the air gap and repeat the adjustment procedure if necessary.
- Test the brake for correct operation before re-fitting the outer brake seal (where fitted) and returning into service.

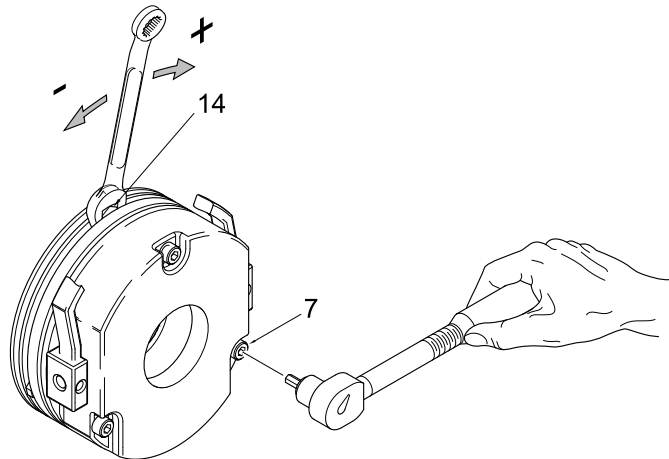


Figure 70 – Adjusting the Hoist Brake Air Gap

5.10.5 Changing the Brake Disc (brake rotor) / Inspecting the brake hub

The thickness of the brake disc can be measured using a vernier calliper without the need to remove the brake. Disconnect the power supply and remove the brake seal (if fitted). Measure between the mounting flange and the armature plate (Figure 71). If the minimum thickness is below the figure given in the Hoist Brake Data table (5.10.2), the brake disc should be replaced.

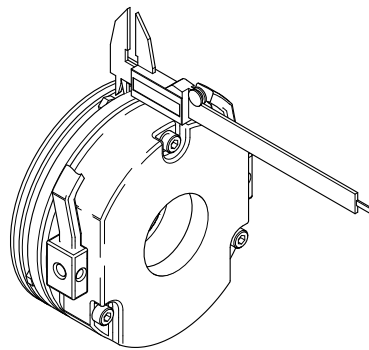


Figure 71 – Inspecting the Brake Disc

- Remove the outer brake seal (where fitted) and clean any brake dust from around the brake.
- Loosen the assembly fixings evenly and remove them taking care to support the brake body.
- Remove the brake body, taking note of its orientation.
- The brake rotor (brake disc) will now be exposed. Withdraw the brake rotor from its hub.
- Before replacing the brake disc, visually inspect the end of the key between the brake hub and shaft. Check the condition of the spline on the brake hub and ensure there is no radial or rotational play between either the new brake disc and the hub or the hub and the shaft. If the hub is damaged, worn or play is apparent, the hub should be replaced. Before replacing, consult Street Crane.
- Ensure the face of the mounting flange is clean and free of any oil or grease. If the mounting flange is worn or excessively scored it should be replaced. Consult Street Crane before replacing.
- Using a vernier calliper, measure both the new brake disc thickness and length of protrusion of the adjustment tubes from the back of the brake.

- Calculate the distance between the stator and the armature plate as follows: -

$$\text{Distance} = \text{Brake disc thickness} + \text{Nominal Air Gap 'a'} - \text{adjustment tube height}$$

- The adjustment tubes should be unscrewed until the calculated distance between the stator and the armature plate is reached.
- Slide the new brake disc (rotor) onto the hub.
- Replace the brake body in the same orientation as originally installed.
- Replace the assembly fixings and tighten to the torque value stated in the table (5.10.2).
- Check and adjust, where necessary, the nominal air gap 'a' and the hand release clearance 's' (see 5.10.4 & 5.10.6).
- Replace the brake seal, where fitted (see 5.10.7).
- Re-connect the brake supply and test the brake for correct operation before returning into service.

5.10.6 Fitting the Hand Release

For safety reasons, the hand release is spring loaded and returns to its original position (brake applied) automatically.

- Insert the compression springs (10) into the holes of the armature plate (1).
- Fit the washers (11) onto the hand release fixings (12) and assemble through the compression springs (10) and the stator (5).
- Fit the barrel nuts (13) into the holes provided in the hand release (9).
- Position the hand release (9) over the stator and tighten the hexagon screws (12) into the barrel nuts (13) until the armature plate moves towards the stator.
- Adjust the gap between the armature plate and the stator using the hexagon hand release screws (12) to achieve a dimension ('s' + 'a') (see Figure 72). Example 1.8mm (1.5+0.3) for brake size 3. Check the dimension at three positions around the circumference.
- Fit the complete brake assembly onto the hoist and tighten the assembly screws (7) to the value shown in the table (5.10.2).
- Re-adjust the air gap 'a' in accordance with section 5.10.4.
- Re-check the Hand Release Clearance dimension 's' and nominal air gap 'a' before returning into service.



The hand release clearance gap, 's' is important. The brake may not apply correctly if the clearance is too small. If the nominal air gap 'a' is adjusted at a later date, do not alter the hand release clearance.

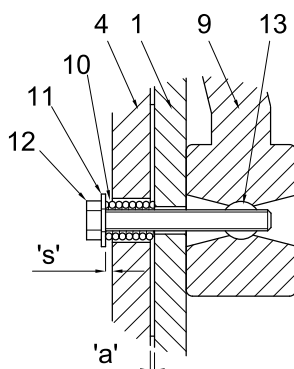


Figure 72 – Hoist Brake Hand Release

5.10.7 Fitting the brake seal kit (optional)

- Pull the electrical cable through the rubber sealing ring.
- Drop the outer brake seal (8a) over the hand release lever and push the sealing ring over the stator.
- Press the lips of the seal into the grooves into the stator (1) and the mounting flange (4) (see Figure 73).
- Tap the stator brake seal (8b) into the hole in the front of the stator.

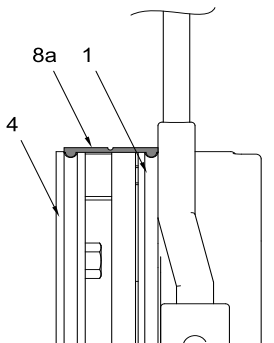


Figure 73 – Brake Seal

5.10.8 Brake rectifier

The ZX series hoist uses three types of brake rectifier. These vary with the size of brake. The rectifier type is marked on the rectifier.

Brake Size (see hoist model code section 7.3)	1, 2 and 3	4 to 9
Brake rectifier type	Normal full wave 14.630.32.016 (BEG-161-270) OR B3-18464 (CSA approved)	Force voltage, full/half wave B3-69500(CSA approved)

Testing the normal rectifier types 14.630.32.016 and B3-18464

With the brake connected to the rectifier, check that the input voltage to the rectifier is correct at 220V. The output, measured at the brake coil terminals, should be approximately 198V DC.

Testing the force voltage rectifier, type B3-69500

With the brake connected to the rectifier, check that the input voltage to the rectifier is correct at 220V. The output, measured at the brake coil terminals, should be 198V DC for 1 second and then reduce to and hold at 98V DC (note these values are approximate only). Use an analogue meter for this test (a digital meter is not suitable).

If the output voltage from the test is below the figures provided, the rectifier should be replaced.

5.11 INSPECTION AND MAINTENANCE – TRAVERSE BRAKE

The traverse brake is a spring applied disc brake. The brake is electro-magnetically released by the application of DC to the brake coil in the stator. To access the traverse brake, the traverse drive fan cowl should be removed. First unscrew the hand release lever (if fitted). The brake rectifier is located in the motor terminal box.

5.11.1 Traverse Brake Components

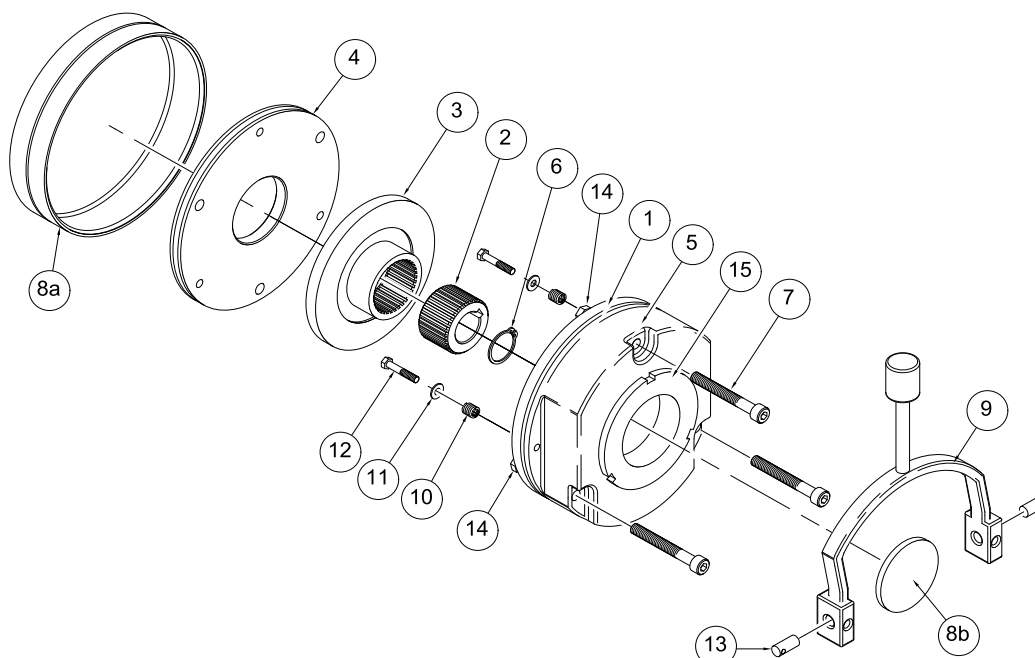


Figure 74 – Traverse Brake Components

Ref	Description
1	Armature plate
2	Brake hub
3	Brake disc (rotor)
4	Mounting Flange
5	Stator
6	Hub circlip
7	Assembly screws
8a	Outer brake seal (optional kit)

Ref	Description
8b	Stator brake seal (optional kit)
9	Hand release mechanism
10	Hand release spring
11	Washer
12	Hand release fixing
13	Barrel nuts
14	Adjustment tubes
15	Torque adjuster nut (Factory set)



Before adjusting the brake or changing the disc, disconnect the power supply to the hoist and to the brake.

5.11.2 Checking / Adjusting the Air Gap

To inspect the air gap it may be necessary to lift or remove the outer brake seal (8a), where fitted. Adjustment of the brake will require total removal of the outer brake seal.

The air gap 'a' (between the stator (5) and the armature plate (1)) should be checked in at least three positions around the circumference of the brake using non-magnetic feeler gauges (see Figure 75). The air gap should not exceed the maximum air gap of **0.6mm**.

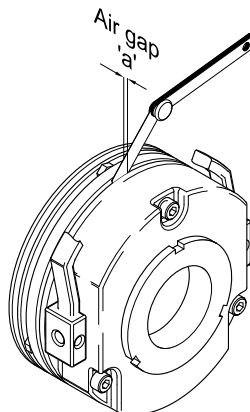


Figure 75 – Checking Traverse Brake Air Gap

Where adjustment is required, loosen the assembly screws (7) by half a turn. Adjust the air gap by turning the adjustment tubes (14) until the required air gap is reached (see Figure 76).

- If the air gap is too large, screw the three adjustment tubes (14) into the stator. If the air gap is too small, screw the adjustment tubes out of the stator.
- Adjust the air gap until a gap of 0.2-0.3mm is reached around the brake.
- Re-tighten the assembly fixings to 3Nm
- Re-check the air gap and repeat the adjustment procedure if necessary.
- Test the brake for correct operation before replacing the outer brake seal (where fitted), the fan cowl and returning the drive into service.

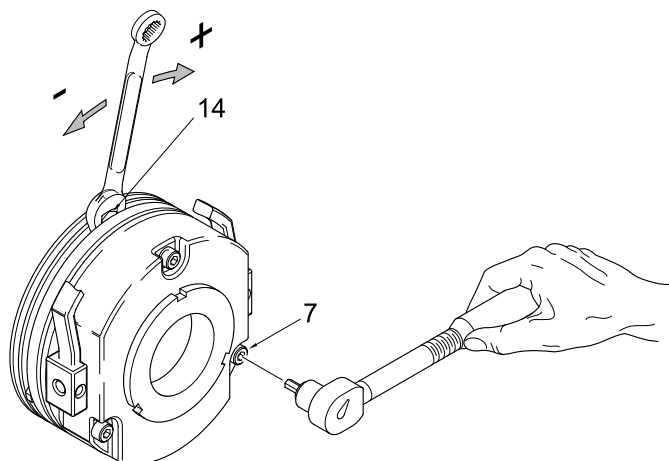


Figure 76 – Adjusting the Traverse Brake Air Gap

5.11.3 Changing the Brake Disc (brake rotor) / Inspecting the brake hub

The thickness of the brake disc can be checked by measuring the distance between the mounting flange and armature plate (5.10.5). If the distance is below **4.5mm**, the brake disc should be replaced.

- Remove the circlip and withdraw the fan from the motor shaft.
- Remove the outer brake seal (if fitted) and clean any brake dust from around the brake.
- Loosen the assembly fixings evenly and remove them taking care to support the brake body.
- Remove the brake body, taking note of its orientation.
- The brake rotor (brake disc) will now be exposed. Withdraw the brake rotor from its hub.

- Before replacing the brake disc, visually inspect the end of the key between the brake hub and shaft. Check the condition of the spline on the brake hub and ensure there is no radial or rotational play between either the new brake disc and the hub or the hub and the shaft. If the hub is damaged, worn or play is apparent, the hub should be replaced. Before replacing, consult Street Crane.
- Ensure the face of the motor end shield is clean and free of any oil or grease. If the end shield is worn or excessively scored it should be replaced. Consult Street Crane before replacing.
- Slide the new brake disc (rotor) onto the hub.
- Replace the brake body in the same orientation as originally installed.
- Replace the assembly fixings and tighten 3Nm.
- Check and adjust, where necessary, the nominal air gap 'a' and the hand release clearance 's' (see 5.11.2 & 5.11.4).
- Replace the brake seal, where fitted (see 5.11.5).
- Press the motor fan onto the motor shaft and replace the circlip, replace the motor fan cowl and the hand release lever.
- Re-connect the brake supply and test the brake for correct operation before returning into service.

5.11.4 Fitting the Traverse Drive Hand Release

For safety reasons, the hand release is spring loaded and returns to its original position (brake applied) automatically.

- Insert the compression springs (10) into the holes of the armature plate (1).
- Fit the washers (11) onto the hand release fixings (12) and assemble through the compression springs (10) and the stator (5).
- Fit the barrel nuts (13) into the holes provided in the hand release (9).
- Position the hand release (9) over the stator and tighten the hexagon screws (12) into the barrel nuts (13) until the armature plate moves towards the stator.
- Adjust the gap between the armature plate and the stator using the hexagon hand release screws (12) to achieve a dimension of 1.0mm. Check the dimension at three positions around the circumference.
- Fit the complete brake assembly onto the hoist and tighten the assembly screws (7) to 3Nm.
- Re-adjust the air gap 'a' in accordance with section 5.11.2.
- Re-check the Hand Release Clearance dimension 's' (0.7mm) and nominal air gap 'a' (0.2-0.3mm) before returning into service.



The hand release clearance gap, 's' (0.7mm) is important. The brake may not apply correctly if the clearance is too small. If the nominal air gap 'a' is adjusted at a later date, do not alter the hand release clearance.

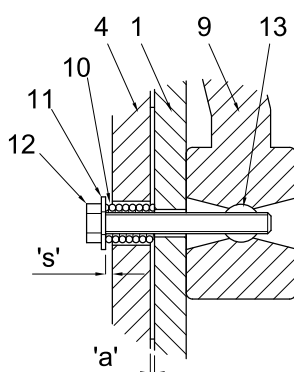


Figure 77 – Traverse Drive Brake Hand Release

5.11.5 Fitting the brake seal kit (optional)

- Withdraw the fan from the motor shaft.
- Pull the electrical cable through the rubber sealing ring.
- Drop the outer brake seal (8a) over the hand release lever and push the sealing ring over the stator.
- Press the lips of the seal into the grooves into the stator (1) and the mounting flange (4) (see Figure 78).
- Tap the stator brake seal (8b) into the hole in the front of the stator.
- Press the motor fan onto the motor shaft and replace the motor fan cowl.

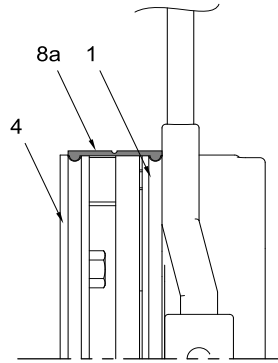


Figure 78 – Traverse Drive Brake Seal

5.12 INSPECTION AND MAINTENANCE – HOOK BLOCK



All inspections should be carried out by trained personnel.

- Each bottom block is clearly labelled with the maximum capacity (safe working load) of the hoist. Ensure that the SWL labels are legible on the sheave covers.
- Check that the hook rotates freely.
- Check the security of the hook nut and it's securing grub screw, for 4 Fall remove cap to inspect see Figure 80. For 2, 6 and 8 Fall rotate the hook up to inspect, see Figure 81.
- Inspect the hook ensuring that it is in good condition and free from deformation.
- Check the hook throat admittance (see Figure 79). Replace the complete bottom block where "t" max. has been exceeded.

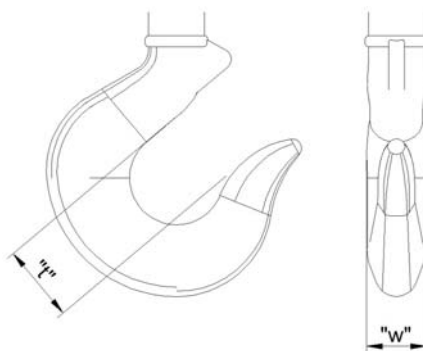


Figure 79 – Hook Throat Admittance

Example from hoist model code: ZX064 - 3EoNM5K031 - LHR0002 - 40050E14X

HOIST MODEL TYPE	NO. FALLS	"t" New Hook (mm)	"t" max. (mm)	"w" ref only. (mm)
ZX06	2	40	44	31
	4	50	55	38
ZX08	2	50	55	38
	4	56	61.6	73
	6	63	69.3	81
	8	71	78.1	93

- Check that the safety catch operates and springs fully closed against the hook point.
- Check the condition of the sheave covers ensuring that they are not damaged. Replace any damaged covers.
- Check security of sheave cover fixings.
- Examine the condition of the sheave(s) and ensure that they are free from cracks or damage due to rope indentations. Check that they can be rotated freely.
- Grease the hook thrust bearing as required in the lubrication schedule (see section 5.7.1 & Figure 80).

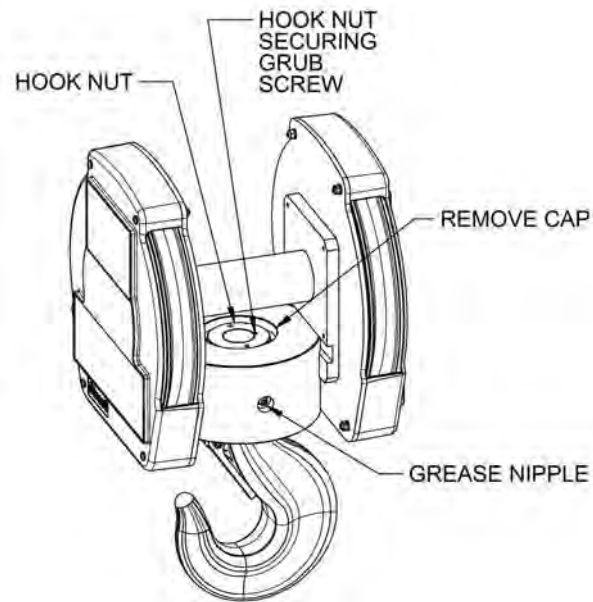


Figure 80 – 4 Fall Bottom Block, Hook Nut, Grubscrew, Grease nipple

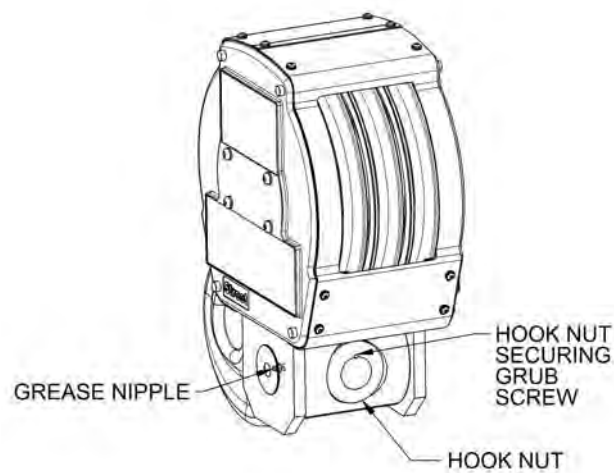
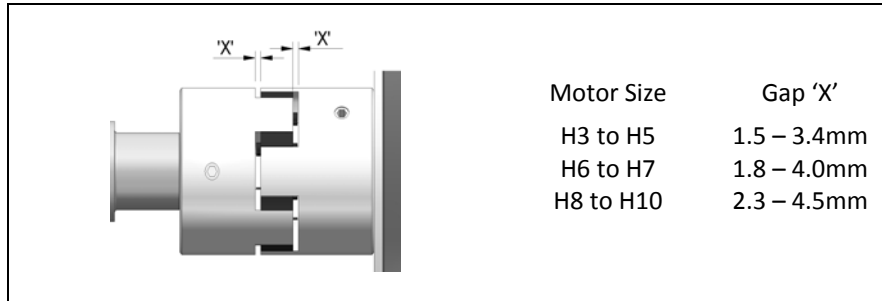


Figure 81 – 2, 6 & 8 Fall Bottom Block, Hook Nut, Grubscrew, Grease nipple

5.13 INSPECTION AND MAINTENANCE – HOIST DRIVE COUPLING

The coupling between the hoist motor and gearbox does not require any maintenance but periodically check for damage to the coupling element and that the correct gap between the two halves of the coupling as been maintained. Inspection can take place through an aperture on the underside of the gearbox case.



If the coupling element requires changing proceed as follows:-



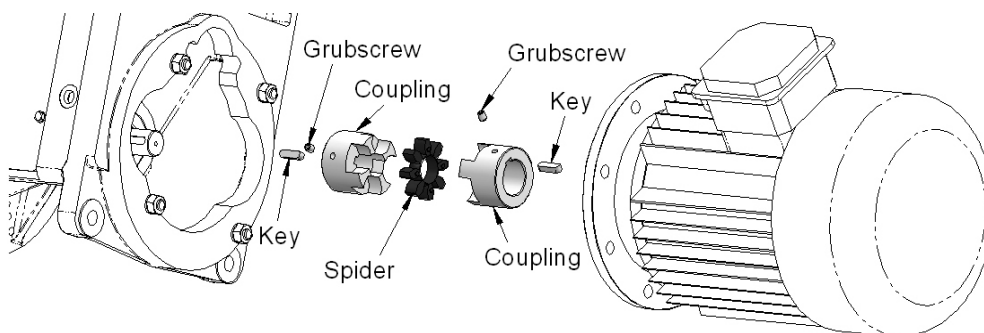
Before removing the motor, lower the bottom block to a suitable level (floor or platform) and allow it to rest on a solid support. Ensure that the mains power is isolated before starting any work.

- Disconnect the power cables from the motor terminal box making notes of each cable and its relative terminal connection.
- Support the motor and remove the four retaining nuts and spring washers that fasten the motor to the gearbox.



NOTE: A hoist motor can weigh up to 120kg (see HOIST MOTOR DATA 7.5).

- Carefully withdraw the motor noting the orientation of the motor terminal box.
- Remove the motor complete and replace the coupling element with new.
- If the coupling body is damaged or loose on the shaft and has to be changed, consult the manufacturer before replacing.
- Carefully refit the assembly onto the side of the hoist gearbox ensuring that the orientation is correct and that the coupling spider element meshes correctly in the coupling hub claws. Do not force engagement of the coupling if any resistance is felt. Use the inspection hole on the underside of the gearcase to ensure correct engagement.
- Replace the motor retaining nuts and spring washers and tighten to 40Nm.
- Check, through the inspection hole, that the coupling halves have engaged correctly and that the gap between the two coupling halves is as shown.
- Re-connect the cables to the motor terminals and, when power is re-established, test for correct operation and direction of rotation.



6 FAULT FINDING



When fault finding on live electrical circuits or energised equipment wear the relevant PPE and use test equipment suitably rated for the tests being carried out. Obtain information from the people who use the equipment and who were present at the time the fault developed. Observe the system during start-up, operation and shut-down to trace the fault area. Isolate the area of the system that is suspicious but do not restrict your focus too narrowly. Test and take corrective action as required. Check the system / device is working properly and document your findings and corrective measures.

Should you require any assistance from the Street Crane Service Department please have available the following information:-

- The hoist serial number and details from both hoist nameplates.
- The reading on the hours-in-service meter.
- A description and the nature and extent of the fault.
- Explain under what circumstances the fault occurred.
- State your suspected cause.

6.1 GENERAL

Problem	Possible Cause	Remedy
Hoist will not operate but travel moves in wrong direction.	Wrong phase sequence to hoist or voltage supply to hoist is too low.	Correct phase sequence and supply.
Hoist unit does not operate or will not start.	No electrical power supply or not all phases are present.	Check that the power supply is correct and the equipment is switched ON.
	Phase monitoring relay not set correctly.	Check settings on relay as section 3.18.3.
	Emergency stop activated.	Release emergency stop. First ensure that the emergency stop button has not been depressed because of a fault.
	Pendant or switchgear fault.	Check condition of pushbuttons, pendant wiring and switchgear.
	After a long period out of service, the brake(s) may be stuck.	Dismantle and service the brake.
Movement of the equipment does not correspond to the symbols on the controller.	Power supply wrongly connected.	Check the phase connections to the equipment and to the relevant motor.
Hoist will not raise.	Hook is at upper limit switch position.	Lower to reset the limit. Check setting of limit.
	Attempt to lift load in excess of hoist rated capacity.	Lower load to floor. Do not apply any load greater than rated capacity of hoist.
	Motor over-temperature protection tripped.	Allow motor to cool. See fault finding guide for motors.
Hoist will not lower.	Hook is already at lower limit switch position.	Raise bottom block to reset limit. Check setting of limit
SWL cannot be lifted or loads in excess of SWL can be lifted.	Rated capacity limiter incorrectly set.	Check and adjust setting of rated capacity limiter.
Hoist does not travel when no load attached.	Wear on the wheel and/or reaction roller.	Check and adjust the setting of the reaction roller spring.
Bottom hook block and rope rotate.	Twist in the rope.	Remove the wire rope and let it hang or lay freely to remove the twist.

6.2 BRAKES

Problem	Possible Cause	Remedy
The brake will not release.	Wrong (low) voltage at the brake coil.	Check that the rectifier has the correct input and output voltage particularly at motor start up.
	Loss of supply to the brake.	Check output from rectifier and check supply from brake contactor. Check the cable for continuity.
	Max permissible air gap exceeded.	Check the air gap and adjust where necessary.
	Brake coil fault or short circuit.	Change the complete brake.
Brake overheating.	Excessive 'inching' of the drive.	Operator Training.
	High ambient temperature.	Check that the ambient temperature is within the design range. Consult Street Crane
	Voltage to the brake coil is too high.	Check function of the rectifier and supply to the rectifier.
Brake slow releasing.	Faulty rectifier or air gap too large.	Check the air gap and function of the rectifier.
Brake does not hold the load or excessive run through when stopping.	Air gap too large.	Check the working air gap.
	Brake lining worn.	Change the brake disc (rotor).
	Manual release device incorrectly set.	Adjust the hand release clearance gap.
Excessive brake lining wear.	Brake slow releasing allowing motor to run excessively before brake released.	Check operation of the brake. Check operation of the brake rectifier.
	Excessive 'inching' of the drive.	Operator Training.
Noise from the brake.	Wear of the carrier gearing caused by excessive stopping and starting.	Replace the carrier.

6.3 MOTOR UNITS

Problem	Possible Cause	Remedy
Motor will not start or motor 'hums',	Break in the connecting cable.	Check and restore the connections
	Loss of phase(s) to motor.	Check operation of switchgear.
	Fuse blown or circuit breaker tripped. Phase sequence to hoist incorrect.	Replace fuse or reset circuit breaker. Investigate reasons for the fault. Check phase sequence.
	Motor contactor does not operate, control system fault.	Check the motor contactor control circuit; rectify the fault if necessary
Motor will not start or starts with difficulty.	Voltage or frequency differs greatly from the design, especially when starting.	Ensure that the supply voltage conditions are improved. Check that the cross section of the cables matches the design
Motor hums and has high power consumption	Faulty winding or rotor catching on housing.	Motor must be repaired by service specialist.
Fuses blow or circuit breaker trips immediately.	Short circuit in the cable.	Repair the short circuit.
	Short circuit in the motor or short circuit to earth.	Motor must be repaired by service specialist.
Motor overheats and thermal protection device trips.	Overload.	Ensure the motion is free and clear of all obstructions.
	Inadequate cooling.	Ensure the cooling air passage is clear.
	Ambient temperature too high.	Check that the ambient temperature is within the design range.
	Motor connected in delta instead of star	Change connection
	Loose lead (intermittent two phase operation)	Repair the loose contact.
	Mains voltage is outside the range quoted in the technical data.	The mains voltage and the motor voltage must be within the stated limits.
	Brake slow to release or not releasing.	See brake fault finding.
	Motor being used beyond its design duty or excessive 'inching' by the operator.	Adjust the operating conditions to the design cycle otherwise consult Street Crane
Motor noisy	Bearings distorted, damaged or dirty, rotating parts vibrate.	Consult Street Crane
	Foreign matter in the cooling air passages.	Clean cooling air passages

6.4 GEARBOXES

Problem	Possible Cause	Remedy
Unusual grinding or knocking noise in gearbox when running.	Bearing damage or irregular gearing.	Check oil and condition of gears and bearings. Call customer service if noise persists.
	Polluted oil or not enough oil.	Check oil / oil level.
Oil is leaking from gearbox.	Defective seal.	Call customer service.
Oil is leaking at breather plug.	Excessive amount of oil in gearbox.	Correct the oil level
	Breather plug fitted incorrectly.	Fit breather plug correctly

7 TECHNICAL DATA

7.1 CONDITIONS OF USE

Standard ZX6 and ZX8 hoist units are designed to operate indoors, in an ambient temperature range of –10 to +40°C, at an altitude less than 1000m above sea level and in an atmosphere of normal humidity free of contamination and harmful deposits. Equipment class of protection against dust and moisture is IP55.

For environments outside this range, i.e. outdoor, chemical pollution, offshore etc., consult Street Crane Co.

7.2 PROCEDURE FOR ESTIMATING REMAINING SERVICE LIFE

The following gives a procedure for estimating the remaining service life of the hoist.

The hoist is classified into groups (M3 to M8) according to the desired service life and the conditions of loading (L1 to L4) to which it will be subjected.

1. Calculate or estimate the state of loading for the hoist (L?). If detailed information on the loading conditions is available, the competent person may be able to calculate the state of loading accurately by following the guidelines given in BS 466, FEM 1.001 or EN/ISO4301. If such information is not available then the competent person can estimate the state of loading using following descriptive guidelines.

L1 (light)	Mechanisms subjected very rarely to their maximum load and normally to very light loads.
L2 (moderate)	Mechanisms occasionally subjected to their maximum load and normally to rather light loads.
L3 (heavy)	Mechanisms frequently subjected to their maximum load and normally to loads of medium magnitude.
L4 (very heavy)	Mechanisms regularly subjected to their maximum load.

2. Ascertain the classification of the hoist (M?). The group classification of your equipment can be found on the equipment nameplate. See section 2.1 for nameplate and 7.3 hoist model code.
3. Knowing the state of loading and the hoist classification, determine the life expectancy of the hoist measured in hours from the following table.

State of Loading	Mechanism Classification					
	M3	M4	M5	M6	M7	M8
L1 (light)	3200	6300	12000	25000	50000	>50000
L2 (moderate)	1600	3200	6300	12000	25000	50000
L3 (heavy)	800	1600	3200	6300	12000	25000
L4 (very heavy)	400	800	1600	3200	6300	12000

The hoist is provided with a 'hours-in-service' meter. This meter records the actual hours run by the hoist. This reading should be compared with the expected service life as determined from the above procedure. When the meter reading approaches 95% of the expected service life, the user should consider replacing the hoist or including a major overhaul as part of the immediate maintenance procedure.

If meter reading exceeds the calculated service life, the life expectancy of the hoist has been exceeded and the hoist should be taken out of service.

Example. A hoist with a design classification of M5 and a calculated / estimated state of loading of L2 has an expected service life of 6300 hours.

7.3 HOIST MODEL CODE

The hoist model code is built up of different characters which identify individual components on the hoist. An example and break-down of each part of the code is given below.

The hoist model code complete with other information on the hoist nameplate (see 2.1) will be required when ordering replacement parts and when assessing the remaining service life of the hoist.

ZX064-3EoNM5K031-LHR0002-40050E14X

HOIST MODEL TYPE

NUMBER OF FALLS OF ROPE

HOIST MOTOR SPEED RATIO

GEARBOX

BARREL LENGTH

CLASSIFICATION

RATED CAPACITY CODE

HOIST MOTOR DESIGNATION

HOIST BRAKE SIZE

HOIST CONSTRUCTION

CRAB GAUGE

CRAB WHEEL TREAD WIDTH

TRAVERSE MOTOR SPEED

SUPPLY POTENTIAL

SUPPLY FREQUENCY

COMPLIANCE

CONTROL POTENTIAL

MAXIMUM AMBIENT TEMPERATURE

SPECIAL FEATURES

HOIST MODEL TYPE: **ZX06** or **ZX08**

NUMBER OF FALLS OF ROPE: **1, 2, 4, 6** or **8**

HOIST MOTOR SPEED RATIO:

- 1** – Dual speed 10:1 (inverter)
- 2** - Dual speed, 20:1 ratio (inverter)
- 3** – Dual speed, 3:1 ratio
- 4** - Dual speed, 4:1 ratio
- 8** - Dual speed, 8:1 ratio

GEARBOX:

- So** (99:1 ratio – ZX6), (139:1 ratio – ZX8)
- Fo** (80:1 ratio – ZX6), (115:1 ratio – ZX8)
- Xo** (64:1 ratio – ZX6), (97:1 ratio – ZX8)
- Xa** (97:1 ratio – ZX8 only)
- Eo** (50:1 ratio – ZX6), (73:1 ratio – ZX8)
- Ea** (73:1 ratio – ZX8 only)

BARREL LENGTH:

- N** – Normal barrel
- L** – Long barrel
- E** - Extra long barrel
- V** – Very long barrel

CLASSIFICATION:**M1, M2, M3, M4, M5, M6, M7, M8****RATED CAPACITY:**

A – 500 kg	H – 2.5 t/T	O – 10 t/T	U – 14 T
B – 630 kg	I – 3.2 t	P – 12.5 t/T	V – 18 T
C – 800 kg	J – 4 t	Q – 15 t/T	W – 27.5 T
D – 1 t/T	K – 5 t/T	R – 16 t	Y – 6 T
E – 1.25 t	L – 6.3 t	S – 20 t/T	Z – 3 T
F – 1.6 t	M – 7.5 t/T	T – 25 t/T	
G – 2 t/T	N – 8 t		

t = metric tonne

T = short Ton (2000lbs)

HOIST MOTOR DESIGNATION:

02 – ZX06-H2
03 – ZX06-H3
04 – ZX06-H4
05 – ZX06-H5
06 – ZX08-H6
07 – ZX08-H7
08 – ZX08-H8
09 – ZX08-H9
10 – ZX08-H10

HOIST BRAKE SIZE:

1 – Type 12/46/20/180
2 – Type 14/60/20/180
3 – Type 14/60/25/180
4 – Type 14/60/25/103
5 – Type 16/80/25/103
6 – Type 18/150/25/103
7 – Type 20/315/35/103
8 – Type 20/170/25/103
9 – Type 20/315/25/103

HOIST CONSTRUCTION:

FTM – Foot mounted
LHR – Low head with reaction roller
LHC – Low head with counterweight
CRB – Crab with hoist parallel to beam
CRE – Crab with hoist perpendicular to beam
STH – Standard headroom
TVL – True vertical lift

CRAB GAUGE:

00 – None
09 – 900mm gauge
14 – 1400mm
20 – 2000mm
26 – 2600mm
32 – 3200mm

CRAB WHEEL TREAD WIDTH:

0 – None
A – 60mm
B – 65mm
C – 70mm

TRAVERSE MOTOR SPEED:

0 – No traverse drive fitted (Foot mounted)
1 – 20/2 m/min (inverter)
2 – 20/5 m/min
3 – 10/3 m/min
4 – 24.4/2.4 m/min (inverter)

SUPPLY POTENTIAL:

230 – 230V (±6%) AC
380 – 380V (±10%) AC

400 - 380V $\pm 6\%$ - 415V $\pm 6\%$ AC
460 - 460V ($\pm 6\%$) AC
480 - 480V ($\pm 6\%$) AC
575 - 575V ($\pm 6\%$) AC

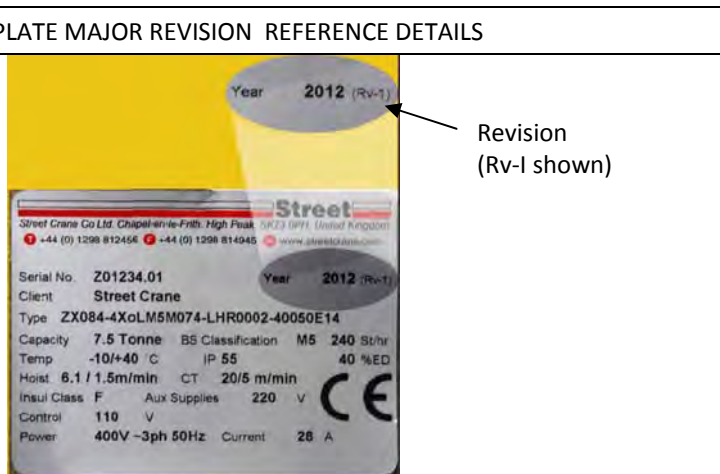
SUPPLY FREQUENCY: **50** - 50Hz ($\pm 1\%$)
60 - 60Hz ($\pm 1\%$)

COMPLIANCE: **E** – European directives (CE)
U – North America
N – Canada (CSA) Imperial
D – Canada (CSA) Metric
C – China (CCL)
B - Brazil

CONTROL POTENTIAL: **4** - 48V AC
1 - 110V AC

MAX AMBIENT TEMPERATURE: **4** - 40°C
5 - 50°C

SPECIAL FEATURES: **X** – Consult Street Crane.
V – Galvanising environment
A - Aggressive environment

NAMEPLATE MAJOR REVISION REFERENCE DETAILS	
	 <p>Revision (Rv-I shown)</p>
Revision Rv-1 for details of changes refer to:- Section 3.7 SETTING THE UPPER AND LOWER LIMIT SWITCHES – Standard Environment Section 5.8.3 Fitting the Rope Guide	

7.4 NOISE LEVELS

The mean sound pressure level was measured in accordance with BS EN ISO 3744:1994.

For measurement purposes the hoist unit was operated under normal loading conditions for a full operating cycle.

Distance from Sound Source (metres)	Mean Sound Level dB(A)	
	ZX6	ZX8
1	80	80
2	77	77
4	74	74
8	61	61
16	68	68

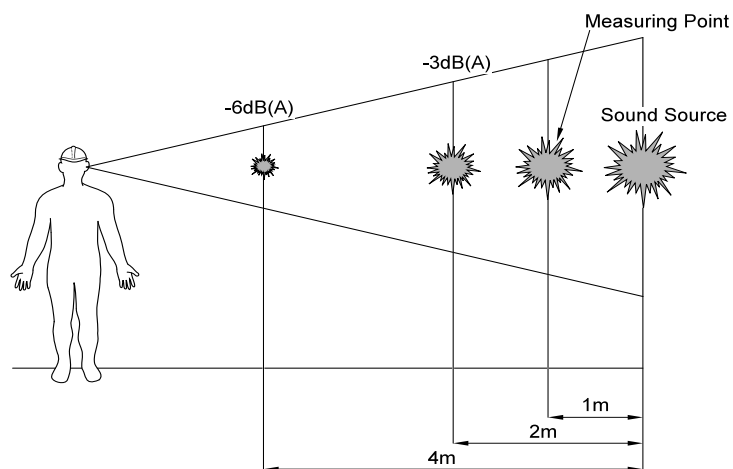


Figure 82 – Sound Pressure Levels

The sound pressure level is reduced by approx. 3dB(A) each time the distance from the sound source is doubled.

7.5 HOIST MOTOR DATA

7.5.1 ZX06 Hoist Motor Data – 3:1 SPEED RATIO - 400V, 3Ph, 50Hz

Example from hoist model code: ZX064 - **3EoNM5K031** - LHR0002 - **40050E14X**

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
03	3	26 (57lb)	M3	17/8	50/100	3.7/1.2	8.24/4.24	24/10.5	16A	0.9/0.69
			M4	20/10	60/120	3.4/1.1	7.68/3.99			0.9/0.66
			M5	27/13	80/160	3.1/1.0	6.87/3.81			0.89/0.62
			M6	34/17	100/200	2.8/0.9	6.07/3.64			0.89/0.57
			M7	40/20	100/200	2.5/0.8	5.36/3.53			0.88/0.54
04	3	30 (66lb)	M3	17/8	50/100	4.7/1.6	12.0/5.0	39/13	20A	0.82/0.68
			M4	20/10	60/120	4.3/1.4	10.6/4.4			0.81/0.65
			M5	27/13	80/160	3.9/1.3	9.8/4.1			0.79/0.62
			M6	34/17	100/200	3.5/1.2	9.0/3.9			0.78/0.59
			M7	40/20	100/200	3.1/1.0	8.4/3.6			0.75/0.53
05	3	53 (117lb)	M3	17/8	50/100	7.8/2.6	17.5/7.5	61/23	25A	0.85/0.66
			M4	20/10	60/120	7.1/2.4	16.2/7.0			0.84/0.64
			M5	27/13	80/160	6.5/2.1	14.8/6.6			0.83/0.6
			M6	34/17	100/200	5.8/1.9	13.5/6.4			0.82/0.57
			M7	40/20	100/200	5.2/1.7	12.4/6.0			0.8/0.53

7.5.2 ZX08 Hoist Motor Data – 4:1 SPEED RATIO - 400V, 3Ph, 50Hz

Example from hoist model code: ZX084 - **4EoNM6K071** - LHR0002 - **40050E14X**

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
06	4	50 (110lb)	M3	17/8	50/100	9.1/2.3	21.0/8.8	61/17.5	32A	0.87/0.59
			M4	20/10	60/120	8.4/2.1	18.9/8.3			0.87/0.56
			M5	27/13	80/160	7.6/1.9	16.7/8.0			0.87/0.54
			M6	34/17	100/200	6.8/1.7	14.7/7.7			0.84/0.51
			M7	40/20	100/200	6.1/1.5	13.3/7.5			0.83/0.46
07	4	58 (128lb)	M3	17/8	50/100	11.2/2.8	26.0/11.5	72/24	40A	0.85/0.6
			M4	20/10	60/120	10.1/2.5	23.0/11.4			0.84/0.6
			M5	27/13	80/160	9.2/2.3	20.0/10.8			0.83/0.55
			M6	34/17	100/200	8.3/2.1	18.5/10.5			0.83/0.52
			M7	40/20	100/200	7.4/1.8	16.3/10.2			0.81/0.47
08	4	98 (216lb)	M3	17/8	50/100	13.0/3.2	27.0/11.0	129/29	40A	0.83/0.53
			M4	20/10	60/120	12.0/3.0	24.5/10.6			0.83/0.52
			M5	27/13	80/160	10.8/2.7	22.0/10.2			0.81/0.49
			M6	34/17	100/200	9.7/2.4	20.3/9.8			0.8/0.45
			M7	40/20	100/200	8.6/2.2	19.7/9.6			0.79/0.42
10	4	120 (265lb)	M3	17/8	50/100	19.2/4.8	46.0/17.5	240/40	TBA	0.75/0.89
			M4	20/10	60/120	17.6/4.4	46.0/15.5			0.7/0.56
			M5	27/13	80/160	16.0/4.0	45.0/14.7			0.67/0.53
			M6	34/17	100/200	14.4/3.6	44.0/14.0			0.64/0.5
			M7	40/20	100/200	12.8/3.2	42.0/13.7			0.6/0.46

7.5.3 ZX06 Hoist Motor Data – 3:1 SPEED RATIO – 460V, 3Ph, 60Hz

Example from hoist model code: ZX064 - 3EoN**M4K04**1 - LHR0002 – 46060UE14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 460V(±6%) 60Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
03	3	26 (57lb)	M3	17/8	50/100	4.4/1.4	8.24/4.24	24/10.5	16A (15A)	0.9/0.69
			M4	20/10	60/120	4.1/1.3	7.68/3.99			0.9/0.66
			M5	27/13	80/160	3.7/1.2	6.87/3.81			0.89/0.62
			M6	34/17	100/200	3.4/1.1	6.07/3.64			0.89/0.57
			M7	40/20	100/200	3.0/1.0	5.36/3.53			0.88/0.54
04	3	30 (66lb)	M3	17/8	50/100	5.6/1.9	12.0/5.0	39/13	20A (20A)	0.82/0.68
			M4	20/10	60/120	5.2/1.7	10.6/4.4			0.81/0.65
			M5	27/13	80/160	4.7/1.6	9.8/4.1			0.79/0.62
			M6	34/17	100/200	4.2/1.4	9.0/3.9			0.78/0.59
			M7	40/20	100/200	3.7/1.2	8.4/3.6			0.75/0.53
05	3	53 (117lb)	M3	17/8	50/100	9.4/3.1	17.5/7.5	61/23	20A (25A)	0.85/0.66
			M4	20/10	60/120	8.5/2.9	16.2/7.0			0.84/0.64
			M5	27/13	80/160	7.8/2.5	14.8/6.6			0.83/0.6
			M6	34/17	100/200	7.0/2.3	13.5/6.4			0.82/0.57
			M7	40/20	100/200	6.2/2.0	12.4/6.0			0.8/0.53

7.5.4 ZX08 Hoist Motor Data – 4:1 SPEED RATIO - 460V, 3Ph, 60Hz

Example from hoist model code: ZX084 - 4EoN**M6K07**1 - LHR0002 – 46060U14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 460V(±6%) 60Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
06	4	50 (110lb)	M3	17/8	50/100	10.9/2.8	21.0/8.8	61/17.5	32A (30A)	0.87/0.59
			M4	20/10	60/120	10.1/2.5	18.9/8.3			0.87/0.56
			M5	27/13	80/160	9.1/2.3	16.7/8.0			0.87/0.54
			M6	34/17	100/200	8.2/2.0	14.7/7.7			0.84/0.51
			M7	40/20	100/200	7.3/1.8	13.3/7.5			0.83/0.46
07	4	58 (128lb)	M3	17/8	50/100	13.4/3.4	26.0/11.5	72/24	40A (35A)	0.85/0.6
			M4	20/10	60/120	12.1/3	23.0/11.4			0.84/0.6
			M5	27/13	80/160	11/2.8	20.0/10.8			0.83/0.55
			M6	34/17	100/200	10/2.5	18.5/10.5			0.83/0.52
			M7	40/20	100/200	8.9/2.2	16.3/10.2			0.81/0.47
08	4	98 (216lb)	M3	17/8	50/100	15.6/3.8	27.0/11.0	129/29	40A (35A)	0.83/0.53
			M4	20/10	60/120	14.4/3.6	24.5/10.6			0.83/0.52
			M5	27/13	80/160	13.0/3.2	22.0/10.2			0.81/0.49
			M6	34/17	100/200	11.6/2.9	20.3/9.8			0.8/0.45
			M7	40/20	100/200	10.3/2.6	19.7/9.6			0.79/0.42
10	4	120 (265lb)	M3	17/8	50/100	23.0/5.8	46.0/17.5	240/40	TBA	0.75/0.89
			M4	20/10	60/120	21.1/5.3	46.0/15.5			0.7/0.56
			M5	27/13	80/160	19.2/4.8	45.0/14.7			0.67/0.53
			M6	34/17	100/200	17.3/4.3	44.0/14.0			0.64/0.5
			M7	40/20	100/200	15.4/3.8	42.0/13.7			0.6/0.46

7.5.5 ZX06 Hoist Motor Data – 3:1 SPEED RATIO - 575V, 3Ph, 60Hz

Example from hoist model code: ZX064 - **3EoN****M5K04**1 - LHR0002 – **57560**N14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 575V(±6%) 60Hz							
			BS Class	CDF	S/h	Power	FLC	LRC	Main Fuse	Cos φ
				%		kW	A	A		
03	3	26 (57lb)	M3	17/8	50/100	4.4/1.4	6.8/3.69	23/10.3	15A	0.85/0.65
			M4	20/10	60/120	4.1/1.3	6.08/3.53			0.84/0.62
			M5	27/13	80/160	3.7/1.2	5.41/3.45			0.83/0.59
			M6	34/17	100/200	3.3/1.1	4.88/3.37			0.82/0.56
			M7	40/20	100/200	3.0/1.0	4.46/3.3			0.80/0.53
04	3	30 (66lb)	M3	17/8	50/100	5.6/1.9	10.2/3.6	22/10.4	15A	0.87/0.75
			M4	20/10	60/120	5.1/1.7	9.4/3.5			0.87/0.72
			M5	27/13	80/160	4.7/1.6	8.2/4.1			0.87/0.69
			M6	34/17	100/200	4.2/1.4	7.1/3.1			0.87/0.65
			M7	40/20	100/200	3.7/1.3	6.2/2.9			0.86/0.62
05	3	53 (117lb)	M3	17/8	50/100	9.3/3.1	13.0/5.3	71/24	20A	0.90/0.73
			M4	20/10	60/120	8.5/2.8	12.0/4.9			0.90/0.70
			M5	27/13	80/160	7.7/2.6	10.7/4.7			0.89/0.69
			M6	34/17	100/200	7.0/2.2	9.9/4.4			0.88/0.66
			M7	40/20	100/200	6.2/2.1	8.9/4.0			0.87/0.63

7.5.6 ZX08 Hoist Motor Data – 4:1 SPEED RATIO - 575V, 3Ph, 60Hz

Example from hoist model code: ZX084 - **4EoN****M6K07**1 - LHR0002 – **57560**N14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 575V(±6%) 60Hz							
			BS Class	CDF	S/h	Power	FLC	LRC	Main Fuse	Cos φ
				%		kW	A	A		
06	4	50 (110lb)	M3	17/8	50/100	10.9/2.7	18.3/8.0	62/17	25A	0.77/0.55
			M4	20/10	60/120	10.0/2.5	17.0/7.8			0.77/0.53
			M5	27/13	80/160	9.1/2.3	15.8/7.6			0.75/0.50
			M6	34/17	100/200	8.2/2.0	14.8/7.3			0.72/0.46
			M7	40/20	100/200	7.3/1.8	13.8/7.2			0.69/0.44
07	4	58 (128lb)	M3	17/8	50/100	13.4/3.4	20.2/9.5	77/20.2	25A	0.87/0.55
			M4	20/10	60/120	12.1/3.0	18.5/9.2			0.86/0.52
			M5	27/13	80/160	11.0/2.8	16.9/9.0			0.85/0.50
			M6	34/17	100/200	10.0/2.5	15.3/8.8			0.84/0.47
			M7	40/20	100/200	8.9/2.2	13.9/8.8			0.82/0.44
08	4	98 (216lb)	M3	17/8	50/100	15.6/3.8	24.7/10.0	115/25	30A	0.85/0.57
			M4	20/10	60/120	14.4/3.6	23.0/9.7			0.85/0.54
			M5	27/13	80/160	13.0/3.2	20.9/9.2			0.85/0.51
			M6	34/17	100/200	11.6/2.9	19.4/8.9			0.84/0.49
			M7	40/20	100/200	10.3/2.6	17.6/8.7			0.83/0.47
10	4	120 (265lb)	M3	17/8	50/100	23.0/5.8	33.3/14.9	181/39	40A	0.84/0.53
			M4	20/10	60/120	21.1/5.3	31.0/14.3			0.85/0.51
			M5	27/13	80/160	19.2/4.8	28.1/13.8			0.84/0.48
			M6	34/17	100/200	17.3/4.3	26.6/13.6			0.84/0.47
			M7	40/20	100/200	15.4/3.8	24.4/13.1			0.83/0.42

7.5.7 ZX06 Hoist Motor Data – 3:1 SPEED RATIO - 380(±10%)V, 3Ph, 60Hz

Example from hoist model code : ZX064 - 3EoNM5K031 - LHR0002 - 38060E14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
03	3	26 (57lb)	M3	17/8	50/100	3.7/1.2	9.1/5.24	29/16.5	16A	0.87/0.55
			M4	20/10	60/120	3.4/1.1	8.1/5.14			0.86/0.52
			M5	27/13	80/160	3.1/1.0	7.4/5.07			0.85/0.49
			M6	34/17	100/200	2.8/0.9	6.7/5.0			0.83/0.46
			M7	40/20	100/200	2.5/0.8	6.1/4.95			0.82/0.43
04	3	30 (66lb)	M3	17/8	50/100	4.7/1.6	12.8/4.8	52/19.4	20A	0.76/0.68
			M4	20/10	60/120	4.3/1.4	11.7/4.6			0.75/0.66
			M5	27/13	80/160	3.9/1.3	10.8/4.4			0.71/0.63
			M6	34/17	100/200	3.5/1.2	10.5/4.3			0.70/0.61
			M7	40/20	100/200	3.1/1.0	9.8/4.05			0.67/0.55
05	3	53 (117lb)	M3	17/8	50/100	7.8/2.6	18.5/8.5	87/29	40A	0.83/0.6
			M4	20/10	60/120	7.1/2.4	17.2/8.1			0.81/0.58
			M5	27/13	80/160	6.5/2.1	15.9/7.8			0.80/0.54
			M6	34/17	100/200	5.8/1.9	14.7/7.6			0.77/0.51
			M7	40/20	100/200	5.2/1.7	13.8/7.3			0.75/0.47

7.5.8 ZX08 Hoist Motor Data – 4:1 SPEED RATIO - 380(±10%)V, 3Ph, 60Hz

Example from hoist model code : ZX084 - 4EoNM6K071 - LHR0002 - 38060E14X

Hoist Motor	Speed Ratio	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz							
			BS Class	CDF %	S/h	Power kW	FLC A	LRC A	Main Fuse	Cos φ
06	4	50 (110lb)	M3	17/8	50/100	9.1/2.3	22.2/10.9	86/25.9	40A	0.86/0.49
			M4	20/10	60/120	8.4/2.1	20.1/10.6			0.80/0.48
			M5	27/13	80/160	7.6/1.9	18.9/10.2			0.78/0.42
			M6	34/17	100/200	6.8/1.7	16.6/10.2			0.80/0.40
			M7	40/20	100/200	6.1/1.5	15.4/10.2			0.76/0.37
07	4	58 (128lb)	M3	17/8	50/100	11.2/2.8	25.7/12.1	100/28	40A	0.83/0.53
			M4	20/10	60/120	10.1/2.5	23.6/11.7			0.82/0.50
			M5	27/13	80/160	9.2/2.3	21.7/11.4			0.80/0.48
			M6	34/17	100/200	8.3/2.1	20.3/11.2			0.79/0.45
			M7	40/20	100/200	7.4/1.8	18.8/11.0			0.76/0.41
08	4	98 (216lb)	M3	17/8	50/100	13.0/3.2	32.7/16.6	167/50	63A	0.84/0.44
			M4	20/10	60/120	12.0/3.0	31.0/16.4			0.83/0.42
			M5	27/13	80/160	10.8/2.7	27.9/16.2			0.83/0.40
			M6	34/17	100/200	9.7/2.4	26.4/16.0			0.82/0.37
			M7	40/20	100/200	8.6/2.2	24.8/15.8			0.80/0.35
10	4	120 (265lb)	M3	17/8	50/100	19.2/4.8		TBA	TBA	
			M4	20/10	60/120	17.6/4.4				
			M5	27/13	80/160	16.0/4.0	TBA			TBA
			M6	34/17	100/200	14.4/3.6				
			M7	40/20	100/200	12.8/3.2				

CDF = Cyclic duration factor (%ED), S/h = Motor starts per hour, FLC = Motor full load current, LRC = Locked rotor current, Cos φ = Power factor.

The motors are designed for the voltage range shown. The hoist motor 2 pole starting current and the rated current of the travel motor are used in selecting the recommended main fuse size.

Main fuses are type gL/gG. Fuse size in (parentheses) are for class 'J' fuses for CSA (CSA-22.2) approved installations.

7.5.9 ZX Dual Wound 'WU' Type Traverse Motor Data- 400V 50Hz

Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80SWU/2-8	12 (26lb)	M3/M4/M5	20/10	80/160	0.55/0.13	1.61/0.79	4.25/1.17	0.77/0.57
		M6	27/13	100/200	0.45/0.1	1.37/0.73		
		M7	40/20	120/240	0.37/0.09	1.32/0.73		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX062 - xxxxxxxxxxx - LHRxxx2 - 40050xxxx								
ZX064 - xxxxxxxxxxx - LHRxxx2 - 40050xxxx								
ZX062 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX064 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX086 - xxxxxxxxxxx - CRExxx2 - 40050xxxx								
ZX086 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX086 - xxxxxxxxxxx - LHCxxx2 - 40050xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80LWU/2-8	13 (29lb)	M3/M4/M5	20/10	80/160	0.60/0.13	1.63/0.74	4.85/1.18	0.9/0.7
		M6	27/13	100/200	0.55/0.13	1.47/0.74		
		M7	40/20	120/240	0.55/0.13	1.47/0.74		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX082 - xxxxxxxxxxx - LHRxxx2 - 40050xxxx								
ZX084 - xxxxxxxOxxx - LHRxxx2 - 40050xxxx								
ZX084 - xxxxxxxPxxx - LHRxxx2 - 40050xxxx								
ZX088 - xxxxxxxxxxx - LHCxxx2 - 40050xxxx								
ZX082 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX082 - xxxxxxxxxxx - CRExxx2 - 40050xxxx								
ZX084 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX084 - xxxxxxxxxxx - CRExxx2 - 40050xxxx								
ZX088 - xxxxxxxxxxx - CRBxxx2 - 40050xxxx								
ZX088 - xxxxxxxxxxx - CRExxx2 - 40050xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90SWU/2-8	17 (38lb)	M3/M4/M5	20/10	80/160	1.3/0.24	3.38/1.35	9.75/2.36	0.87/0.59
		M6	27/13	100/200	0.8/0.2	2.50/1.31		
		M7	40/20	120/160	0.8/0.2	2.50/1.31		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90LWU/2-8	19 (42lb)	M3/M4/M5	20/10	80/160	1.65/0.32	3.93/1.7	13.3/3.15	0.79/0.59
		M6	27/13	100/200	1.2/0.3	3.17/1.66		
		M7	40/20	120/160	1.2/0.3	3.17/1.66		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								

7.5.10 ZX Dual Wound 'WU' Type Traverse Motor Data- 460V 60Hz

Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 460V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80SWU/2-8	12 (26lb)	M3/M4/M5	20/10	80/160	0.63/0.14	1.5/0.73	4.12/1.14	0.77/0.57
		M6	27/13	100/200	0.52/0.115	1.33/0.71		
		M7	40/20	120/240	0.42/0.10	1.22/0.69		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX062 - xxxxxxxxxxx - LHRxxx2 - 46060xxxx								
ZX064 - xxxxxxxxxxx - LHRxxx2 - 46060xxxx								
ZX062 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX064 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX086 - xxxxxxxxxxx - CRExxx2 - 46060xxxx								
ZX086 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX086 - xxxxxxxxxxx - LHCxxx2 - 46060xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 460V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80LWU/2-8	13 (29lb)	M3/M4/M5	20/10	80/160	0.65/0.15	1.39/0.68	4.52/1.09	0.9/0.7
		M6	27/13	100/200	0.63/0.15	1.37/0.68		
		M7	40/20	120/240	0.63/0.15	1.37/0.68		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX082 - xxxxxxxxxxx - LHRxxx2 - 46060xxxx								
ZX084 - xxxxxxxOxxx - LHRxxx2 - 46060xxxx								
ZX084 - xxxxxxxPxxx - LHRxxx2 - 46060xxxx								
ZX088 - xxxxxxxxxxx - LHCxxx2 - 46060xxxx								
ZX082 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX082 - xxxxxxxxxxx - CRExxx2 - 46060xxxx								
ZX084 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX084 - xxxxxxxxxxx - CRExxx2 - 46060xxxx								
ZX088 - xxxxxxxxxxx - CRBxxx2 - 46060xxxx								
ZX088 - xxxxxxxxxxx - CRExxx2 - 46060xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 460V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90SWU/2-8	17 (38lb)	M3/M4/M5	20/10	80/160	1.5/0.26	3.15/1.24	8.89/2.18	0.87/0.59
		M6	27/13	100/200	0.92/0.23	2.28/1.21		
		M7	40/20	120/160	0.92/0.23	2.28/1.21		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 460V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90LWU/2-8	19 (42lb)	M3/M4/M5	20/10	80/160	1.8/0.35	3.53/1.58	12.1/2.96	0.79/0.59
		M6	27/13	100/200	1.38/0.35	2.89/1.56		
		M7	40/20	120/160	1.38/0.35	2.89/1.56		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								

7.5.11 ZX Dual Wound 'WU' Type Traverse Motor Data- 575V 60Hz

Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 575V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80SWU/2-8	12 (26lb)	M3/M4/M5	20/10	80/160	0.63/0.14	1.31/0.64	3.09/0.92	0.77/0.57
		M6	27/13	100/200	0.52/0.115	1.21/0.62		
		M7	40/20	120/240	0.42/0.10	1.12/0.61		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX062 - xxxxxxxxxxx - LHRxxx2 - 57560xxxx								
ZX064 - xxxxxxxxxxx - LHRxxx2 - 57560xxxx								
ZX062 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX064 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX086 - xxxxxxxxxxx - CRExxx2 - 57560xxxx								
ZX086 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX086 - xxxxxxxxxxx - LHCxxx2 - 57560xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 575V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80LWU/2-8	13 (29lb)	M3/M4/M5	20/10	80/160	0.65/0.15	1.2/0.58	5.28/1.17	0.88/0.69
		M6	27/13	100/200	0.63/0.15	1.16/0.58		
		M7	40/20	120/240	0.63/0.15	1.16/0.58		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX082 - xxxxxxxxxxx - LHRxxx2 - 57560xxxx								
ZX084 - xxxxxxxOxxx - LHRxxx2 - 57560xxxx								
ZX084 - xxxxxxxPxxx - LHRxxx2 - 57560xxxx								
ZX088 - xxxxxxxxxxx - LHCxxx2 - 57560xxxx								
ZX082 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX082 - xxxxxxxxxxx - CRExxx2 - 57560xxxx								
ZX084 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX084 - xxxxxxxxxxx - CRExxx2 - 57560xxxx								
ZX088 - xxxxxxxxxxx - CRBxxx2 - 57560xxxx								
ZX088 - xxxxxxxxxxx - CRExxx2 - 57560xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 575V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90SWU/2-8	17 (38lb)	M3/M4/M5	20/10	80/160	1.5/0.26	2.65/1.12	7.61/1.79	0.87/0.65
		M6	27/13	100/200	0.92/0.23	2.05/1.1		
		M7	40/20	120/160	0.92/0.23	2.05/1.1		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 575V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90LWU/2-8	19 (42lb)	M3/M4/M5	20/10	80/160	1.8/0.35	2.98/1.41	9.91/2.25	0.8/0.59
		M6	27/13	100/200	1.38/0.35	2.52/1.41		
		M7	40/20	120/160	1.38/0.35	2.52/1.41		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								

7.5.12 ZX Dual Wound 'WU' Type Traverse Motor Data- 380V 60Hz

Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80SWU/2-8	12 (26lb)	M3/M4/M5	20/10	80/160	0.63/0.14	2.50/1.04	7.56/1.62	0.77/0.57
		M6	27/13	100/200	0.52/0.115	2.44/1.01		
		M7	40/20	120/240	0.42/0.10	2.37/1.0		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX062 - xxxxxxxxxxx - LHRxxx2 - 38060xxxx								
ZX064 - xxxxxxxxxxx - LHRxxx2 - 38060xxxx								
ZX062 - xxxxxxxxxxx - CRBxxx2 - 38060xxxx								
ZX064 - xxxxxxxxxxx - CRBxxx2 - 38060xxxx								
ZX086 - xxxxxxxxxxx - CRExxx2 - 38060xxxx								
ZX086 - xxxxxxxxxxx - CRBxxx2 - 38060xxxx								
ZX086 - xxxxxxxxxxx - LHCxxx2 - 38060xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80LWU/2-8	13 (29lb)	M3/M4/M5	20/10	80/160	0.65/0.15	1.69/0.82	5.45/1.31	0.9/0.7
		M6	27/13	100/200	0.63/0.15	1.65/0.82		
		M7	40/20	120/240	0.63/0.15	1.65/0.82		
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX082 - xxxxxxxxxxx - LHRxxx2 - 38060xxxx								
ZX084 - xxxxxxxOxxx - LHRxxx2 - 38060xxxx								
ZX084 - xxxxxxxPxxx - LHRxxx2 - 38060xxxx								
ZX088 - xxxxxxxxxxx - LHCxxx2 - 38060xxxx								
ZX082 - xxxxxxxxxxx - CRBxxx2 - 38060xxxx								
ZX082 - xxxxxxxxxxx - CRExxx2 - 38060xxxx								
ZX084 - xxxxxxxxxxx - CRBxxx2 -38060xxxx								
ZX084 - xxxxxxxxxxx - CRExxx2 - 38060xxxx								
ZX088 - xxxxxxxxxxx - CRBxxx2 - 38060xxxx								
ZX088 - xxxxxxxxxxx - CRExxx2 - 38060xxxx								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90SWU/2-8	17 (38lb)	M3/M4/M5	20/10	80/160	1.5/0.26	4.03/1.71	12.05/3.0	0.87/0.59
		M6	27/13	100/200	0.92/0.23	3.09/1.66		
		M7	40/20	120/160	0.92/0.23	3.09/1.66		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 380V(±10%) 60Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
90LWU/2-8	19 (42lb)	M3/M4/M5	20/10	80/160	1.8/0.35	4.64/2.15	16.7/4.07	0.79/0.59
		M6	27/13	100/200	1.38/0.345	4.0/2.14		
		M7	40/20	120/160	1.38/0.345	4.0/2.14		
ABOVE MOTOR IS NOT USED ON ANY STANDARD ZX6 or ZX8 MODELS:-								

7.5.13 ZX Traverse Motor Data for use with Frequency Inverter

Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
71 S/4	8.4 (19lb)	N/A	N/A	N/A	0.25	0.76	N/A	0.77
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX062 - XXXXXXXXXXXX - LHRxxx1 - XXXXXXXXXXXX								
ZX064 - XXXXXXXXXXXX - LHRxxx1 - XXXXXXXXXXXX								
ZX062 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
ZX064 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
71 L/4	9.3 (21lb)	N/A	N/A	N/A	0.37	1.09	N/A	0.71
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX086 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
ZX086 - XXXXXXXXXXXX - CRExxx1 - XXXXXXXXXXXX								
ZX086 - XXXXXXXXXXXX - LHCxxx1 - XXXXXXXXXXXX								
ZX062 - XXXXXXXXXXXX - LHRxxx4 - XXXXXXXXXXXX								
ZX064 - XXXXXXXXXXXX - LHRxxx4 - XXXXXXXXXXXX								
ZX062 - XXXXXXXXXXXX - CRBxxx4 - XXXXXXXXXXXX								
ZX064 - XXXXXXXXXXXX - CRBxxx4 - XXXXXXXXXXXX								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80 S/4	12 (26lb)	N/A	N/A	N/A	0.55	1.52	N/A	0.73
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								
ZX082 - XXXXXXXXXXXX - LHRxxx1 - XXXXXXXXXXXX								
ZX084 - XXXXXXXXXXXX - LHRxxx1 - XXXXXXXXXXXX								
ZX082 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
ZX084 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
ZX082 - XXXXXXXXXXXX - CRExxx1 - XXXXXXXXXXXX								
ZX084 - XXXXXXXXXXXX - CRExxx1 - XXXXXXXXXXXX								
ZX088 - XXXXXXXXXXXX - CRBxxx1 - XXXXXXXXXXXX								
ZX088 - XXXXXXXXXXXX - CRExxx1 - XXXXXXXXXXXX								
ZX088 - XXXXXXXXXXXX - LHCxxx1 - XXXXXXXXXXXX								
ZX082 - XXXXXXXXXXXX - LHRxxx4 - XXXXXXXXXXXX								
ZX084 - XXXXXXXOxxx - LHRxxx4 - XXXXXXXXXXXX								
ZX086 - XXXXXXXXXXXX - CRBxxx4 - XXXXXXXXXXXX								
ZX086 - XXXXXXXXXXXX - CRExxx4 - XXXXXXXXXXXX								
ZX088 - XXXXXXXXXXXX - CRBxxx4 - XXXXXXXXXXXX								
ZX088 - XXXXXXXXXXXX - CRExxx4 - XXXXXXXXXXXX								
ZX086 - XXXXXXXXXXXX - LHCxxx4 - XXXXXXXXXXXX								
Traverse Motor Frame	Motor Mass (kg)	Motor Ratings at 400V(±10%) 50Hz						
		Classification	CDF	S/h	Power	FLC	LRC	Cos φ
			%		kW	A	A	
80 L/4	13 (29lb)	N/A	N/A	N/A	0.75	2.10	N/A	0.74
ABOVE MOTOR IS USED ON THE FOLLOWING HOIST MODELS:-								

ZX084 - XXXXXX P xxx - LHRxxx 4 - XXXXXXXXX
ZX088 - XXXXXXXXXX - LHCxxx 4 - XXXXXXXXX
ZX082 - XXXXXXXXXX - CRBxxx 4 - XXXXXXXXX
ZX084 - XXXXXXXXXX - CRBxxx 4 - XXXXXXXXX

NOTE:

Street Crane policy is to where possible run motors at 87 Hz full speed from the inverter connected in Delta. The inverter will be common to all voltages as a transformer will be used, therefore CT inverter motors will be wound to 400V 50 Hz base and will be common for main supply voltages.

IMPORTANT please contact Street Crane for inverter parameters if required.

7.6 CABLE CROSS SECTION AND LENGTH OF SUPPLY CABLE

Hoist Motor	Monorail Installation						Crane Installation					
	Flexible PVC sheathed festoon cable in free air from point of supply to hoist.						Flexible PVC sheathed festoon cable in free air along crane bridge to hoist.					
	400V(±10%) 50Hz		460V(±6%) 60Hz		575V (±6%) 60Hz		400V(±10%) 50Hz		460V(±6%) 60Hz		575V (±6%) 60Hz	
	CSA (mm ²)	Max Length (m)	CSA (mm ²)	Max Length (m)	CSA (mm ²)	Max Length (m)	CSA (mm ²)	Max Length (m)	CSA (mm ²)	Max Length (m)	CSA (mm ²)	Max Length (m)
03	2.5	60	2.5	69	2.5	87	2.5	22	2.5	26	2.5	33
	-	-	-	-	-	-	4.0	35	4.0	41	4.0	53
	-	-	-	-	-	-	6.0	53	6.0	62	6.0	79
04	2.5	36	2.5	41	2.5	53	2.5	13	2.5	15	2.5	19
	4.0	57	4.0	66	4.0	83	4.0	20	4.0	24	4.0	31
	-	-	-	-	-	-	6.0	30	6.0	35	6.0	46
	-	-	-	-	-	-	10.0	51	10.0	60	10.0	77
05	2.5	25	2.5	29	2.5	37	2.5	9	2.5	11	2.5	14
	4.0	40	4.0	46	4.0	59	4.0	14	4.0	17	4.0	22
	6.0	60	6.0	69	6.0	88	6.0	21	6.0	25	6.0	33
	-	-	-	-	-	-	10.0	36	10.0	43	10.0	56
06	4.0	38	4.0	44	4.0	56	4.0	13	4.0	16	4.0	21
	6.0	56	6.0	65	6.0	83	6.0	20	6.0	24	6.0	31
	-	-	-	-	-	-	10.0	34	10.0	40	10.0	52
	-	-	-	-	-	-	16.0	55	16.0	64	16.0	83
07	6.0	51	6.0	59	6.0	74	6.0	19	6.0	22	6.0	28
	10.0	86	10.0	99	10.0	125	10.0	32	10.0	37	10.0	47
	-	-	-	-	-	-	16.0	50	16.0	59	16.0	75
08	6.0	34	6.0	39	6.0	50	6.0	12	6.0	14	6.0	18
	10.0	57	10.0	66	10.0	84	10.0	20	10.0	24	10.0	31
	-	-	-	-	-	-	16.0	32	16.0	38	16.0	49
10					10.0	46					10.0	17
	TBA				16.0	74	TBA				16.0	28

CSA is the recommended conductor cross sectional area for the cable length stated.

Max supply cable length for monorail installation assumes 5% voltage loss from point of supply to hoist.

Max supply cable length for crane installation assumes 2% voltage loss along crane bridge to hoist (allowing 3% losses in supply to crane).

For 380V cable data consult Street Crane.

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www.streetcrane.co.uk

Street

Street Crane Company Limited, Chapel-en-le-Frith, High Peak SK23 0PH, UK
email: admin@streetcrane.co.uk web: www.streetcrane.co.uk
Telephone: +44 (0) 1298 812456



Certificate No. FM13635
Quality Management ISO 9001

SECTION 6.

WHEELS & DRIVES

EXCELLENCE IN SERVICE AND SUPPORT

SUPERIOR PRODUCTS AND DESIGN



End Carriage User Manual

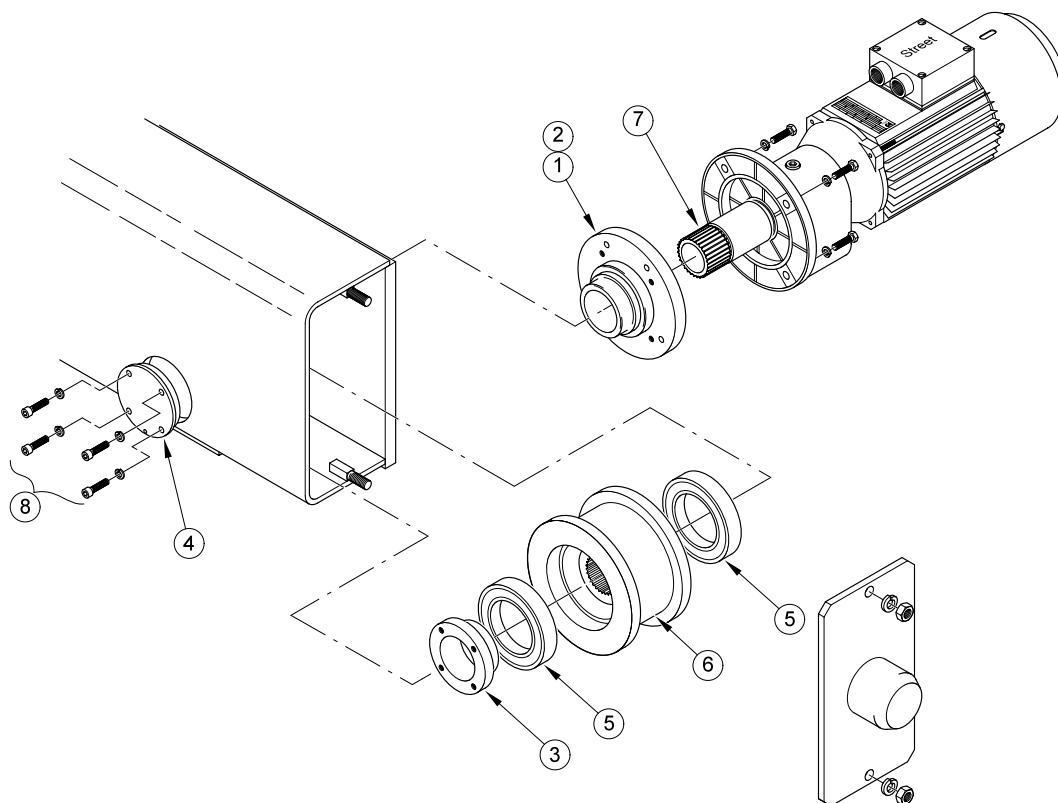
End Carriage Serial No.: _____



Street Crane Company Limited
Chapel-en-le-Frith
High Peak
SK23 0PH
United Kingdom
e-mail admin@streetcrane.co.uk
web <http://www.streetcrane.co.uk>
Tel +44 (0) 1298 812456
Fax +44 (0) 1298 814945

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DIRECT DRIVE WHEEL ASSEMBLY



Each wheel assembly comprises of the following components :-

Item	Quantity	Description
①	2 No.....	Drive adaptor / bearing support (drive assembly only).
②	2 No.....	Bearing Support (non-drive assembly only).
③	4 No.....	Bearing Stub Shaft.
④	4 No.....	Flanged Plug.
⑤	8 No.....	Ball Bearings (Sealed For Life).
⑥	4 No.....	Travel Wheels. (2 No. Driven / 2 No. Non-driven)
⑦	2 No.....	Splined Drive Couplings (drive assembly only).
⑧		Fixings & Washers.

The travel drive assembly comprises of a double flanged wheel supported and running on bearing stubs. The travel brake is mounted on the rear of the motor shaft.

This assembly is generally maintenance free as the ball bearings are sealed for life. The only lubrication required is the lubrication of the travel drive unit gearbox, see lubrication schedule for details. Should the drive unit be removed for any reason then the coupling splines should be lightly greased with a copper grease prior to re-assembly.

Wheel should be replaced if :-

- Flange thickness is less than half of its original thickness.
- Flange is damaged or distorted.
- Wheel tread diameter has been reduced by max. of 5% of its original value.

Caution : Before removing a crane wheel check :

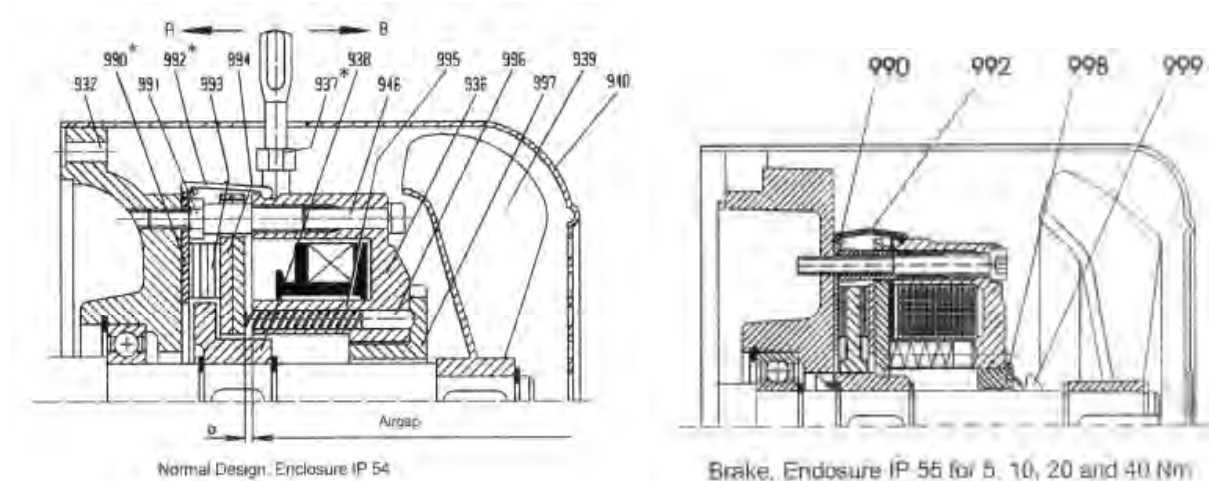
- That there is no load on the hook.
- That the hoist / crab unit is positioned at the opposite side of the crane from the side to be jacked.

DIRECT DRIVE WHEEL ASSEMBLY

Wheel Removal

- Disconnect the power cables from the drive terminal box making notes of each cable and its relative terminal connection.
- Support the drive unit and remove the four bolts which fasten the drive to the support stub.
- Withdraw the drive unit, taking care not to invert the drive as this will cause oil to leak from the filler/breather plug.
- Unbolt and remove the end carriage end plate.
- Measure inside the end carriage to the first stiffening diaphragm and position the jack directly beneath this diaphragm. **Caution** : Buckling of the end carriage may occur if this procedure is not followed.
- Jack up the end carriage just sufficient to allow the wheel to rotate freely.
- Insert packs between the rail and the carriage, positioning them as close to the diaphragm as possible.
- Unbolt and remove the bearing support.
- Unbolt and remove the flanged plug
- Withdraw the wheel along with the bearing stub shaft through the end of the end carriage.

SK-F DRIVE



932	Non-drive endshield	991	Setting bolt
936	Complete brake	992	Brake seal ¹⁾
937	Manual brakereferse	993	Brake lining
938	Brake hub	994	Armature
939	Fan	995	Spring
940	Fan-cowl	996	Pressure plate **
946	Fixing screw	997	Adjusting ring **
971	O-Ring	998	Bushing / Seal
990	Friction plate	999	V-Ring

* Option

** only for brakes 5 Nm to 40 Nm

¹⁾ not for Brakes 20 Nm, 400 Nm and 800 Nm

Operation of the Brake

The brake is released by applying a DC current to the brake coil. The armature plate is pulled towards the stator. The rotor, connected to the drive shaft by a splined hub, is then released. When the brake coil is de-energised, the brake springs exert pressure between the armature plate, the rotor and the mounting flange, producing the braking torque. With power failure the brake is applied automatically, satisfying the fail safe braking principle. The brake can be overridden by operating the hand release mechanism.

Maintenance of the Brake

To maintain a safe and efficient braking action, regular inspection of the brake is essential. Generally, a one monthly interval is sufficient, but for higher duty applications refer to the Inspection & Maintenance Schedule for specific frequencies. When inspecting the brake, particular attention should be made to the air gap, upon inspection, check this dimension complies with the min. air gap, as outlined below.

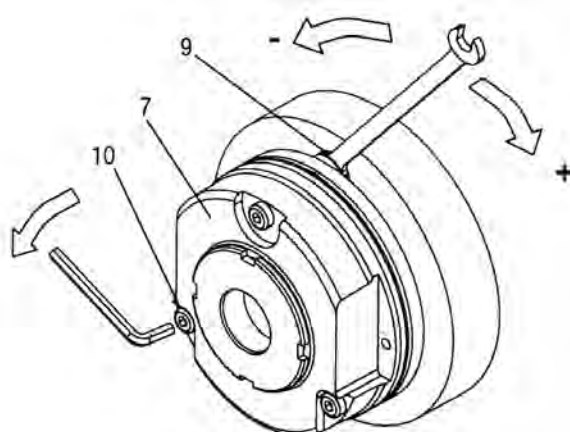
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SK-F DRIVE

Braking Torque M_B	[Nm]	5	10	20	40
Power of coil P 20	[W]	22	28	39	42
Normal air gap a	[mm]	0.2	0.2	0.2	0.3
Re-adjustment recommended at a_{max}	[mm]	0.7	0.8	n/a	0.9
Max. permissible wear V	[mm]	3.0	3.0	1.00	3.0
Min. permissible lining thickness	[mm]	4.5	5.5	7.5	9.5
Table LT015/1					

Checking / Setting the Air Gap (see LT015/1.)

The air gap 'a' (between the stator and the armature plate) should be checked in at least three positions around the brake using non-magnetic feeler gauges. The air gap should not exceed the max.



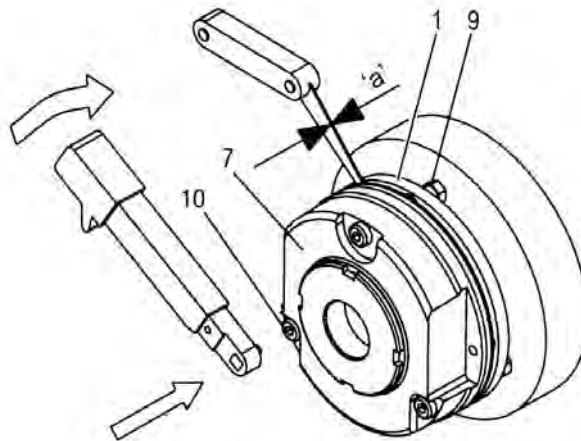
Where adjustment is required, slacken the assembly fixings (10)

Adjust air gap by turning the adjustment tubes (9) until the nominal air gap 'a' is reached.

- If the air gap is too large, screw the adjustment tubes into the stator (7).
- If the air gap is too small, screw the adjustment tubes out of the stator (7).

NOTE: 1/6 turn adjusts the air gap by approx. 0.15mm

SK-F DRIVE



- Re-tighten the assembly fixings to the recommended torque value (see Table LT015/1)
Re-check the air gap and repeat adjustment if necessary.

Changing the Rotor (brake disc)

CAUTION: Before changing the rotor, lower the bottom block to a suitable level (floor or platform) and allow it to rest on a solid support.

- Disconnect the supply to the brake.
- Loosen the assembly fixings evenly and remove them (take care to support the brake body).
- Remove the brake body, taking note of its orientation.
- The old rotor (brake disc) will now be exposed. Withdraw the rotor from its hub by hand.
- Check the condition of the splining on the brake hub. If damaged, the hub should also be replaced.
- Check the braking surface on the mounting flange or friction plate. Replace where strong scoring is observed.
- Measure both the new rotor thickness and length of protrusion of the adjustment tubes from the back of the brake.
- Calculate the distance between the stator and the armature plate as follows: -

Distance = Rotor thickness + Nominal Air Gap 'a' – adjustment tube height

- The adjustment tubes should be unscrewed until the calculated distance between the stator and the armature plate is reached.
- Slide the new rotor onto the hub.
- Replace the brake assembly in the same orientation as originally.
- Replace the assembly fixings and torque to the value stated in Table LT015/1.
- Check and adjust, if necessary, the Brake Air Gap 'a'.
- Re-connect the brake supply.

TRAVEL BRAKE MOTORS TYPE “EFB2” & “EFB3”

Operation Of The Brake

The travel brake is designed to provide a braking action with the removal of the electrical power, either accidentally or intentionally.

The brake is released by applying a direct current to the brake coil. This causes the pressure plate to become magnetically attracted towards the brake end shield which in turn releases the brake disc (fan). When direct current is removed from the brake coil the central brake spring pushes the pressure plate onto the brake lining thus producing a braking force.

The direct current for the brake is derived from an AC/DC rectifier which is mounted in the drive terminal box.

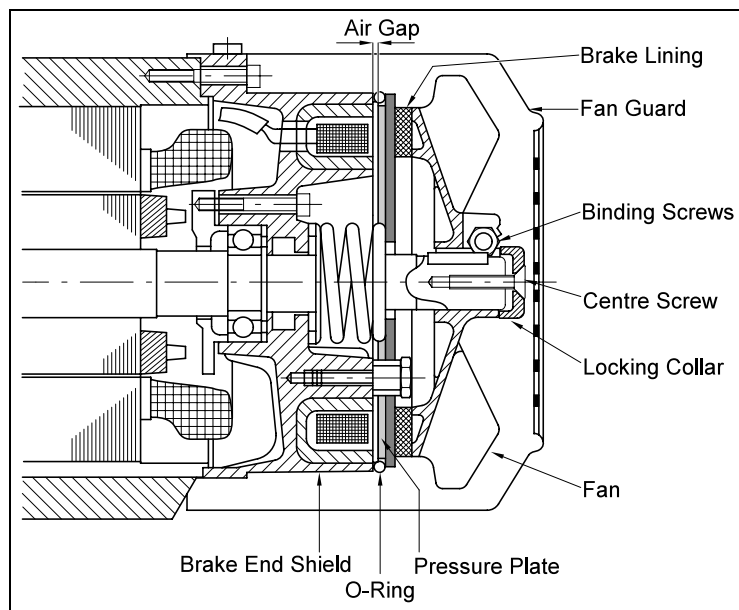


Fig LT005/1.

Warning: Ensure that the mains power is isolated before starting any maintenance work.

Maintenance Of The Brake

The travel drive fitted is a flange mounted helical geared brake motor. This type of drive has a sealed for life gearbox which will not require re-lubricating. The only maintenance the motor will require is the checking and adjusting, if necessary, of the brake Air Gap and the possible renewing of the brake lining.

Checking the Air Gap (see LT005/1.)

- Remove the Fan guard.
- Remove O-ring.
- Use non magnetic feeler gauges to check Air Gap. When the working gap exceeds that stated in Table LT005/1. then the brake must be adjusted.

TRAVEL BRAKE MOTORS TYPE “EFB2” & “EFB3”

Adjusting the Air Gap

- Remove the Fan guard.
- Loosen the binding screws.
- Remove O-ring.
- Insert a shim or non-magnetic feeler gauges between Brake end shield and the Pressure plate. Thickness should be 0.25 - 0.30mm
- Tighten the centre screw until the shim or gauges are a sliding fit (do not clamp tight).
- Check that the Air gap is constant at a minimum of three places around the brake.
- Evenly tighten the binding screws starting with the screw opposite the key. For tightening torque see Table LT005/1.
- Re-tighten the centre screw.
- Replace O-ring and fan guard.
- Test run brake.

The brake lining should be replaced when it is not possible to re-set the Air gap to the recommended setting.

Brake Type (See motor Nameplate)	Nominal Brake Torque (Nm) (See motor Nameplate)	Maximum Air Gap (mm)	Tightening torque for binding screws (Nm)
EFB2	6.0 - 7.5	0.6	5.5
	3.8 - 5.4	0.7	
	2.9 - 3.7	0.9	
	2.1 - 2.8	0.55	
	1.5 - 2.0	0.65	
	1.0 - 1.4	0.9	
	0.7 - 1.1	1.1	
EFB3	20.2 - 25.0	0.6	9.0
	15.2 - 21.6	0.8	
	8.9 - 13.3	1.0	
	4.1 - 7.9	0.85	
	2.9 - 4.7	1.2	
	1.3 - 2.3	1.4	

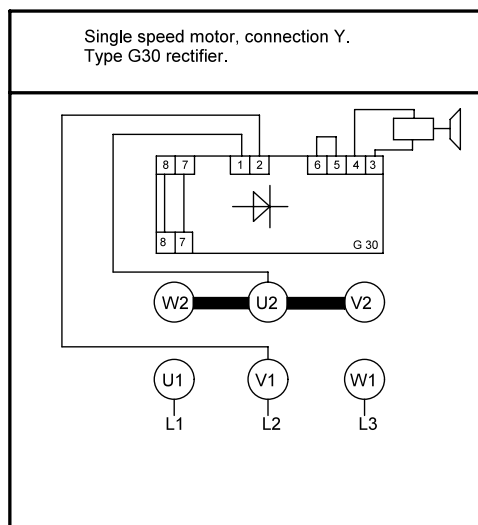
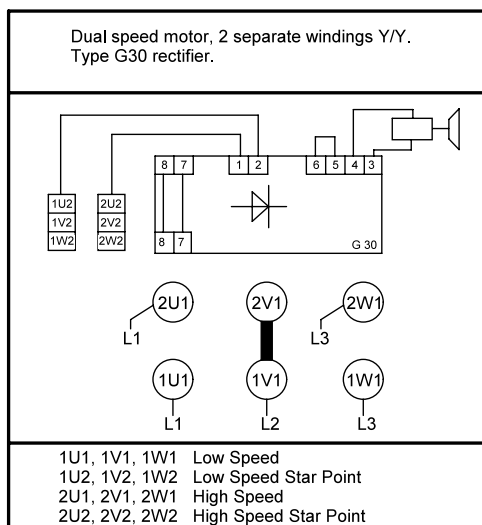
Table LT005/1

Renewing The Brake Lining / Fan

- Remove the Fan guard.
- Loosen the binding screws
- Remove the centre screw and the locking collar.
- Withdraw the fan, taking care not to loose the key.
- Replace the lining and fan which are supplied bonded together.
- Replace the locking collar and centre screw.
- Adjust the Air Gap.

TRAVEL BRAKE MOTORS TYPE “EFB2” & “EFB3”

Brake Rectifier Circuit Diagrams



(Direct Drive Assembly)

INSPECTION & MAINTENANCE SCHEDULE

	Duty	A	B	C	D	E
BRAKES: Carry out a functional check of the motion brakes to ascertain that they operate efficiently. If not, dismantle, clean, adjust and renew worn parts where necessary.	M3		•			
	M4		•			
	M5	•				
	M6	•				
DRIVEN COMPONENTS: Check the condition of the wheels for signs of wear on the tread & flanges.	M3		•			
	M4		•			
	M5		•			
	M6		•			
BEARINGS Check wheel bearings for signs of damage or wear.	M3				•	
	M4				•	
	M5				•	
	M6				•	
WIRES AND CABLES: Inspect wires and cables for signs of damage and ensure that each wire is secure.	M3				•	
	M4				•	
	M5				•	
	M6				•	

Maintenance Intervals:- A = Weekly, B = Monthly, C = 3 Monthly, D = Annually, E = Every 2 Years

("SK-F" Drive)

LUBRICATION SCHEDULE

ITEM	Duty	A	B	C	D	E	Qty	Lubricant Characteristics
GEARBOX : Check level via inspection plug and top up as required.	M3		●				As Req'd	Industrial gear oil :- ISO classification 220 Specific gravity 0.897 Pour point -18°C Closed flash point 205°C Viscosity @ 40°C 220.2cSt @100°C 19.5cSt Viscosity Index 100
	M4		●					
	M5		●					
	M6		●					
	M7		●					
	M8		●					
Drain and refill with new oil.	M3					●	As Req'd	
	M4					●		
	M5					●		
	M6					●		
	M7					●		
	M8					●		
GEARBOX AND MOTOR BEARINGS : Only applicable to frame sizes 225 or higher Apply via grease nipple.	M3					●	2 shots	EP Grease :- Drop point 175°C Pour point -10°C Flash point 280°C Timken OK load 45lbs Viscosity @ 40°C 175cSt Viscosity Index 80
	M4					●		
	M5					●		
	M6					●		
	M7					●		
	M8					●		

The above lubrication schedule is suitable for an ambient temperature range of -10 to +55°C

Lubrication Intervals:- A = Weekly, B = Monthly, C = 3 Monthly, D = Annually, E = Every 2 Years

“ABM” Drive

LUBRICATION SCHEDULE

ITEM	Duty	A	B	C	D	E	Qty	Lubricant Characteristics
GEARBOX:	M3						Non	Gearbox is greased filled and does not require any lubrication.
	M4							
	M5							
	M6							
	M7							
	M8							

The above lubrication schedule is suitable for an ambient temperature range of -10 to +55°C

Lubrication Intervals:- A = Weekly, B = Monthly, C = 3 Monthly, D = Annually, E = Every 2 Years

SECTION 7.

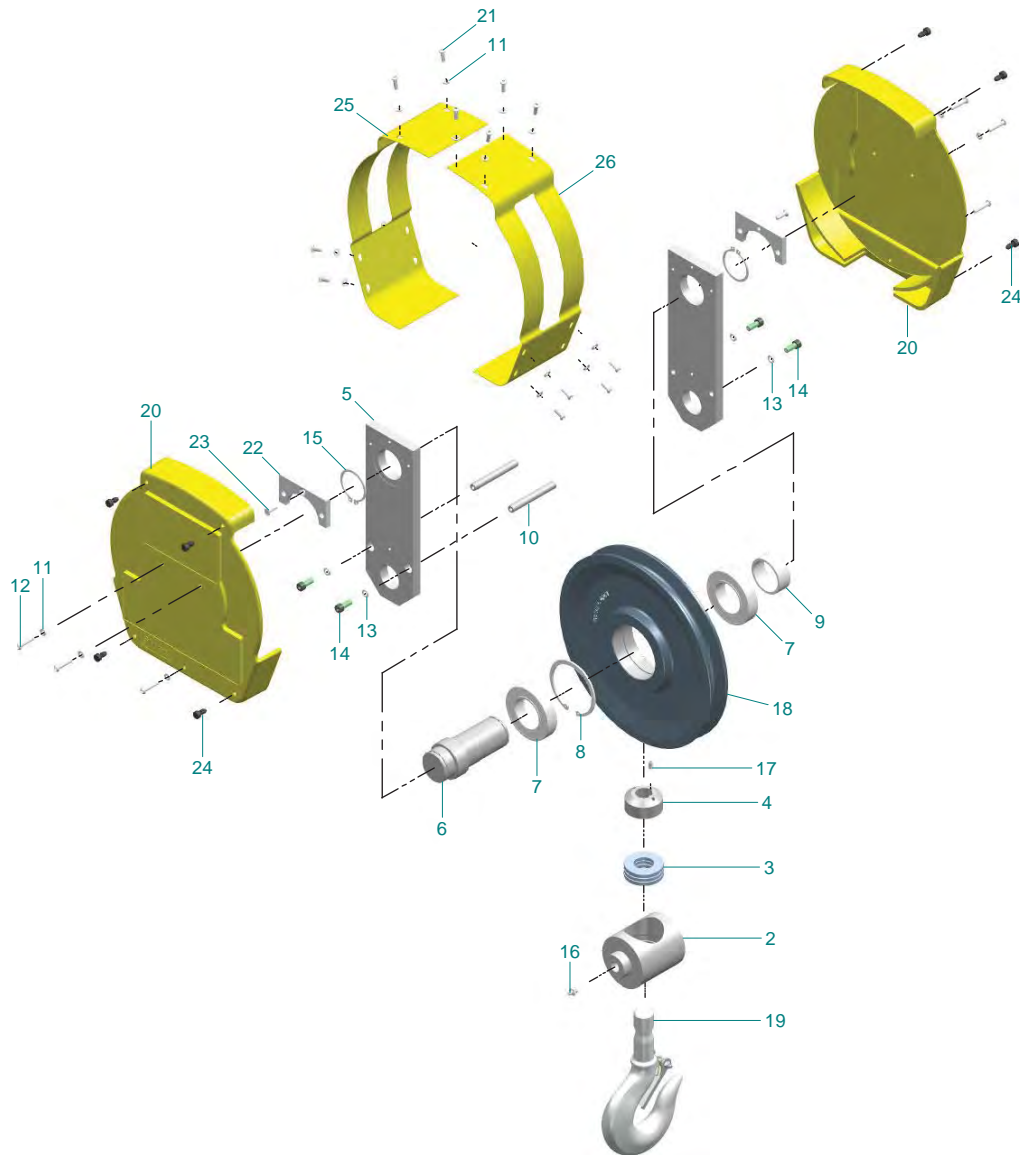
SPARE PARTS

EXCELLENCE IN SERVICE AND SUPPORT

SUPERIOR PRODUCTS AND DESIGN



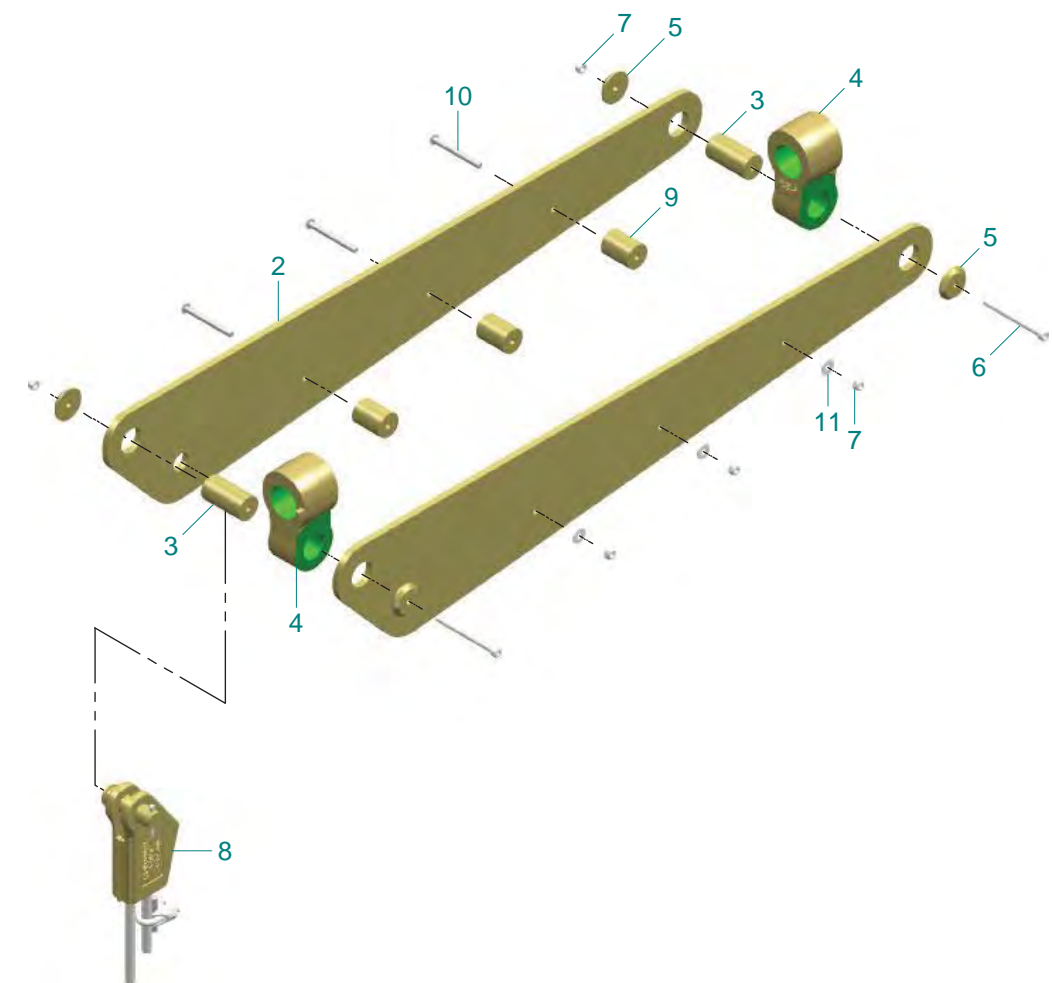
ZX8 SERIES HOIST UNIT 2 FALL BOTTOM BLOCK (ZX082-*****_*****_*****)



ZX8 SERIES HOIST UNIT 2 FALL BOTTOM BLOCK (ZX082-*****_*****_*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	2F BOTTOM BLOCK ASSEMBLY (ASSEMBLY DRAWING)	820-1491
2	1	2F BOTTOM BLOCK CROSSHEAD	220-3811
3	1	THRUST BALL BEARING	350-371
4	1	2F BOTTOM BLOCK HOOK NUT	220-4301
5	2	2F BOTTOM BLOCK SIDEPLATE	220-4311
6	1	2F BOTTOM BLOCK CENTRE PIVOT BAR	220-4331
7	2	BALL BRG	35-50611
8	1	INTERNAL CIRCLIP	55-80551
9	1	2F BOTTOM BLOCK SHEAVE SPACER	220-4341
10	2	2F BOTTOM BLOCK CROSSHEAD SPACER	220-4321
11	20	SPRING WASHER TYPE B BZP	55-65053
12	6	BUTTON HEAD CAP SCREW	54-29021
13	4	SPRING WASHER TYPE A BZP	55-65061
14	4	SOCKET HEAD CAP SCREW BZP	54-16071
15	2	EXTERNAL CIRCLIP	55-81401
16	1	GREASE NIPPLE	57-10371
17	1	GRUB SCREW W-POINT BZP	54-35851
18	1	SHEAVE 280 BOG - MACHINING (13mm ROPE)	220-1841
19	1	2F HOOK ASSEMBLY	220-4051
20	2	2F BOTTOM BLOCK COVER M/C	220-4351
21	14	BUTTON HEAD SOCKET CAP SCREW BZP	54-29001
22	2	ZX8 5T 2FBOTTOM BLOCK COVER SPACER	220-4471
23	2	CSK SCKT HEAD SCREW	54-25521
24	8	BLIND GROMMET 6.2 DIA HOLE 5 THK PANEL	740-51
25	1	2F BOTTOM BLOCK INTERMEDIATE COVER	220-16171
26	1	2F BOTTOM BLOCK INTERMEDIATE COVER	220-16161

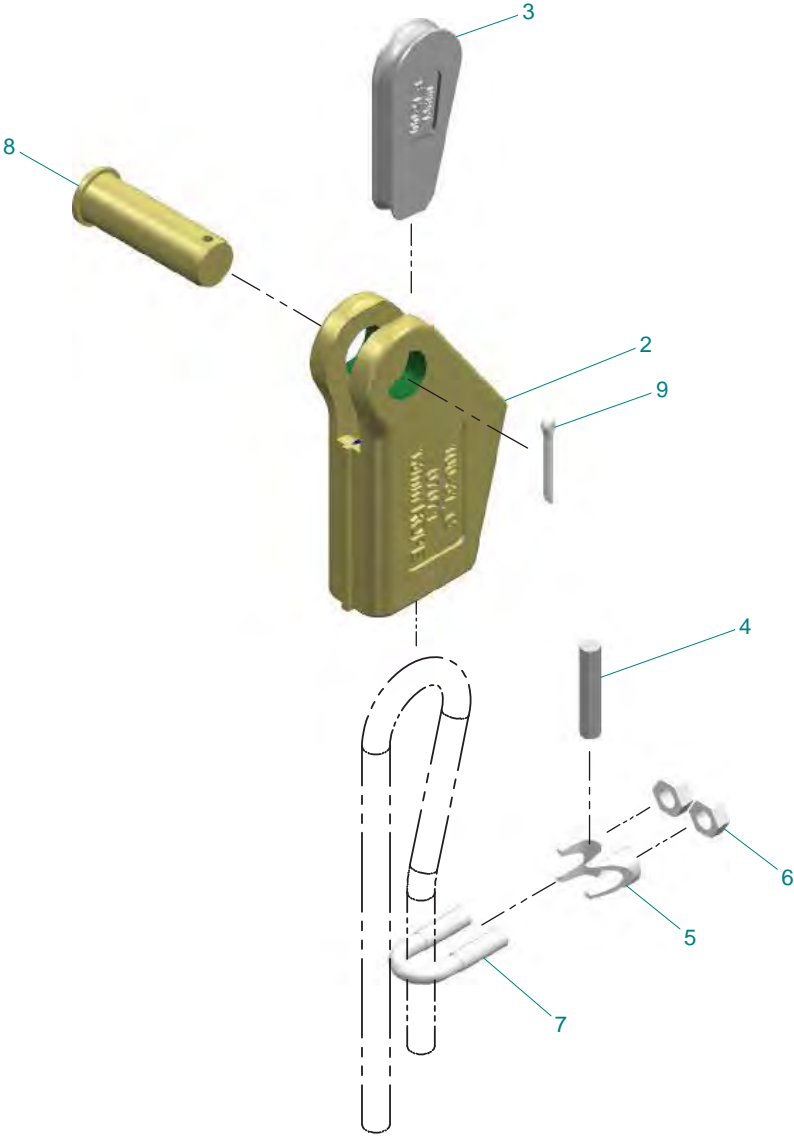
ZX8 SERIES HOIST UNIT
2 FALL ANCHOR HOUSING (ZX082-*****_*****_*****)



ZX8 SERIES HOIST UNIT
2 FALL ANCHOR HOUSING (ZX082-*****_*****_*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER		
			NORMAL BARREL (ZX082-***N)	LONG BARREL (ZX082-***L)	EXTRA LONG BARREL (ZX082-***E)
1	1	ANCHOR HOUSING ASSY DRG (ZX82-*****-LHR)	820-1781	820-1791	820-1841
		ANCHOR HOUSING ASSY DRG (ZX82-*****-CRB)	820-3051	820-3061	820-3071
		(ZX82-*****-CRE)			
		ANCHOR HOUSING ASSY DRG (ZX82-*****-FTM)	820-3081	820-3091	820-3101
2	2	2F LB ANCHOR SIDE PLATE	220-4591	220-4601	820-4611
3	2	SHEAVE PLATE PIN		220-1261	
4	2	NB SHEAVE ANCHOR SUPPORT - MACHINING		220-1231	
5	4	SHEAVE PIN WASHER		220-1251	
6	2	SOCKET HEAD CAP SCREW BZP		54-16221	
7	2(NB)-5(LB)-8(ELB)	NYLOC NUT		55-61071	
8	1	2 FALL ROPE SOCKET ASSEMBLY		820-2911	
9	3(LB)-6(ELB)	SHEAVE PLATE SPACER	----	220-2671	
10	3(LB)-6(ELB)	BUTTON HEAD CAP SCREW BZP	----	540-241	
11	3(LB)-6(ELB)	FORM C PLAIN WASHER BZP	----	55-64101	

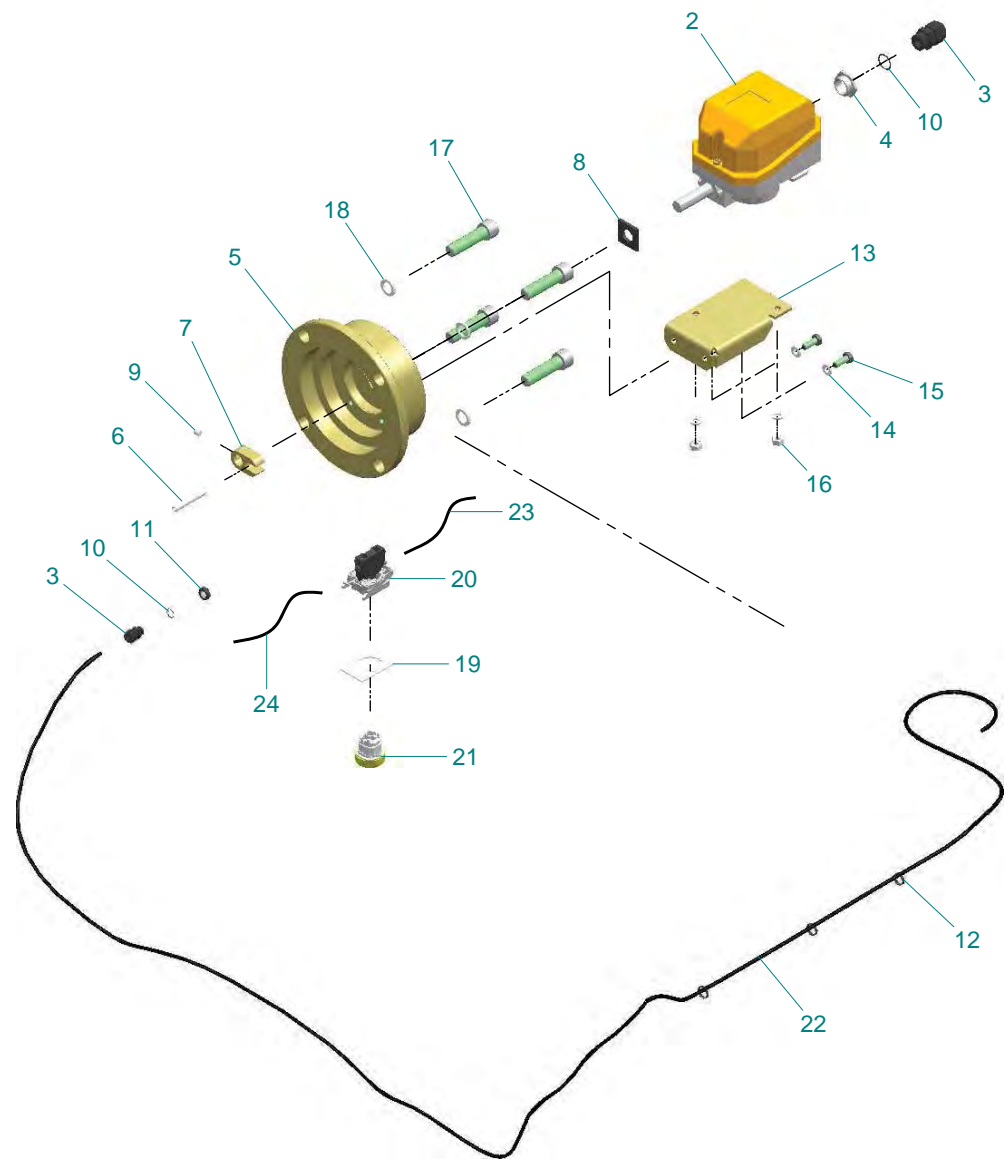
ZX8 SERIES HOIST UNIT
2 FALL ROPE SOCKET ASSEMBLY (ZX082-***_*****_*****)**



ZX8 SERIES HOIST UNIT
2 FALL ROPE SOCKET ASSEMBLY (ZX082-***_*****_*****)**

ITEM	QTY	DESCRIPTION	PART No.
1	1	ZX82 ROPE SOCKET ASSEMBLY (ASSEMBLY DRAWING)	820-2911
2	1	ZX8 13mm ROPE SOCKET	100-31
3	1	ZX8 13mm ROPE WEDGE	100-21
4	1	ZX6 ROPE ANCHOR CLAMP BAR	220-821
5	1	WIRE ROPE GRIP BODY	58-08121BODY
6	2	WIRE ROPE GRIP NUT	58-08121NUT
7	1	WIRE ROPE GRIP U-BOLT	58-08121UBOLT
8	1	ZX8 2 FALL ANCHOR PIN	220-13391
9	1	SPLIT PIN BZP	59-30061

ZX8 SERIES HOIST UNIT
ZX8 ROTARY ULTIMATE LIMIT (zx08-*****_*****_*****)



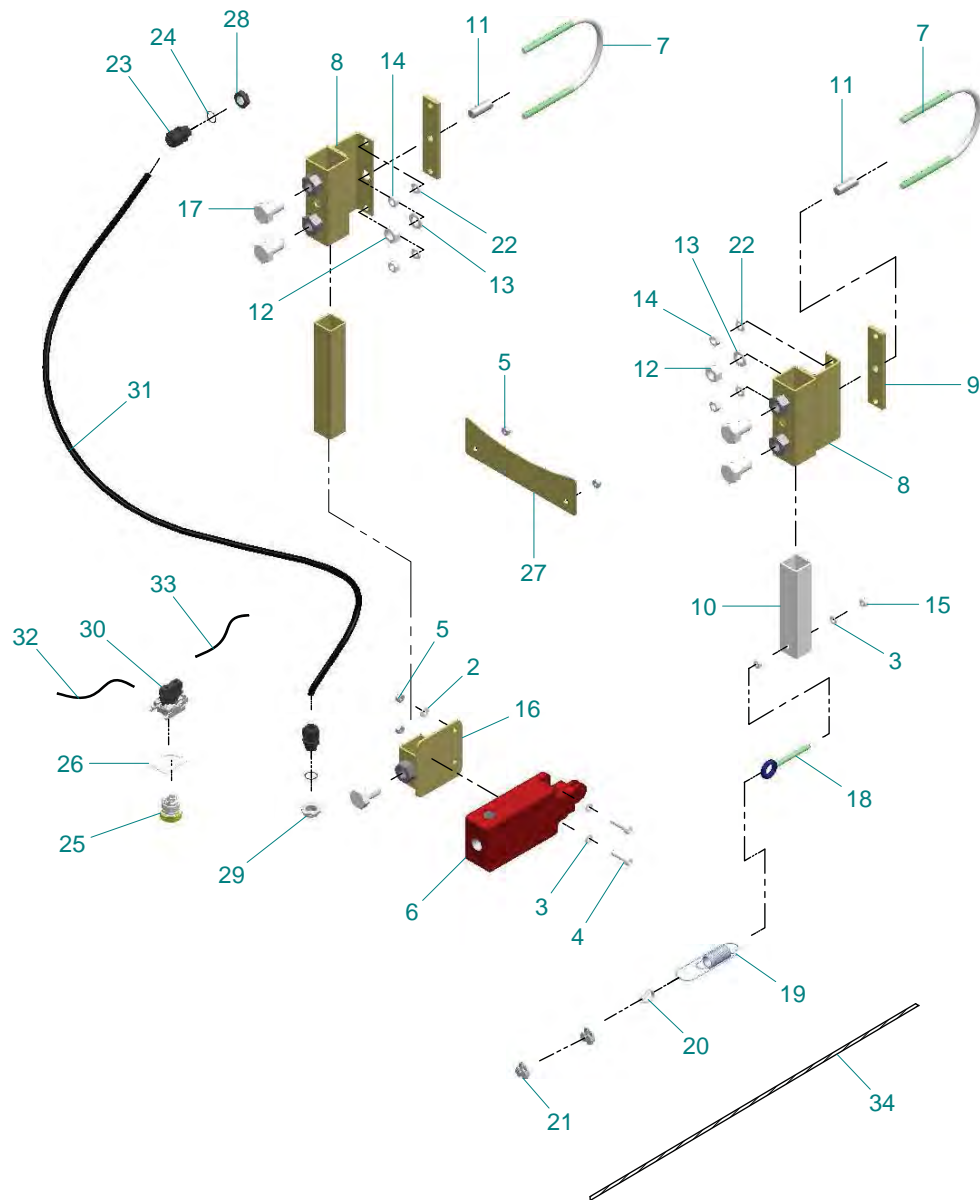
ZX8 SERIES HOIST UNIT
ZX8 ROTARY ULTIMATE LIMIT (zx08-*****_*****_*****)

ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	ZX8 ROTARY ULTIMATE LIMIT ASSY (ASSY DRG)	820-2721
2	1	LIMIT SWITCH	41-26061
3	2	CABLE GLAND	421-553
4	1	NICKEL PLATED BRASS REDUCER	421-655
5	1	ZX8 ROTARY ULTIMATE LIMIT MOUNTING FLANGE	220-12491
6	1	SPRING PIN	59-33371
7	1	ZX ROTARY LIMIT DRIVING ARM	220-12161
8	1	ROTARY LIMIT SEAL	140-41
9	1	SOCKET SETSCREW	54-35821
10	2	O RING	421-569
11	1	NYLON FLANGELESS LOCKNUT	421-561
12	3	CABLE TIE	74-00301
13	1	ZX6 & ZX8 ROTARY LIMIT SWITCH MOUNTING BRKT	220-12401
14	4	SPRING WASHER	55-65053
15	2	HEX HEAD SET SCREW	50-15751
16	2	NUT	55-60102
17	4	SOCKET HEAD CAP SCREW	54-17081
18	3	SPRING WASHER	55-65081
19	1	ULTIMATE LIMIT TRIP LEGEND	440-211
20	1	LED PILOT LIGHT	440-171
21	1	YELLOW LENS HEAD	440-161
22	1	ZX8 ROTARY LIMIT CABLE	420-131
23	1	ZX8 ULT LIMIT PILOT LIGHT WIRE ONE	420-161
24	1	ZX8 ULT LIMIT PILOT LIGHT WIRE TWO	420-171

ZX8 SERIES HOIST UNIT

ZX8 TRIP WIRE ULTIMATE LIMIT ASSY

(ZX08*-*****-LHR****-*****)



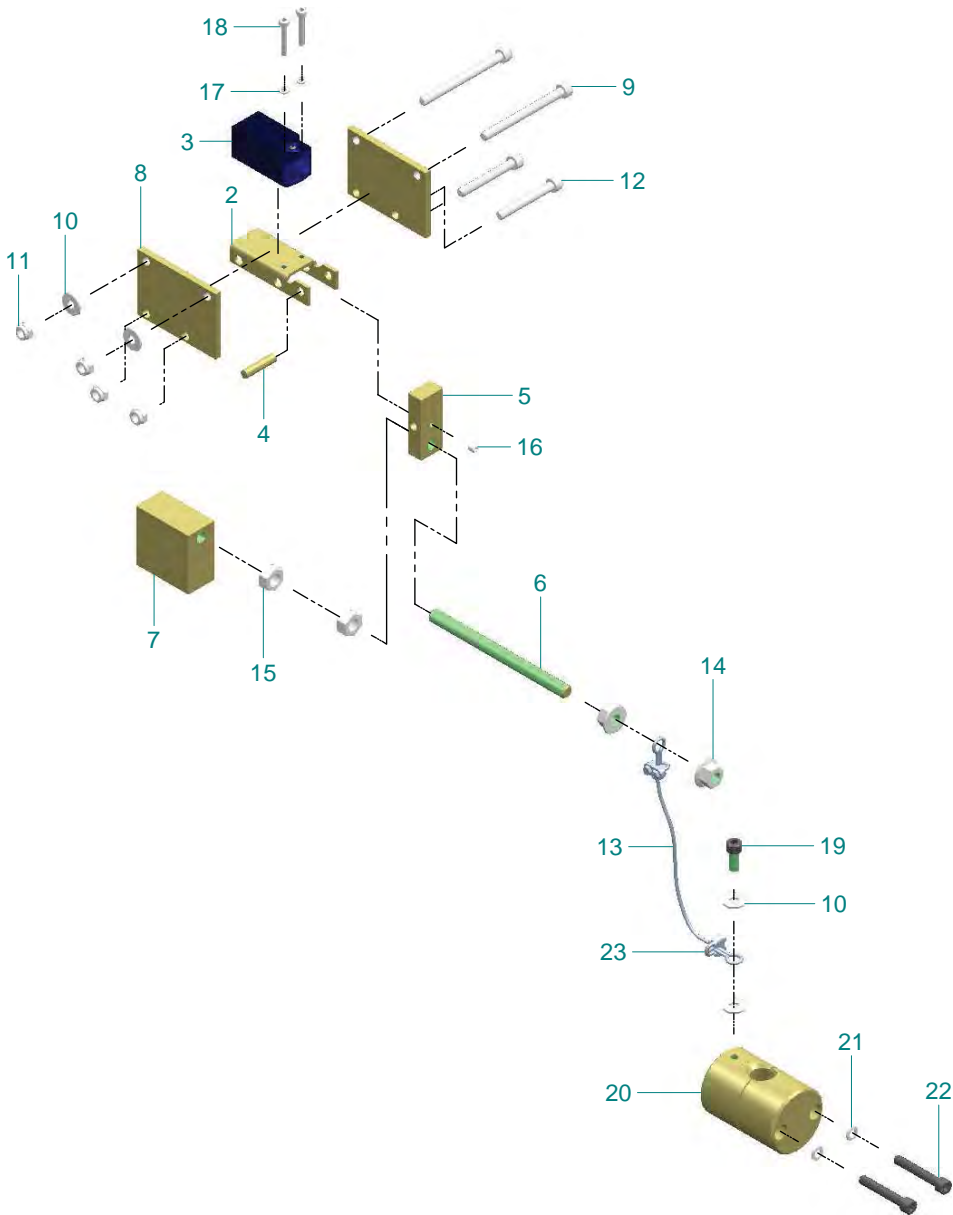
ZX8 SERIES HOIST UNIT

ZX8 TRIP WIRE ULTIMATE LIMIT ASSY

(ZX08*-*****-LHR****-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 LH TRIP WIRE ULTIMATE LIMIT ASSY (ASSY DRG)	828-2205
2	1	PLAIN WASHER	55-64092
3	3	SPRING WASHER	55-65053
4	2	SOCKET HEAD CAP SCREW	54-15891
5	4	NYLOC NUT	55-61061
6	1	TRIPWIRE SWITCH	XY2-CH13250H29
7	2	EXHAUST CLAMP	570-21
8	2	ZX8 ULTIMATE LIMIT VERTICAL ARM CLAMP FAB	22F-13231
9	2	ZX8 LH TRIP WIRE ULTIMATE LIMIT CLAMP PLATE	220-13301
10	2	ZX6&8 TRIP WIRE ULTIMATE LIMIT VERTICAL ARM SHS	220-13221
11	2	GRUB SCREW PLAIN CUP POINT	540-61
12	2	FULL NUT	55-60132
13	2	SPRING WASHER	55-65082
14	4	FULL NUT	55-60112
15	2	NUT	55-60102
16	1	ZX6&8 WIRE TRIP ULTIMATE LIMIT SWITCH MOUNTING FABRICATION	22F-13171
17	5	HEX HEAD SETSCREW	50-17511
18	1	EYEBOLT	63-30121
19	1	END SPRING	XY2-CZ703
20	1	CABLE END	C\XY2-CZ701
21	2	CABLE CLAMP	XY2-CZ523
22	4	SPRING WASHER	55-65062
23	2	CABLE GLAND	421-553
24	2	O RING	421-569
25	1	YELLOW LENS HEAD	440-161
26	1	ULTIMATE LIMIT TRIP LEGEND	440-211
27	1	ZX8 LH ULTIMATE LIMIT BOTTOM BLOCK CATCH PLATE	220-13091
28	1	NYLON FLANGELESS LOCKNUT	421-561
29	1	NICKEL PLATED BRASS REDUCER	421-655
30	1	LED PILOT LIGHT	440-171
31	1	ZX TRIP WIRE ULTIMATE LIMIT CABLE	420-231
32	1	ZX8 ULT LIMIT PILOT LIGHT WIRE ONE	420-161
33	1	ZX8 ULT LIMIT PILOT LIGHT WIRE TWO	420-171
34	1	PENDANT WIRE	62-00300

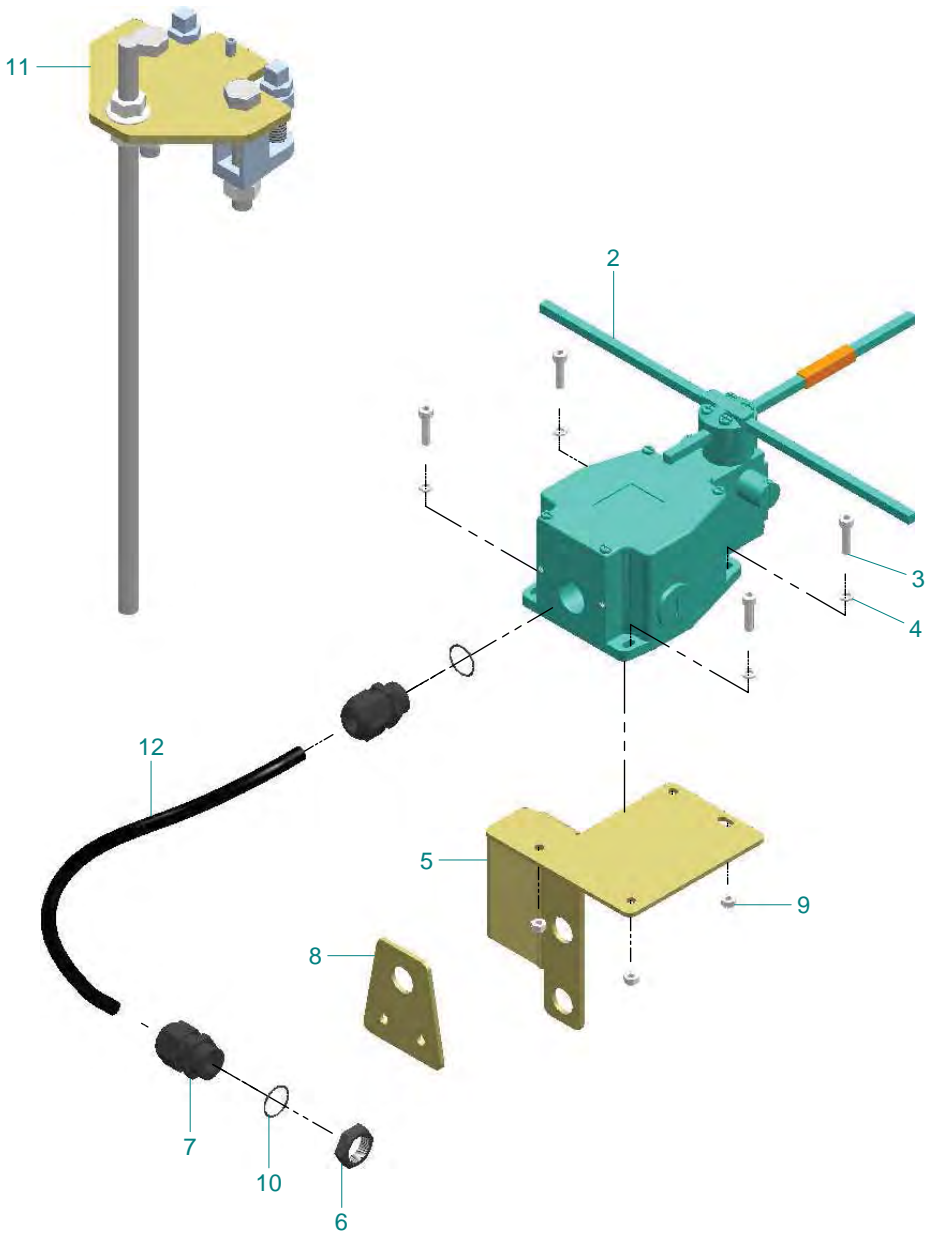
ZX8 SERIES HOIST UNIT
ZX8 BLOCK OPERATED ULTIMATE LIMIT



ZX8 SERIES HOIST UNIT
ZX8 BLOCK OPERATED ULTIMATE LIMIT

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 BLOCK OPERATED ULTIMATE LIMIT ASSY (ASSEMBLY DRG)	820-4221
2	1	BOTTOM BLOCK LIMIT SWITCH MOUNTING PLATE	220-16541
3	1	SAFETY LIMIT SWITCH (AUTO RESET)	411-225
4	1	BOTTOM BLOCK LIMIT PIVOT PIN	220-16581
5	1	BOTTOM BLOCK LIMIT TRIGGER BAR	220-16521
6	1	BOTTOM BLOCK LIMIT STUD	220-16551
7	1	BOTTOM BLOCK LIMIT BALANCE MASS	220-16511
8	2	ZX8 BOTTOM BLOCK LIMIT SWITCH ADJUSTMENT PLATE	220-16531
9	2	SOCKET HEAD CAP SCREW	54-16201
10	4	PLAIN WASHER	55-64101
11	4	NYLOC NUT	55-61071
12	2	SOCKET HEAD CAP SCREW	54-16151
13	1	WIRE (1m)	62-00300
14	2	HEXAGON FLANGE NUT	55-71031
15	2	FULL NUT	55-60132
16	1	SOCKET SETSCREW	54-35821
17	2	SPRING WASHER	55-65041
18	2	SOCKET HEAD CAP SCREW	54-15701
19	1	SOCKET HEAD CAP SCREW	54-16071
20	1	BOTTOM BLOCK TRIGGER MASS	220-16571
21	2	SPRING WASHER	55-65061
22	2	SOCKET HEAD CAP SCREW	54-16131
23	2	CABLE CLAMP	XY2-CZ523

ZX8 SERIES HOIST UNIT
ZX8 CROSS TRAVEL LIMIT ASSY (ZX08*-*****-LHR****-*****)



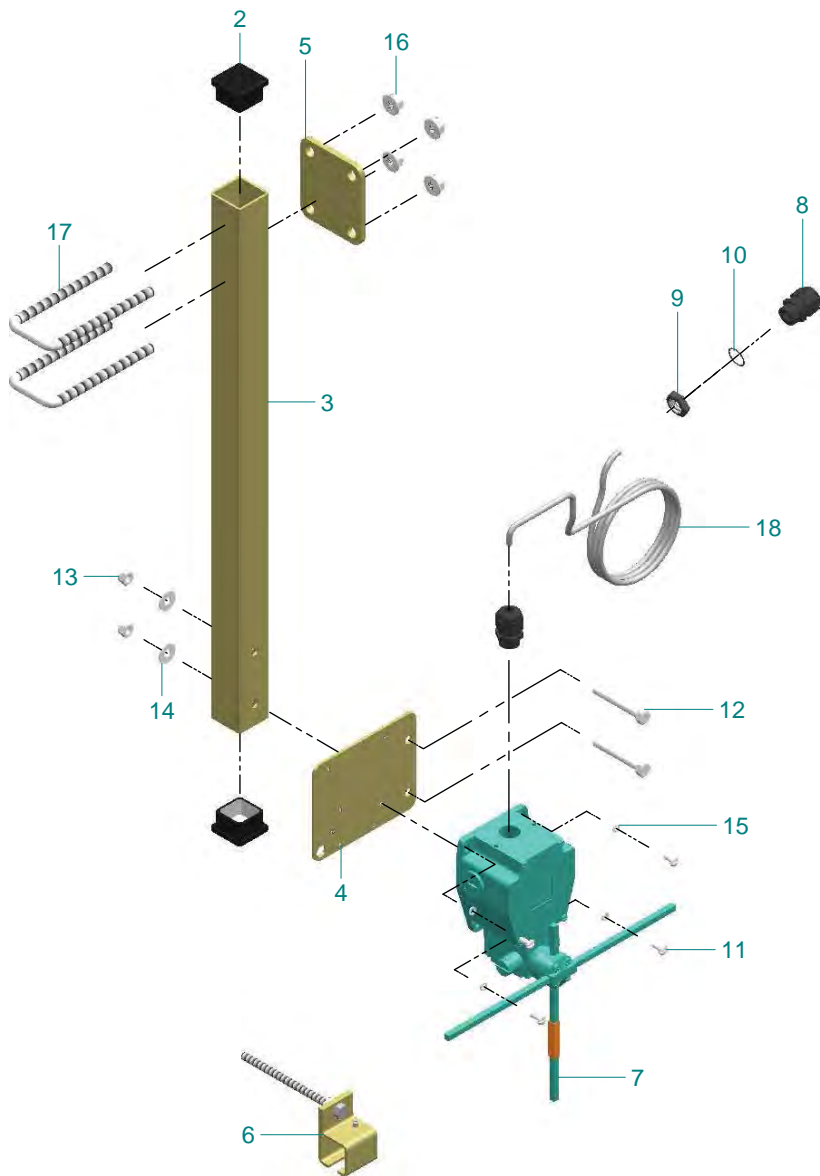
ZX8 SERIES HOIST UNIT
ZX8 CROSS TRAVEL LIMIT ASSY (ZX08*-*****-LHR****-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER		
			RIGHT/LEFT STOP	RIGHT/LEFT SLOWDOWN	RIGHT/LEFT SLOWDOWN & STOP
1	1	ZX8 CROSS TRAVEL LIMIT ASSY (ASSY DRG)	828-2202	828-2203	828-2204
2	1	LIMIT SWITCH	41-26041	41-26041	41-26111
3	*	SOCKET HEAD CAP SCREW		54-15681	
4	*	SPRING WASHER		55-65041	
5	1	ZX8 CT LIMIT SWITCH MOUNTING BRACKET		220-9171	
6	1	NYLON FLANGELESS LOCKNUT		421-562	
7	2	CABLE GLAND		421-554	
8	1	ZX8 PENDANT SUSPENSION BRACKET		220-1861	
9	3	NYLOC NUT		55-61051	
10	2	O RING		421-570	
11	*	ZX6 & ZX8 LINDAPTER CT STRIKER PEG ASSY		820-711	
12	1	ZX8 CT LIMIT CABLE	420-91	420-91	420-101
13**	1	ZX CT LIMIT STOP & SLOWDOWN LINK WIRE	--	--	420-111

* - 2 FOR RIGHT/LEFT STOP AND RIGHT/LEFT SLOWDOWN
- 4 FOR RIGHT/LEFT SLOWDOWN & STOP

** - LINK WIRE INSIDE LIMIT SWITCH. NOT SHOWN IN VIEW.

ZX8 CROSS TRAVEL LIMIT ASSY (ZX08*-***-CRB****-*****)**



ZX8 CROSS TRAVEL LIMIT ASSY (ZX08*-***-CRB****-*****)**

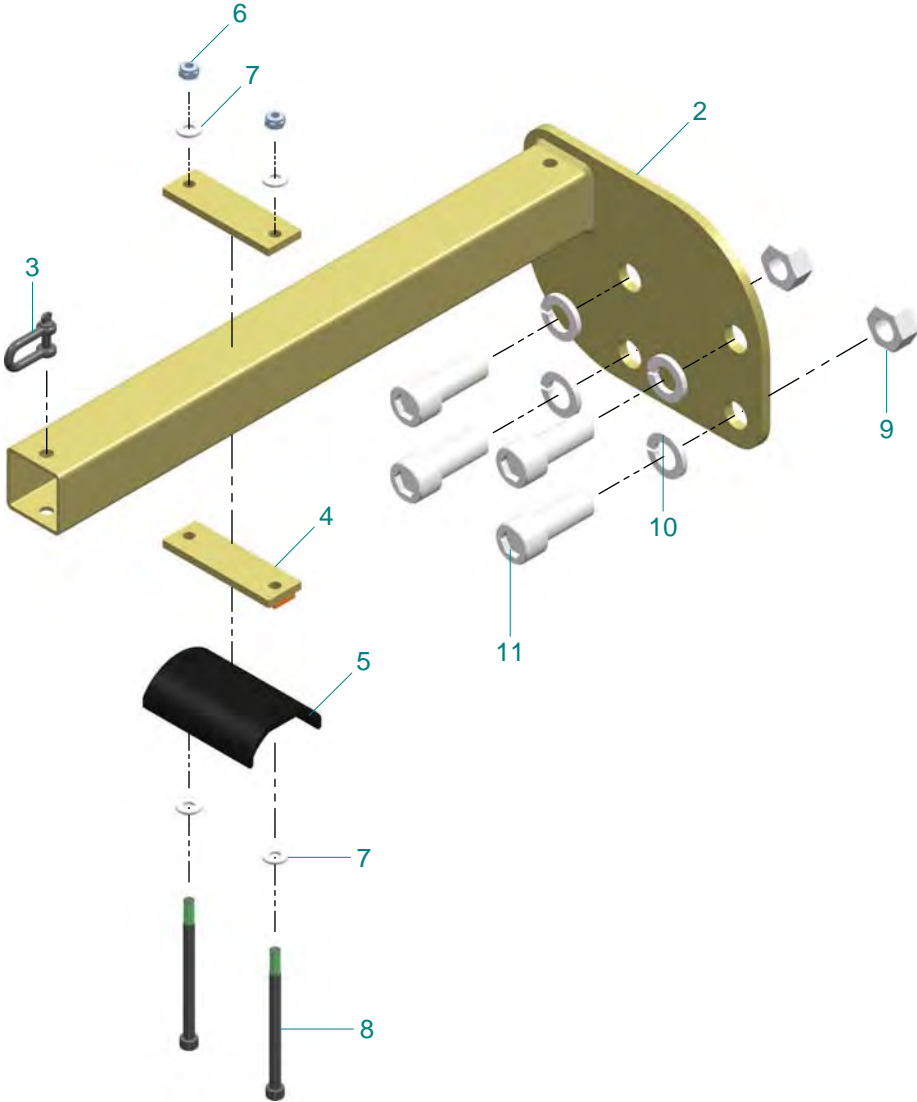
ITEM	QTY	DESCRIPTION	PART NUMBER		
			RIGHT/LEFT STOP	RIGHT/LEFT SLOWDOWN	RIGHT/LEFT SLOWDOWN & STOP
1	1	ZX8 CRAB CROSS TRAVEL LIMIT ASSY (ASSY DRG)	828-2207	828-2208	828-2209
2	2	PLASTIC INSERT		15-50141	
3	1	CRAB COLLECTOR BRACKET VERTICAL ARM SHS		220-13141	
4	1	CRAB COLLECTOR BRACKET ADAPTOR PLATE		220-13151	
5	1	CLAMP PLATE		29-10321	
6	*	TRAVERSE LIMIT STRIKER ASSEMBLY		290-151	
7	1	LIMIT SWITCH	41-26041	41-26041	41-26111
8	2	CABLE GLAND		421-554	
9	1	NYLON FLANGELESS LOCKNUT		421-562	
10	1	O RING		421-570	
11	*	SLOTTED PAN HD MACHINE SCREW		50-15601	
12	2	HEX HEAD SET SCREW		50-16091	
13	2	NYLOC NUT		55-61071	
14	2	PLAIN WASHER		55-64101	
15	*	SPRING WASHER		55-65041	
16	4	HEXAGON FLANGE NUT		55-71021	
17	2	U-BOLT		57-70061	
18	1	ZX CRAB CROSS TRAVEL LIMIT CABLE	420-181	420-181	420-191
19**	1	ZX CT STOP & SLOWDOWN LINK WIRE	---	---	420-111

* - 2 FOR RIGHT/LEFT STOP AND RIGHT/LEFT SLOWDOWN
- 4 FOR RIGHT/LEFT SLOWDOWN & STOP

**- ITEM NOT SHOWN IN VIEW.

ZX8 SERIES HOIST UNIT
ZX8 CT COLLECTOR BRACKET ASSEMBLY - MIRRORED

(ZX08*-*****-LHR****-*****)



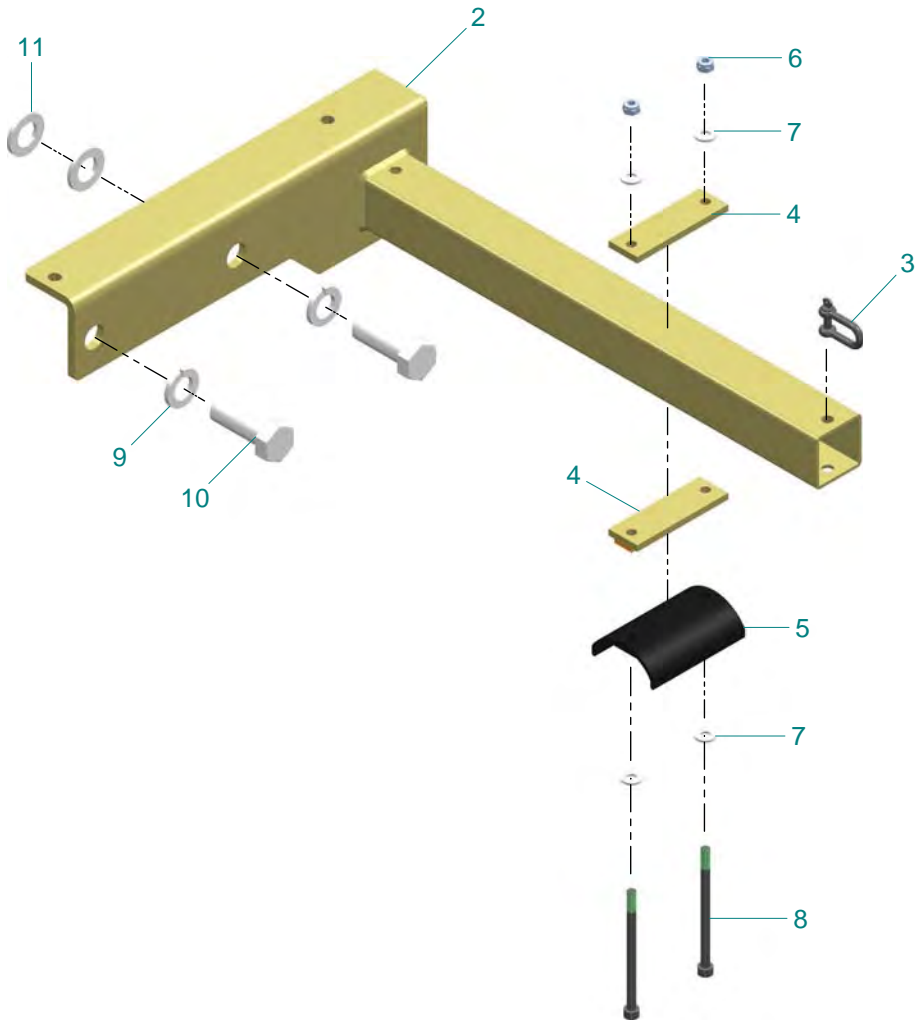
ZX8 SERIES HOIST UNIT
ZX8 CT COLLECTOR BRACKET ASSEMBLY - MIRRORED

(ZX08*-*****-LHR****-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 CT COLLECTOR BRACKET ASSY-MIRRORED (ASSY DRG)	890-1991
2	1	ZX8 CT COLLECTOR BRACKET	290-181
3	1	DEE SHACKLES	63-30141
4	2	ZX6 & ZX8 CT COLLECTOR CABLE CLAMP PLATE	110-51
5	1	PVC CABLE CLAMP	61-11071
6	2	NYLOC NUT	55-61061
7	4	PLAIN WASHER	55-64092
8	2	SOCKET HEAD CAP SCREW	54-16001
9	2	FULL NUT	55-60152
10	4	SPRING WASHER	55-65101
11	4	SOCKET HEAD CAP SCREW	54-17601

ZX8 SERIES HOIST UNIT
ZX8 COLLECTOR BRACKET ASSEMBLY - STANDARD

(ZX08*-*****-LHR****-*****)

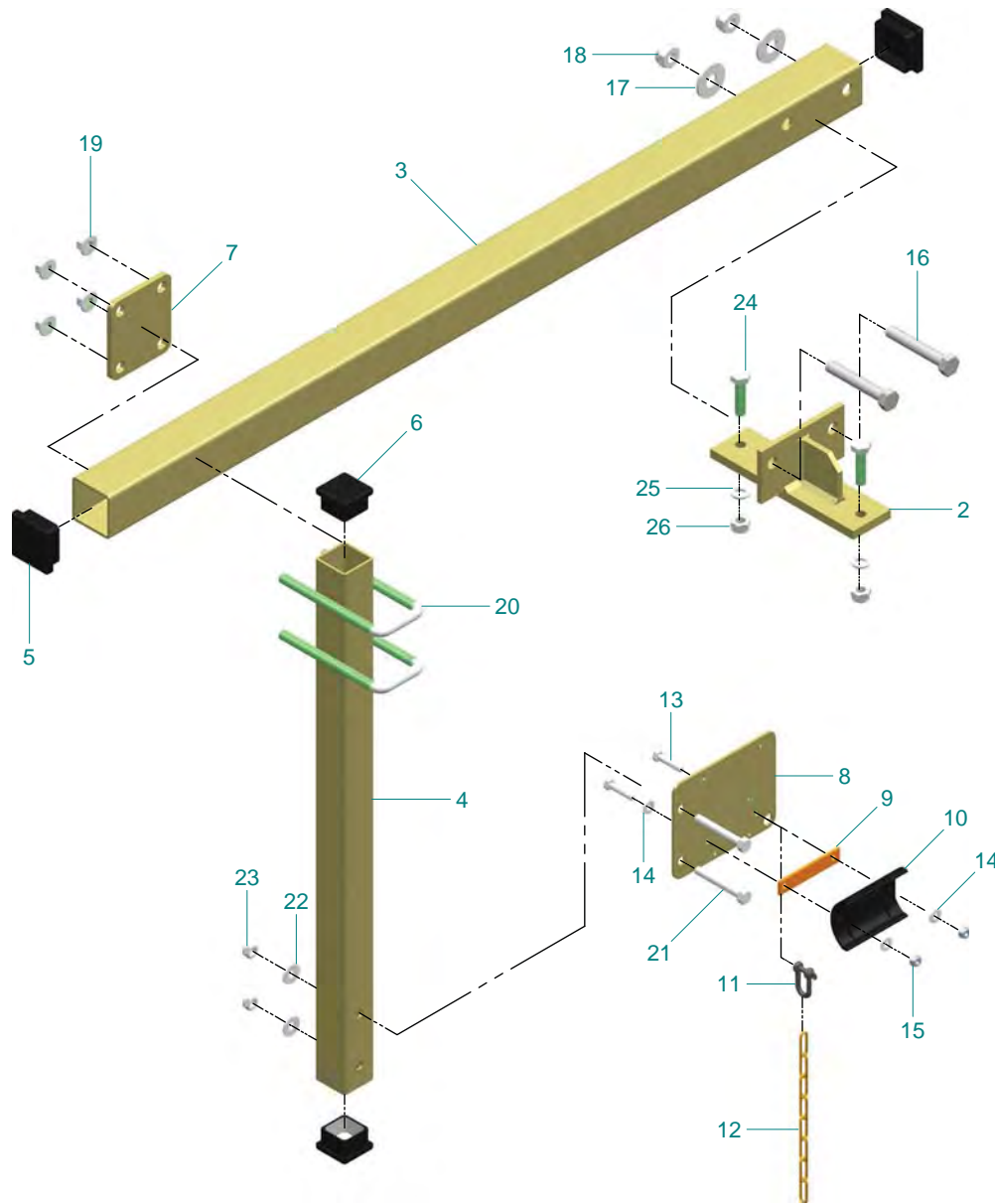


ZX8 SERIES HOIST UNIT
ZX8 COLLECTOR BRACKET ASSEMBLY - STANDARD

(ZX08*-*****-LHR****-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 COLLECTOR BRACKET ASSEMBLY (ASSY DRG)	820-2751
2	1	ZX8 CT COLLECTOR ASSEMBLY FABRICATION	22F-12611
3	1	DEE SHACKLES	63-30141
4	2	ZX6 & ZX8 CT COLLECTOR CABLE CLAMP PLATE	110-51
5	1	PVC CABLE CLAMP	61-11071
6	2	NYLOC NUT	55-61061
7	4	PLAIN WASHER	55-64092
8	2	SOCKET HEAD CAP SCREW	54-16001
9	2	SPRING WASHER	55-65101
10	2	HEX HEAD SET SCREW	50-17551
11	2	BRIGHT PLAIN WASHER	55-64131

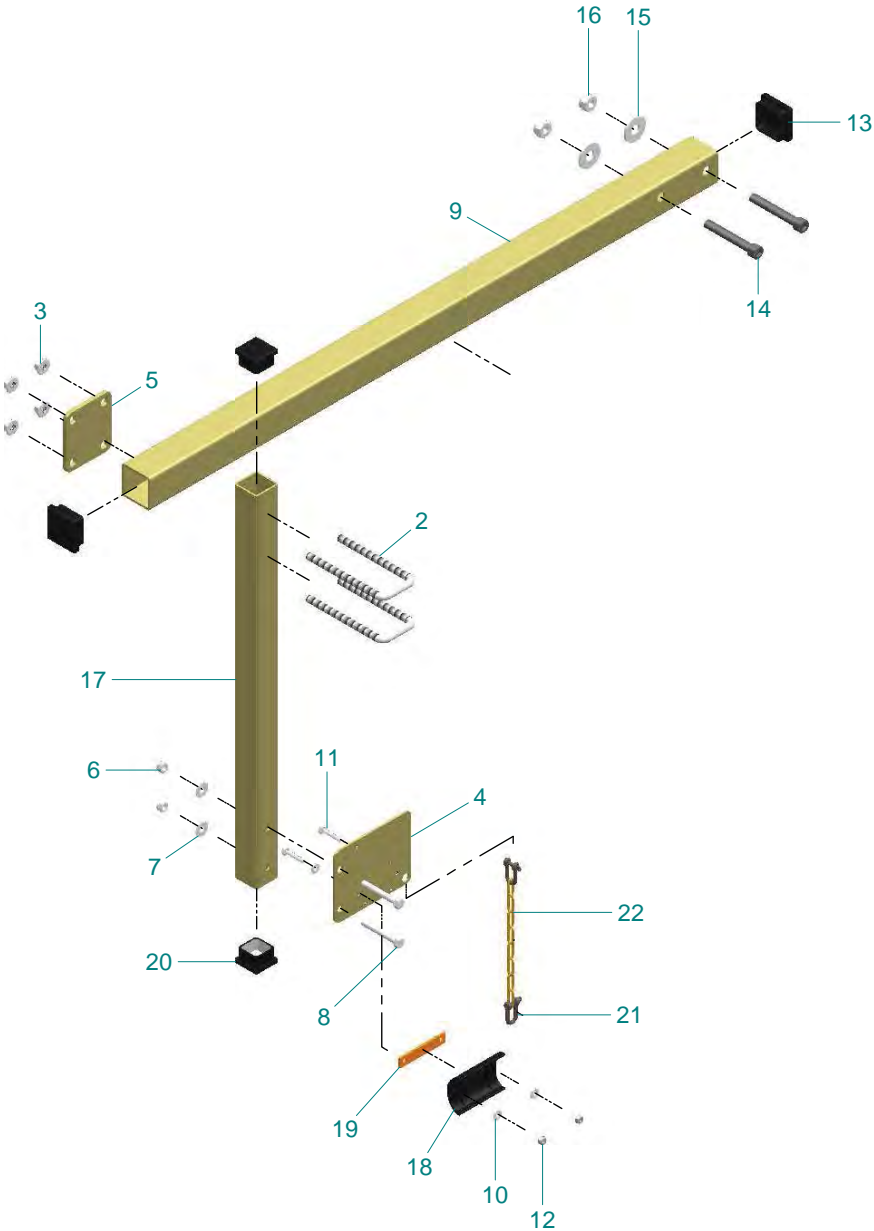
ZX8 SERIES HOIST UNIT ZX8 CRAB COLLECTOR ASSEMBLY - STANDARD



ZX8 SERIES HOIST UNIT ZX8 CRAB COLLECTOR ASSEMBLY - STANDARD

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 CRAB COLLECTOR BRACKET ASSY (ASSY DRG)	828-2217
2	1	ZX8 CRAB COLLECTOR MOUNTING BRACKET - FAB	22F-13051
3	1	CRAB COLLECTOR BRACKET HORIZONTAL ARM SHS	220-13131
4	1	CRAB COLLECTOR BRACKET VERTICAL ARM SHS	220-13141
5	2	PLASTIC BUNG	15-50121
6	2	PLASTIC INSERT	15-50141
7	1	CLAMP PLATE	29-10321
8	1	CRAB COLLECTOR BRACKET ADAPTOR PLATE	220-13151
9	1	BLACK FLAT BAR	00-07101.25X5.43A
10	1	PVC CABLE CLAMP	61-11071
11	2	DEE SHACKLES	63-30141
12	1	CHAIN	63-30131
13	2	HEX HEAD SET SCREW	50-15781
14	4	PLAIN WASHER	55-64092
15	2	NYLOC NUT	55-61061
16	2	HEX HEAD HT SET SCREW	50-17101
17	2	PLAIN WASHER	55-64125
18	2	NYLOC NUT	55-61091
19	4	HEXAGON FLANGE NUT	55-71021
20	2	U-BOLT	57-70061
21	2	HEX HEAD SET SCREW	50-16091
22	2	PLAIN WASHER	55-64101
23	2	NYLOC NUT	55-61071
24	2	HEX HEAD HT SET SCREW	50-16551
25	2	SPRING WASHER	55-65072
26	2	NYLOC NUT	55-61081

ZX8 SERIES HOIST UNIT
ZX8 CRAB COLLECTOR ASSEMBLY - MIRRORED

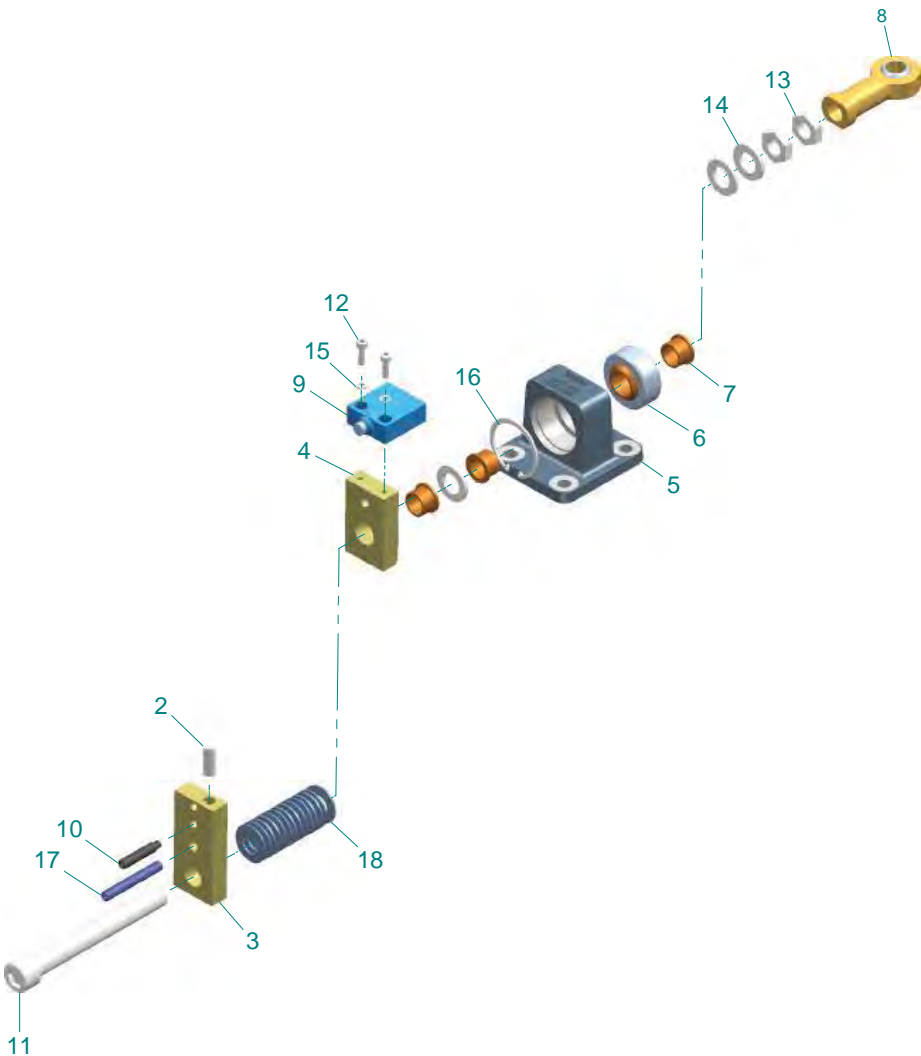


ZX8 SERIES HOIST UNIT
ZX8 CRAB COLLECTOR ASSEMBLY - MIRRORED

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX8 CRAB COLLECTOR ASSEMBLY - MIRRORED (ASSY DRG)	828-2218
2	2	U-BOLT	57-70061
3	4	HEXAGON FLANGE NUT	55-71021
4	1	CRAB COLLECTOR BRACKET ADAPTOR PLATE	220-13151
5	1	CLAMP PLATE	29-10321
6	2	NYLOC NUT	55-61071
7	2	PLAIN WASHER	55-64101
8	2	HEX HEAD SET SCREW	50-16091
9	1	CRAB COLLECTOR BRACKET HORIZONTAL ARM SHS	220-13131
10	4	PLAIN WASHER	55-64092
11	2	HEX HEAD SET SCREW	50-15781
12	2	NYLOC NUT	55-61061
13	2	PLASTIC BUNG	15-50121
14	2	SOCKET HEAD CAP SCREW	54-17121
15	2	PLAIN WASHER	55-64125
16	2	NYLOC NUT	55-61091
17	1	CRAB COLLECTOR BRACKET VERTICAL ARM SHS	220-13141
18	1	PVC CABLE CLAMP	61-11071
19	1	BLACK FLAT BAR	00-07101.25X5.43A
20	2	PLASTIC INSERT	15-50141
21	2	DEE SHACKLES	63-30141
22	1	CHAIN	63-30131

ZX6 & ZX8 SERIES HOIST UNIT

OVER LOAD ASSEMBLY (ZX***-*****-*****-*****)



ZX6 & ZX8 SERIES HOIST UNIT

OVER LOAD ASSEMBLY (ZX***-*****-*****-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	OVER LOAD ASSEMBLY (ASSEMBLY DRAWING)	820-311
2	1	LONG NYLON BAR	15-03931
3	1	ZX6 & ZX8 OVERLOAD TOP PLATE	220-221
4	1	ZX6 & ZX8 OVERLOAD BOTTOM PLATE	220-231
5	1	ZX6 & ZX8 OVERLOAD BODY MACHINING	220-241
6	1	SPHERICAL BEARING	350-81
7	3	FLANGED BUSH	350-91
8	1	ROD END JOINT	35-50706
9	1	LIMIT SWITCH	40-15011
10	1	DOG POINT GRUB SCREW	540-191
11	1	SOCKET HEAD CAP SCREW BZP	540-21
12	2	SOCKET HEAD CAP SCREW BZP	54-15661
13	2	HEXAGON LOCK NUT BZP	55-60641
14	3	PLAIN WASHER FORM A BZP	55-64132
15	2	SPRING WASHER FORM A BZP	55-65041
16	1	INTERNAL CIRCLIP	55-80351
17	1	SPRING PIN	590-11
18	#	DISC SPRING	59-50131

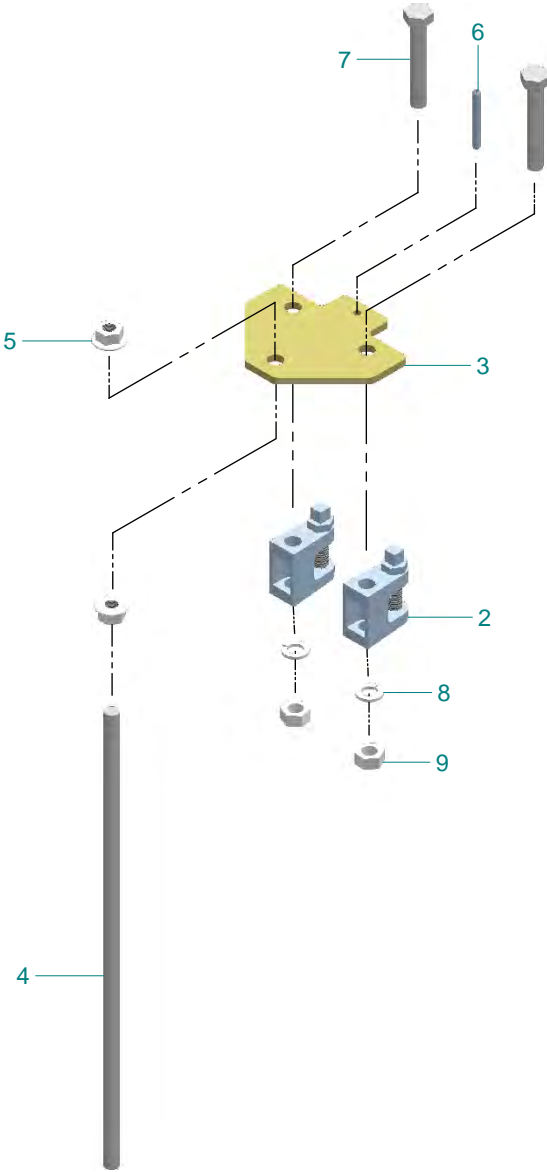
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4 FALL : 1 TONNE (D)
2 FALL : 1 TON (US) (D)
4 FALL : 1 TON (US) (D)

- 14 FOR 2 FALL : 1.25 TONNE (E)
2 FALL : 1.6 TONNE (F)
2 FALL : 2 TONNE (G)
2 FALL : 2.5 TONNE (H)
4 FALL : 2 TONNE (G)
4 FALL : 2.5 TONNE (H)
4 FALL : 3.2 TONNE (I)
4 FALL : 4 TONNE (J)
4 FALL : 5 TONNE (K)
2 FALL : 1.25 TON (US) (E)
2 FALL : 1.6 TON (US) (F)
2 FALL : 2 TON (US) (G)
2 FALL : 2.5 TON (US) (H)
4 FALL : 2 TON (US) (G)
4 FALL : 2.5 TON (US) (H)
4 FALL : 3.2 TON (US) (I)
4 FALL : 4 TON (US) (J)
4 FALL : 5 TON (US) (K)

ZX6 & ZX8 SERIES HOIST UNIT

LINDAPTER CT STRIKER PEG ASSY

(ZX***-*****-LHR***-*****)



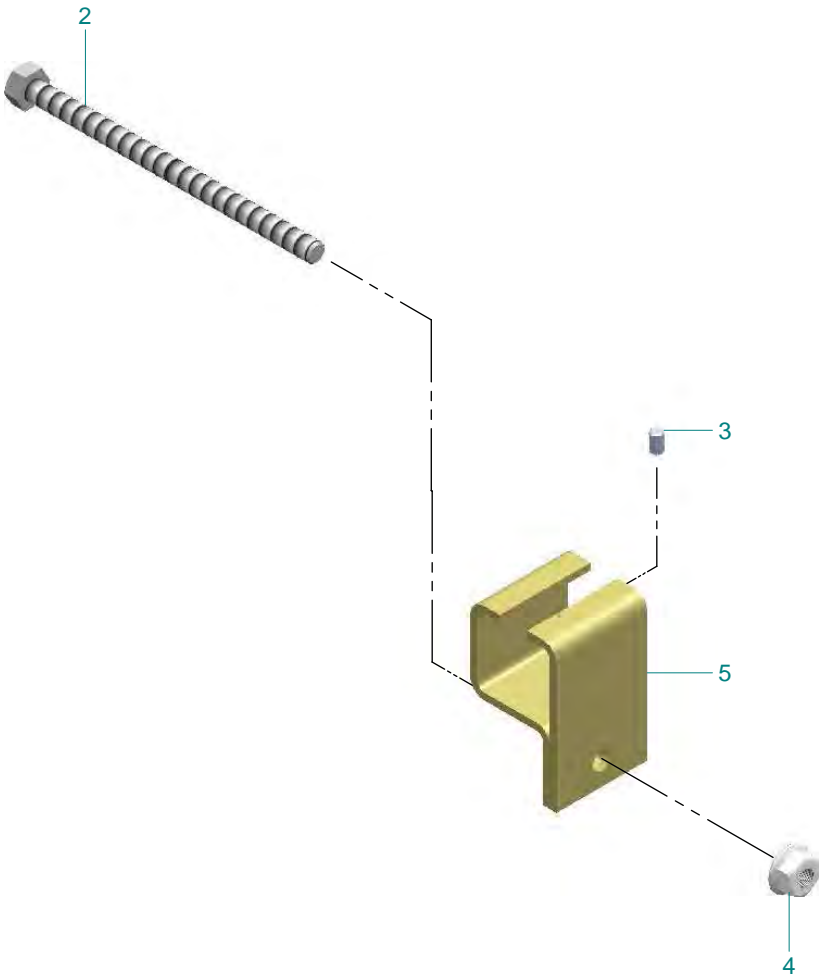
ZX6 & ZX8 SERIES HOIST UNIT

LINDAPTER CT STRIKER PEG ASSY

(ZX***-*****-LHR***-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	ZX6 & ZX8 LINDAPTER CT STRIKER PEG ASSY (ASSY DRG)	820-711
2	2	FLANGE CLAMP	550-221
3	1	ZX6&8 STRIKER PEG PLATE FOR LINDATPER ASSY	220-9481
4	1	SCREWED ROD	220-5701
5	2	HEXAGON FLANGE NUT	55-71031
6	1	SPRING PIN	59-33376
7	2	HEX HEAD HT SET SCREW	50-17101
8	2	SPRING WASHER	55-65082
9	2	FULL NUT	55-60132

ZX6 & ZX8 SERIES HOIST UNIT
TRAVERSE LIMIT STRIKER ASSEMBLY
(ZX***-*****-CRB***-*****)



ZX6 & ZX8 SERIES HOIST UNIT
TRAVERSE LIMIT STRIKER ASSEMBLY
(ZX***-*****-CRB***-*****)

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	TRAVERSE LIMIT STRIKER ASSY (ASSY DRG)	290-151
2	1	HEX HEAD SET SCREW	500-11
3	1	GRUB SCREW	54-35701
4	1	HEXAGON FLANGE NUT	55-71011
5	1	WALL SUPPORT BRACKET	610-31

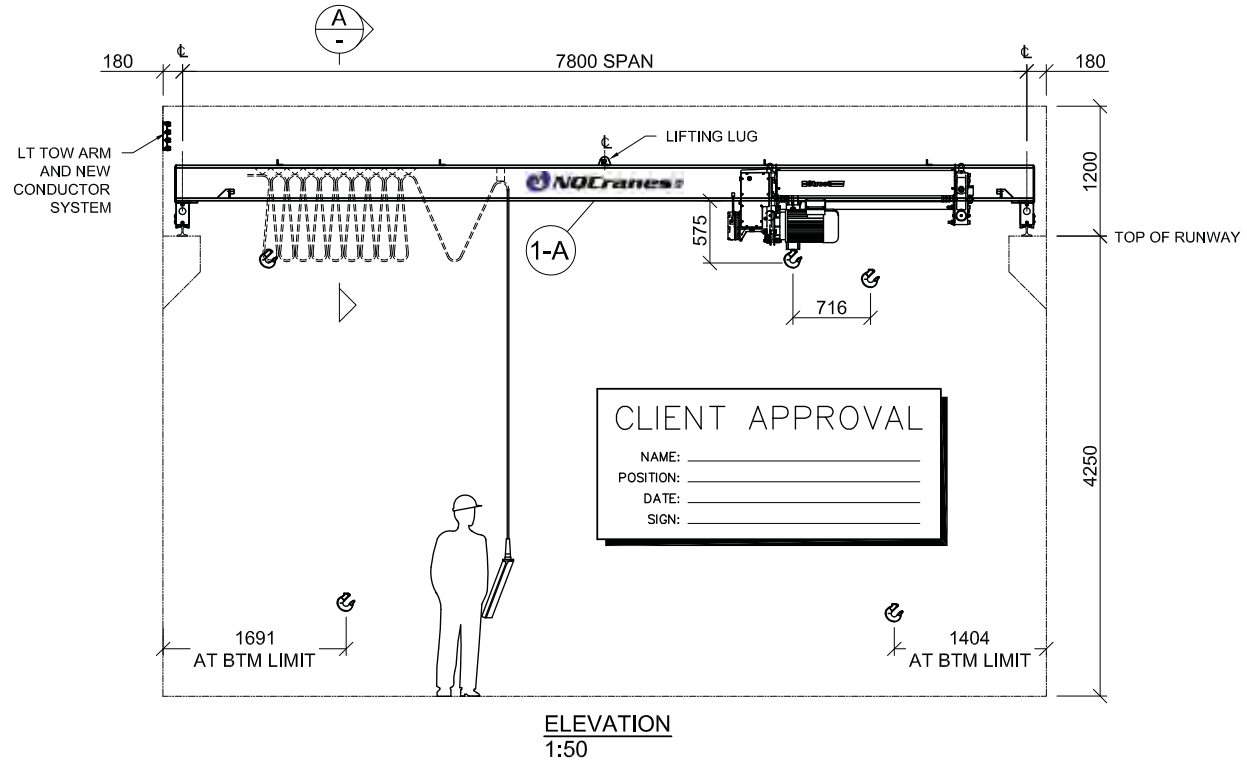
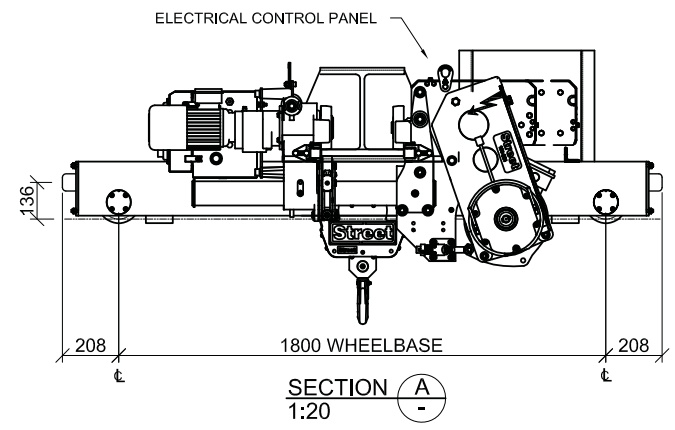
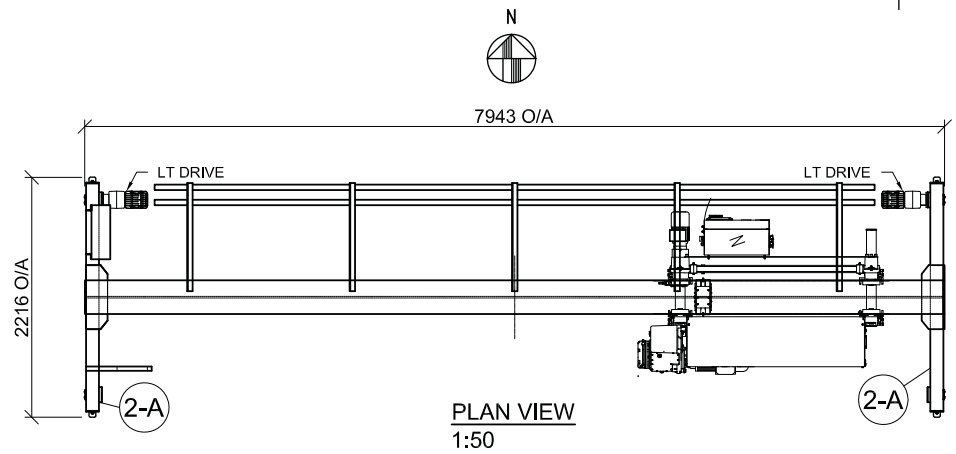
SECTION 8.

AS BUILT DRAWING

EXCELLENCE IN SERVICE AND SUPPORT

SUPERIOR PRODUCTS AND DESIGN





WHEEL LOADS

UNLOADED STATIC WHEEL LOAD (UNFACTORED)	MAX 9.84kN	MIN 5.03kN
LOADED STATIC WHEEL LOAD (UNFACTORED)	23.83kN	6.74kN
LOADED DYNAMIC WHEEL LOAD (FACTORED)	33.37kN	8.29kN
OBLIQUE TRAVEL	Y21 4.79kN	
	Y11 1.35kN	
LATERAL INERTIA	Phb +/- 1.83kN	
LONG TRAVEL BUFFER FORCE (EACH SIDE)	12.50kN	
APPROX. CRANE WEIGHT (NO HOIST)	1800kg	
HOIST WEIGHT	1255kg	

CRANE SPECIFICATION	
LOCATION	INDOOR
SPAN	7800mm
CLASSIFICATION	C4/M4
HEIGHT OF LIFT	40 Mts AVAILABLE ON HOIST
HOIST MODEL	STREET ZX082-4SoEM4K074
HOIST CAPACITY	5,000Kg @ M4
HOISTS FITTED TO CRANE	1
HOISTING SPEEDS	0.8 - 8.3 Mts/min. (VSD)
CROSS TRAVEL SPEEDS	2 - 20 Mts/min. (VSD)
LONG TRAVEL SPEEDS	3 - 32 Mts/min (VSD)
L/T WHEELS & DRIVES	STREET AS125/1800 -TM1
INCLUDED	MECHANICAL LOAD LIMITER
INCLUDED	LOAD SPECTRUM RECORDER
INCLUDED	REMOTE CONTROLS
INCLUDED	LONG TRAVEL LIMITS
INCLUDED	CROSS TRAVEL LIMITS
INCLUDED	LONG TRAVEL ALARM
INCLUDED	LONG TRAVEL FLASHING LIGHT
INCLUDED	SECONDARY HOIST BRAKE
INCLUDED	MECHANICAL OVERSPEED SWITCH

CLIENT APPROVAL

NAME: _____

POSITION: _____

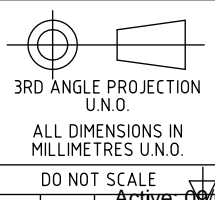
DATE: _____

SIGN: _____



Address: 26-30 Enterprise St, Mackay 4740
Email: nqc@nqcranes.com.au
Ph: (07) 4952 5488
Fax: (07) 4952 5633
ABN: 20 060 375 699

No.	BY	DATE	DESCRIPTION
1	AS	30.05.13	CLIENT APPROVAL



ALL DIMENSIONS IN MILLIMETRES U.N.O.
DO NOT SCALE

Designed by SM
Drawn by AS
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MARK	ITEM	QTY	SECTION	LENGTH	REMARKS	MASS
Approved by - date			Cad File name	Date 09.05.13	Scale 1:50/1:20	A3
QUEENSLAND URBAN UTILITIES - 5T x 7800 SG OHTC				GENERAL ASSEMBLY		
JOB No. BW120021 - NQC7377				Drawing No 13-023-1	Rev 1	Sheet 1

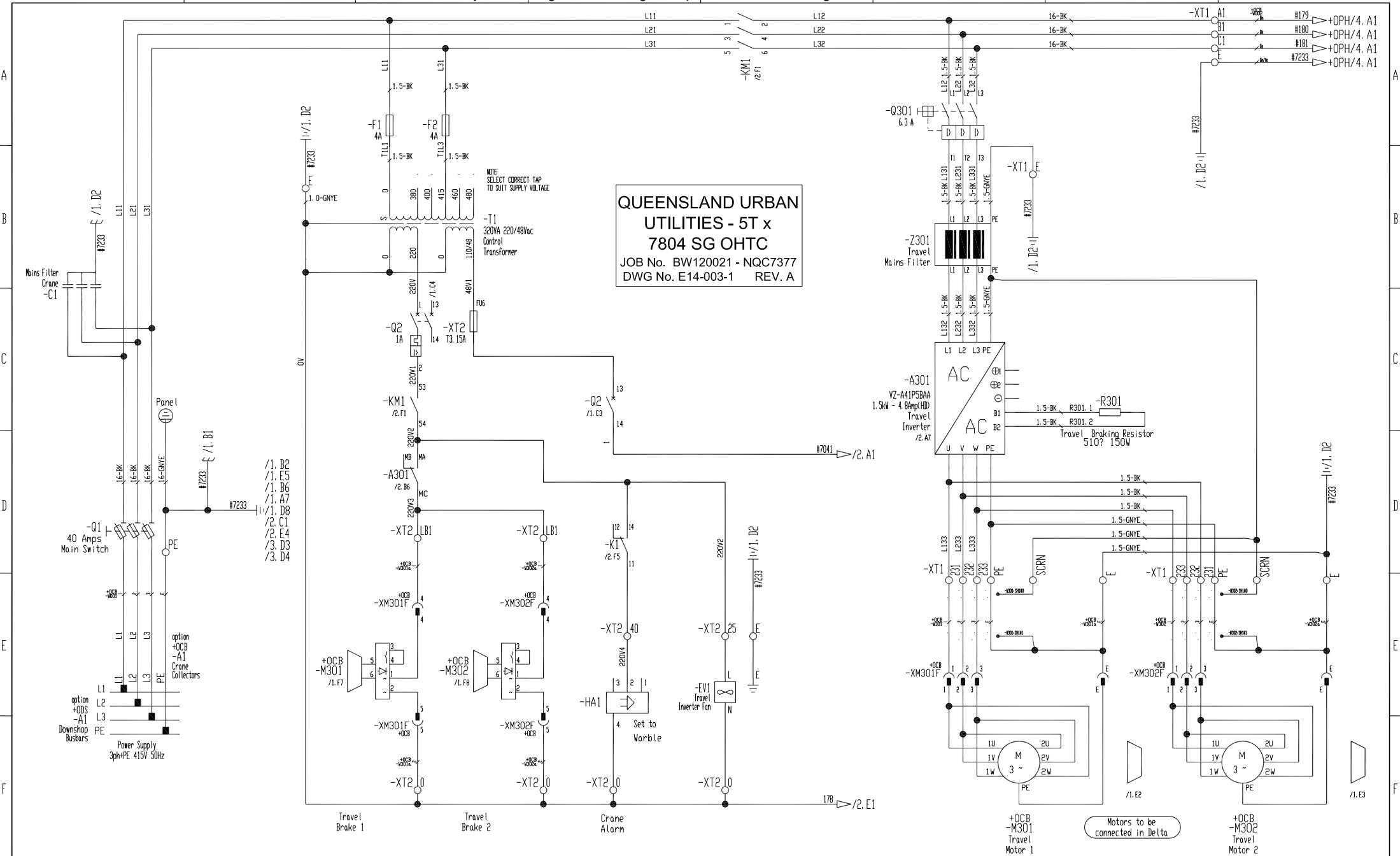
SECTION 9.

AS BUILT ELECTRICAL DRAWINGS

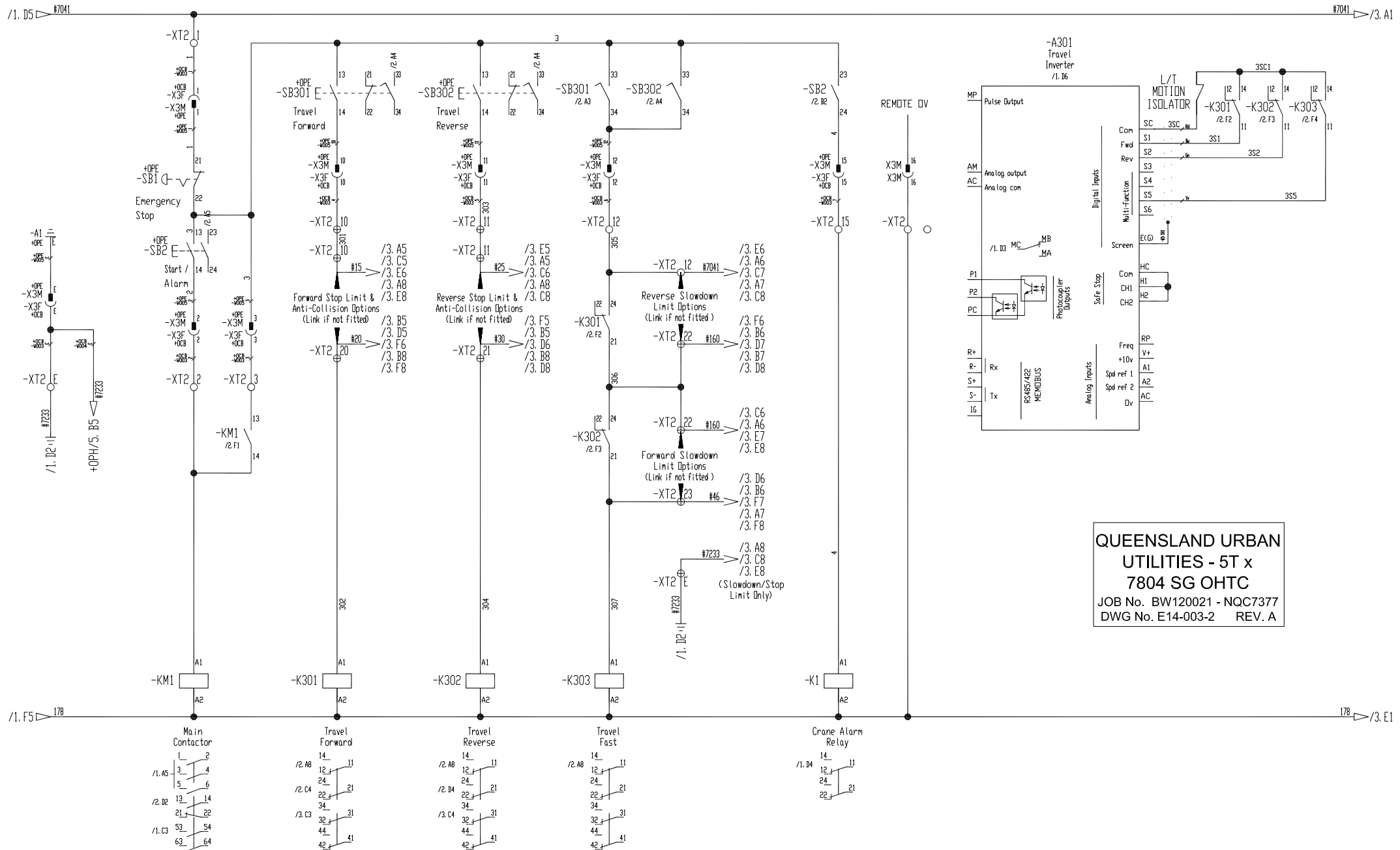
EXCELLENCE IN SERVICE AND SUPPORT

SUPERIOR PRODUCTS AND DESIGN





STREET CRANE CO LTD		TITLE		Contract No	
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27/06/13	KPC		N/A	Drawing No	
REV		DESCRIPTION	BY	DATE	SHT 1 OF 10

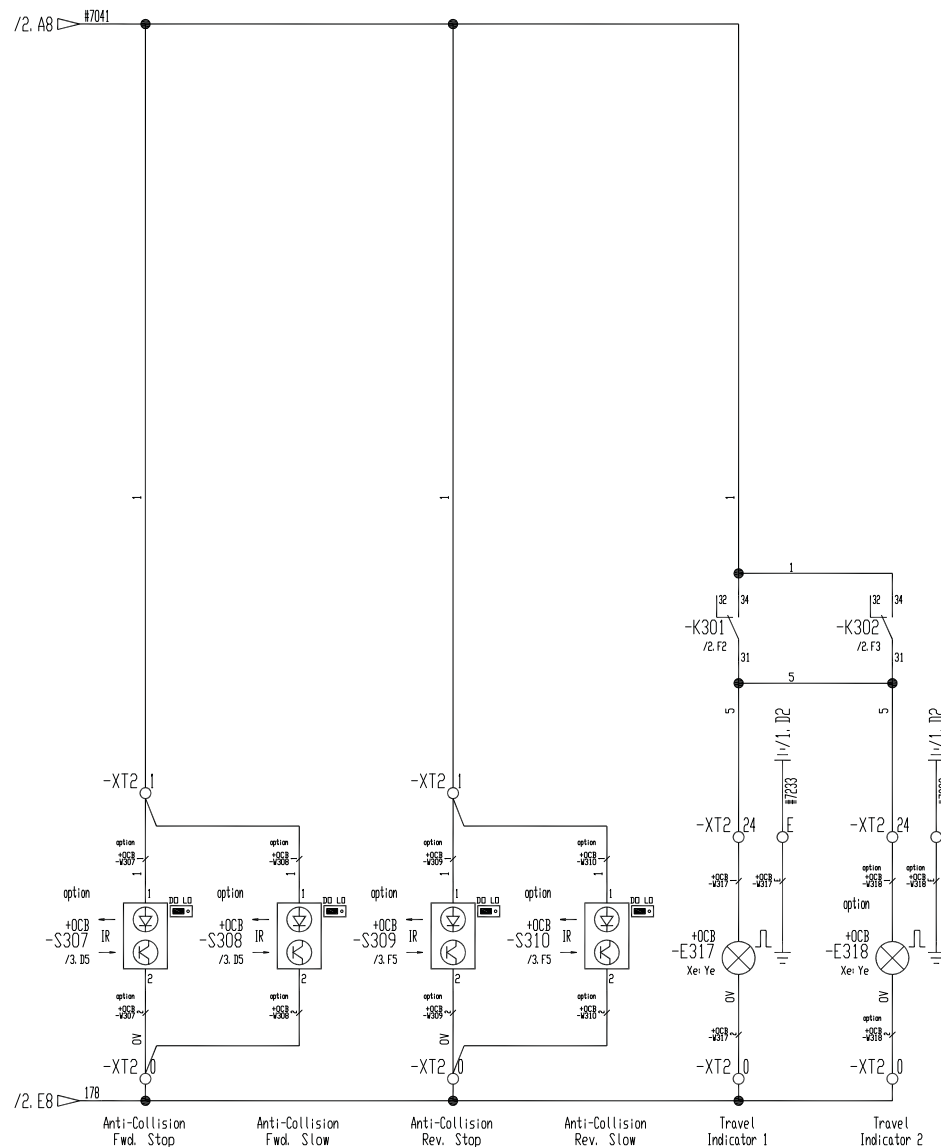


**QUEENSLAND URBAN
UTILITIES - 5T x
7804 SG OHTC**
JOB No. BW120021 - NQC7377
DWG No. E14-003-2 REV. A

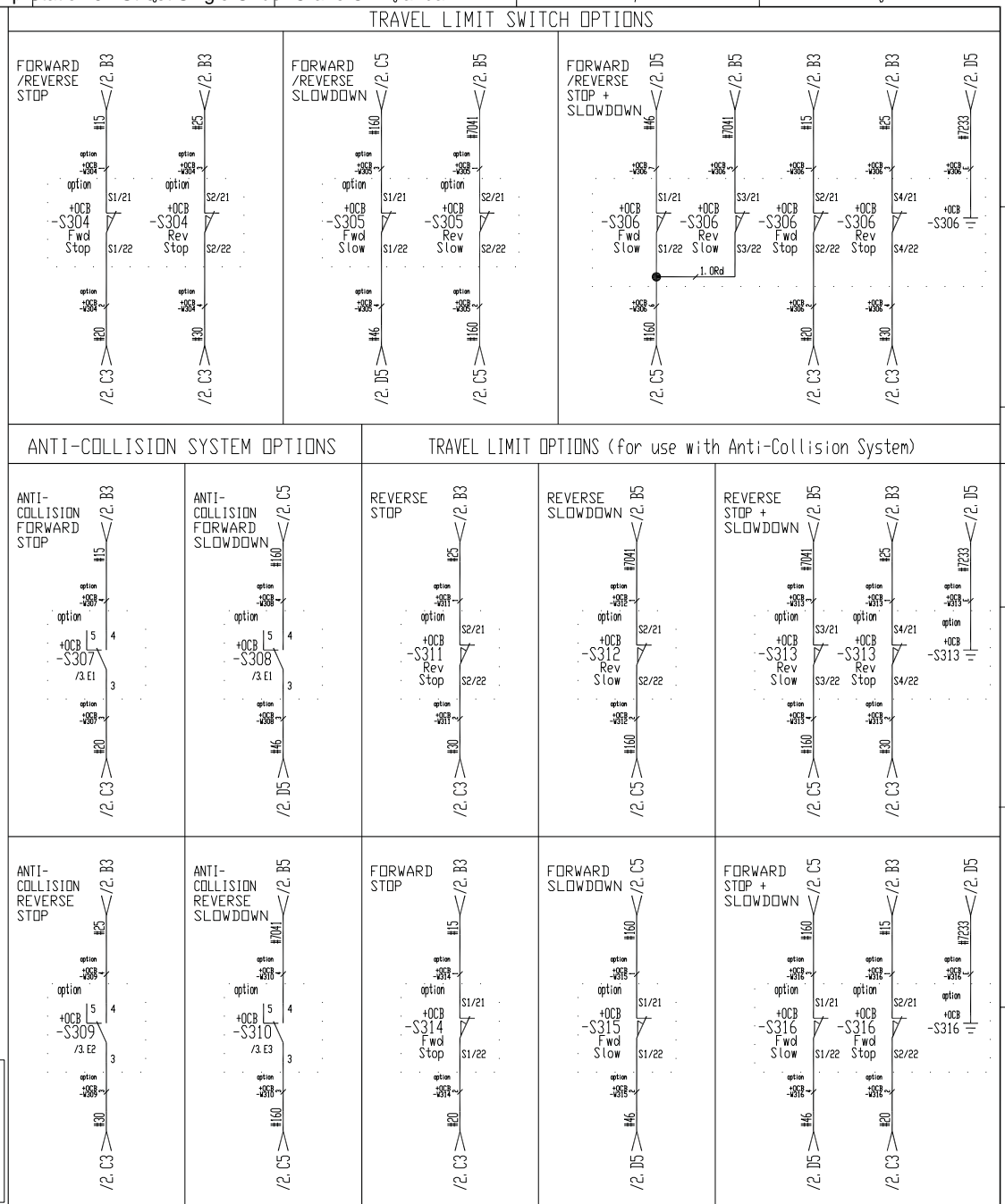
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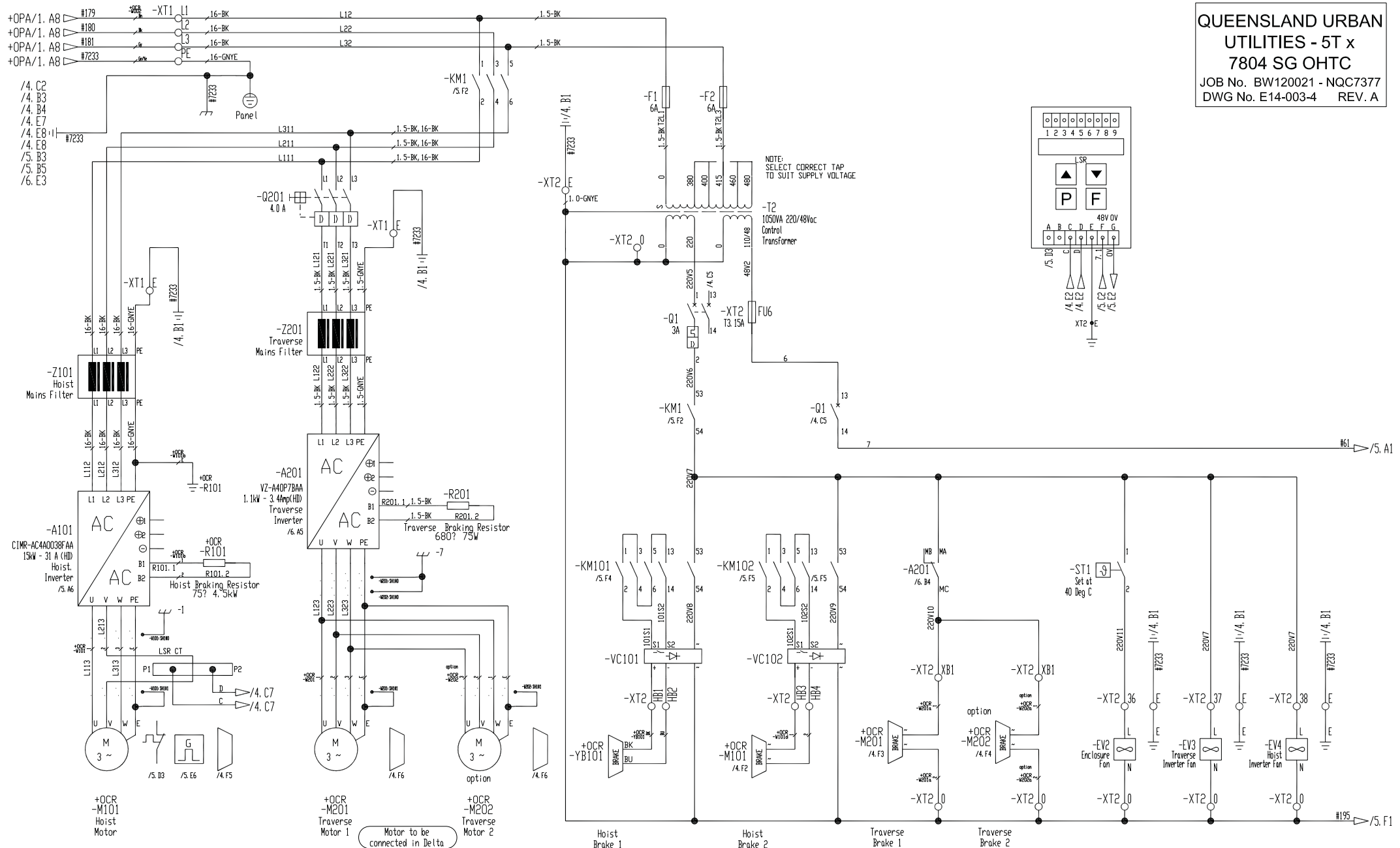


QUEENSLAND URBAN
UTILITIES - 5T x
7804 SG OHTC
JOB No. BW120021 - NQC7377
DWG No. E14-003-3 REV. A



				STREET CRANE CO LTD				TITLE 10 - Schematic ZX8 Crane Type H7V Travel Anti-Collision, Beacons & Limits	Contract No		Z05429.1	
				DATE	DRAWN	CHECKED	SCALE		Location		+OPA	
REV	DESCRIPTION	BY	DATE	27/06/13	KPC		N/A		Drawing No	OSL 000-4729	SHT 3 OF 10	

QUEENSLAND URBAN
UTILITIES - 5T x
7804 SG OHTC
JOB No. BW120021 - NQC7377
DWG No. E14-003-4 REV. A



STREET CRANE CO LTD

TITLE

10 - Schematic

Contract No Z05429.1

DATE DRAWN CHECKED SCALE

ZX8 Crane Type H7V

Location +OPH

REV DESCRIPTION BY DATE

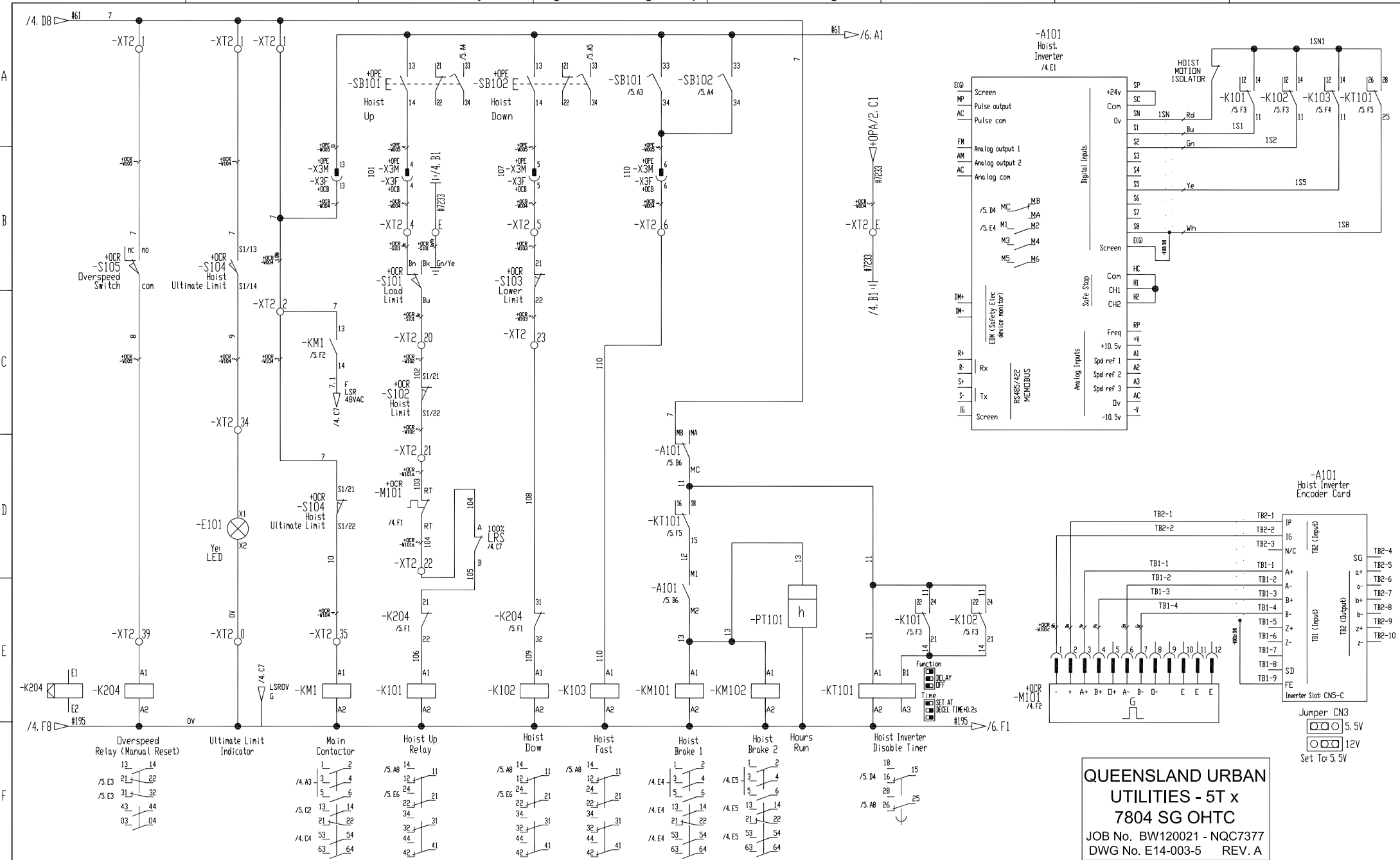
Hoist & Traverse Mains

Drawing No OSL 000-4729

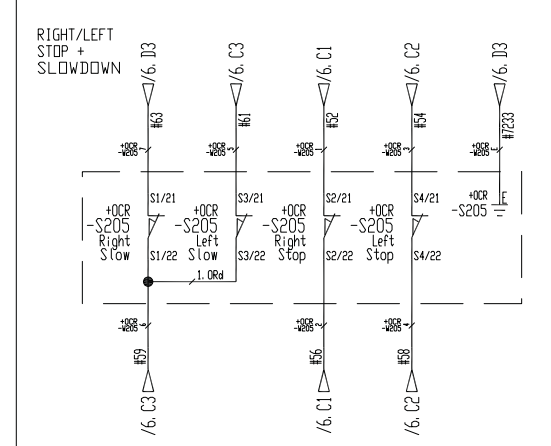
SHT 4 OF 10

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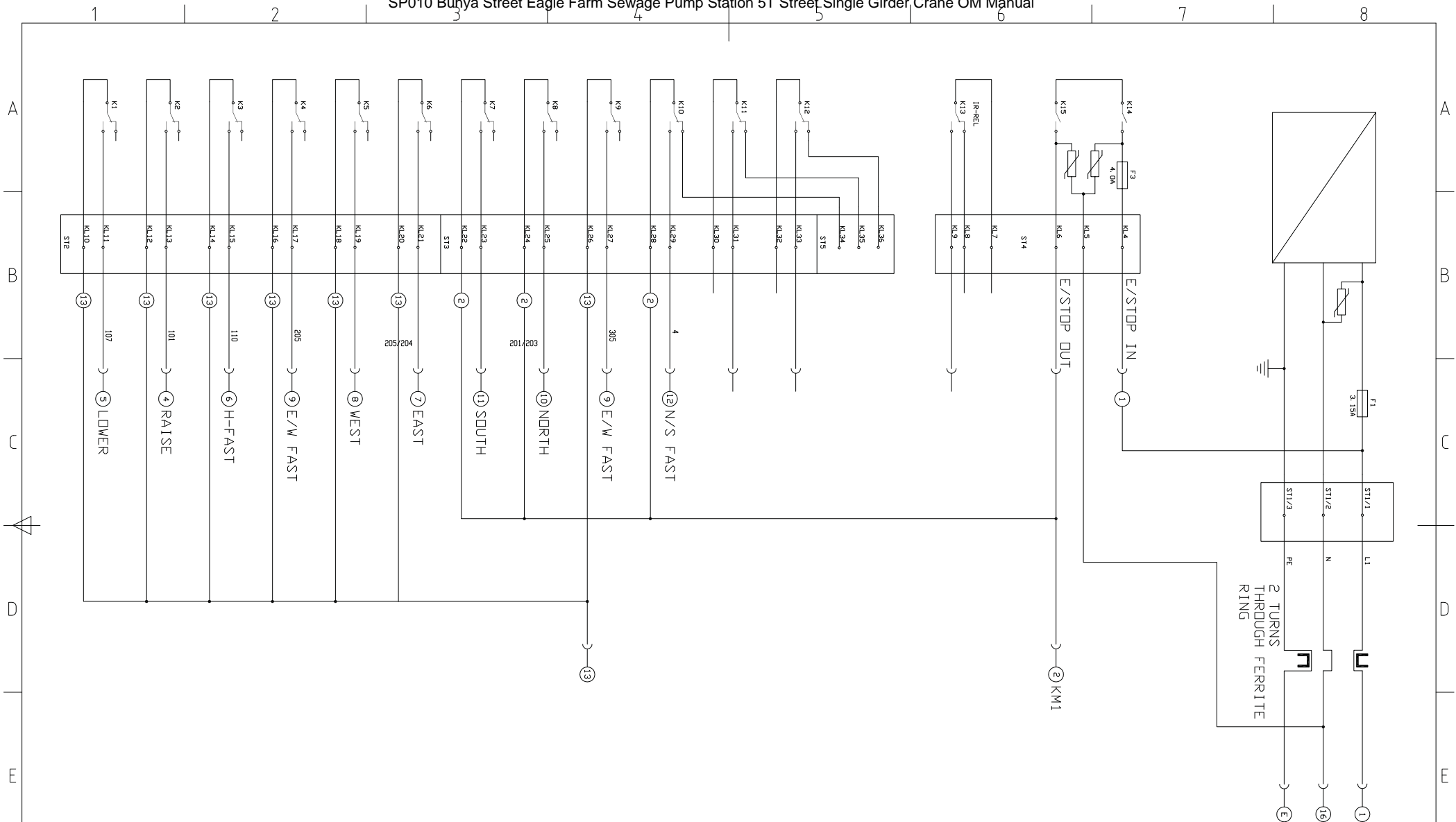


				STREET CRANE CO LTD				TITLE 10 - Schematic ZX8 Crane Type H7V Hoist Control	Contract No	Z05429.1		
				DATE	DRAWN	CHECKED	SCALE		Location	+OPH		
REV	DESCRIPTION	BY	DATE	27/06/13	KPC		N/A		Drawing No	OSL	000-4729	SHT 5 OF 10



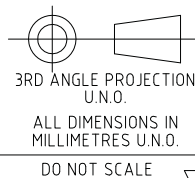
QUEENSLAND URBAN
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Address: 26-30 Enterprise St, Mackay 4740
Email: nqc@nqcranes.com.au
Ph: (07) 4952 5488
Fax: (07) 4952 5633
ABN: 20 060 375 699

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**QUEENSLAND URBAN
UTILITIES - 5T x
7804 SG OHTC**
JOB No. BW120021 - NQC7377

**HBC Remote Control
Connections FSE 512**

Drawing No
E14-003-7

Rev
A

Sheet
7

SECTION 10.

REMOTE CONTROL & LOAD DISPLAY

10.1 REMOTE CONTROL

10.2 LOAD DISPLAY





Operating Instructions

Original Operating Instructions

quadrix

AOQ12G02





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Maintenance

Attachments: Frequency list for EU member states, EFTA states, and Turkey, EC Declaration of conformity, system specific views, circuit diagrams and /or output wiring

Pictographs



Danger due to electrical voltage. Touching live parts inside the unit can be fatal or cause serious injuries.



Instructions for occupational health and safety. Not following these instructions can cause accidents, which can cause damage, serious injuries or even death.



Important information about the operation of the radio system

Manufacturer:

HBC-radiomatic GmbH • Haller Straße 45 – 53 • 74564 Crailsheim • Germany • Tel. +49 7951 393-0 • info@radiomatic.com.
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Safety Instructions

Read through these operating instructions carefully before working with the radio system. This applies in particular to the installation, commissioning and maintenance of the radio system.

The operating instructions are a constituent part of the radio control system and must always be kept close at hand for the responsible personnel.

The term 'machine' is used in the operating instructions for the different possible uses of the radio system.

Intended Use

- The radio system serves to control machines and for data transfer. Observe the job safety and accident prevention regulations applicable to each application.
- The intended use also includes reading the operating instructions and adhering to all safety information contained therein.
- The radio system must not be used in areas where there is a risk of explosion, nor for the control of machines used to convey persons, unless it is explicitly approved by the manufacturer for these uses.
- Modifications to the radio system may only be carried out by specialist personnel who have been trained and authorized by HBC-radiomatic. All modifications must be documented at the factory in the radio control master file.
- The radio control system safety devices must not be modified, removed or bypassed. In particular, modifications to any part of the radio system's complete E-STOP system are impermissible.

Safety Instructions for Installation and Operation

- The electrical connection per the accompanying output wiring diagram must be established by a qualified electrician exclusively.
- The receiver may only be opened by trained personnel. Components inside the receiver can be energized at life-threatening voltages. The supply voltage for the machine must be deactivated before the receiver is opened.
- Please also note with radio systems, that the presence of persons in the danger zone - in particular beneath the load (cranes!) - is prohibited in every instance.
- Select a safe location for radio control, from which you have a good and complete view of the working movements of the machine, the load movements and the surrounding working conditions.
- It is not permissible to put a radio transmitter unattended to one side whilst activated. Always switch the radio transmitter off when it is not required. This applies in particular if you change location, when working without radio control, during breaks and at the end of work. Always safeguard the radio transmitter against use by unauthorized persons, for example by locking it away.
- In the event of an emergency and with all faults, switch the radio transmitter off immediately by pressing the STOP switch.
- Only operate the radio system when it is in perfect working order. Faults and defects that could influence safety must be rectified before the system is put back into operation, by specialists who have been trained and authorized by HBC-radiomatic.
- Note that the operational directions of the operating elements may appear inverted depending on location and viewing angle to the machine. This applies in particular to rotary cranes, if your location changes from inside to outside the radius of the crane. The operator must make himself familiar with the directional markings on the machine before the start of work.
- Repairs may only be carried out by specialist personnel who have been trained and authorized by HBC-radiomatic. Use original replacement parts and accessories (e.g. rechargeable batteries) exclusively; otherwise it is possible that the equipment safety can no longer be guaranteed and our extended warranty will be voided.
- Remain vigilant when working with the radio system and familiarize yourself with its functions. This applies in particular if you are working with it for the first time or if you work with it only occasionally.
- Before starting to work, examine the STOP switch for mechanical ease of motion and electronic function at least once a day:

When you press the STOP switch with the transmitter on, the status LED of the transmitter has to go out. If the status LED does not go out then you have to disable the radio control system immediately. Remove the battery and the radiomatic® iLOG from the transmitter and inform a service technician.



Operation

The transmitter is equipped with an electronic radiomatic® iLOG key. radiomatic® iLOG contains all the data required for operating the transmitter. Operation is not possible without radiomatic® iLOG! Depending on the version the radiomatic® iLOG can also be used for operation of replacement transmitters of identical construction.

When activating the transmitter and if the radio connection is interrupted (e. g. if the connection is lost or the transmission range is exceeded), the transmitter reacts with the so-called enforced zero-position. Release all operating elements so they can return to the zero-position and actuate the start button. The machine will not react if the operating elements are not in zero-position. This prevents uncontrolled machine movements after the radio connection has been interrupted.

Activating the Transmitter

With start sequence

Insert a charged battery into the battery compartment.

The following steps need to be carried out within **4 seconds**:

1. Pull the STOP switch.
2. Shortly press the start button and then release. The transmitter will switch off if the button is pressed for longer than half a second!
3. Press the start button again until the status LED flashes green. Then release the button.
The transmitter is now ready for operation.

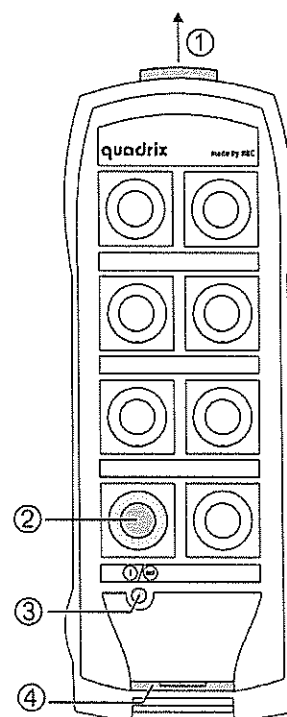


Note:

The transmitter switches off, if

- the start button is pressed for longer than half a second in step 2 of the start sequence.
- the start sequence is not completed within 4 seconds.
- another button is pressed during the start sequence.

In such cases, press the STOP switch and repeat the entire start sequence!

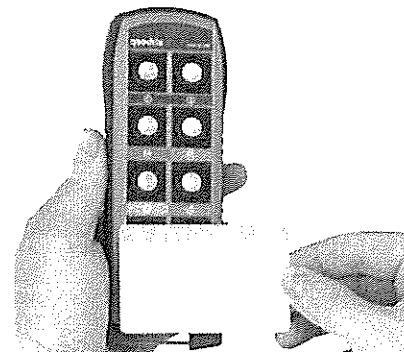


- ① STOP switch
- ② Start button
- ③ Status LED
- ④ radiomatic® iLOG



With HBC Smart Card

1. Insert a charged battery into the battery compartment.
2. Pull the STOP switch.
The status LED flashes green 2 times and red 1 time per second.
3. Hold your HBC Smart Card to the lower end of the transmitter (cf. illustration). An acoustic signal sounds.
When the status LED flashes green, the transmitter is ready to operate.

**Note:**

The transmitter can only be activated with a valid Smart Card. If you use a card that does not match the respective transmitter or is not approved for this transmitter, an acoustic signal sounds 3 times. The transmitter is automatically shut down after 2 seconds. Please contact your superior in such cases.

The transmitter also shuts down if the start sequence is not completed within 10 seconds. In this case press the STOP switch and repeat the entire start sequence!

**Caution:**

Before starting work always trigger the acoustic signal. This warns all colleagues that the machine is about to move.

Deactivating the Transmitter

Press the STOP switch.

**Note:**

Replace the battery when the status LED in the transmitter flashes red and an acoustic signal sounds. Otherwise, the transmitter will switch off in a few minutes.
Recharge the empty battery in the respective charger.

Automatic Switch-Off (APO Function)

For safety reasons we have equipped the transmitter with an automatic switch-off (APO function). The transmitter is automatically put out of circuit after approx. 15 minutes of non-use.

The automatic switch-off also saves battery power.

After an automatic switch-off you must reactivate the transmitter as described in chapter "Operation".

**Caution:**

The automatic switch-off does not relieve the operator of his responsibility to turn off the transmitter with the STOP switch when not in use.



Battery and Battery Charger

NiMH Battery

The battery capacity (= the ability to store electric current) and the battery charge (= the actual amount of stored current) depend on the age of the battery and the environment temperature. Older batteries begin to lose capacity over time. If the temperatures are below 0 °C or above 40 °C, the charge decreases faster.



Note:

- In all cases, charge the batteries completely before initial use and at intervals not exceeding 6 months if they are stored. This ensures that the batteries have their full capacity in use, even after long storage. Please refer to the date on the battery's packaging.
- Charge the battery fully before storing it for a prolonged period. Otherwise total discharge may occur.
- Use only the associated HBC charger to charge the battery.
- Charge the battery at an ambient temperature of 0 – 40 °C (32 – 104 °F).
- Charge the battery only when the status LED flashes red and an acoustic signal sounds.
- Always store rechargeable batteries at room temperature.
- Protect the battery from short circuits and always store it in the protective cover provided.

When handled properly the battery can exceed 500 charging cycles.

Battery Charger

Depending on customer selection, an AC or DC charger is available.



Ensure that you observe the following instructions:

- Use this charger only to charge the batteries specified on the type plate.
- The charger may not be used in hazardous areas.
- The charger has to be operated with the voltage indicated on the back.
- The charger has to be used in vehicles or indoors only.
- Use the charger only within the specified temperature range.
- Protect the charger against heat, dust and humidity.
- Do not cover the charger while it is in use.
- Disconnect the charger from the power supply when it is not in use.
- In case of any fault of the charger or the connecting cable disconnect it immediately and put it out of operation.
- Do not make technical changes to the charger or the connecting cable.
- Defects must be repaired by qualified personnel only.

Three LEDs indicate the actual operating state of the battery.

LED **green**: Illuminates when battery is charged.

LED **orange**: Illuminates when battery is charging.

LED **red**: Illuminates when battery is deep discharged or defective.



Note:

If a deep discharged battery is inserted into the charger, the red LED will illuminate for a few seconds before charging is started (LED orange illuminates).

**QA108600 / QD108300 / QD308300 with EC type-approval**

The charger is supplied with a connecting cable with a matching power plug.

Charging the Battery

1. Connect the charger via the connecting cable to the power supply.
2. Insert the battery into the compartment.

Charging will start automatically.

Technical Data	
Operating voltage	100 – 240 V AC (QA108600) 10 – 30 V DC (QD108300 / QD308300)
Charging time	ca. 3 h
Operating temperature	10 – 40 °C (50 – 104 °F)
Housing material	Plastic
Protection class	II



Options

The availability of the following functions depends on the design and configuration of your radio control system.

Safety Features

radiomatic® shock-off / roll-detect / zero-g / inclination switch

In specific emergency situations, these safety features can prevent unintended movement commands from being given to the machine, protecting the operator as well as other personnel in close proximity to the machine in use.

radiomatic® shock-off can react if the transmitter receives a hard impact.

radiomatic® roll-detect can activate if the transmitter rolls away.

radiomatic® zero-g can react if the transmitter is falling down or being thrown.

inclination switch can activate if the transmitter exceeds an inclination angle of approx. 150° for a specified time and/or is positioned upside down.

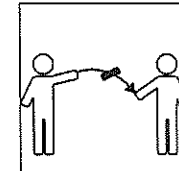
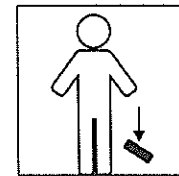
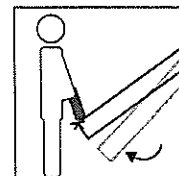
Depending on the ordered version the features can operate in three different ways:

- The complete radio system is shut down.
- Safety-relevant functions are deactivated.
- A previously defined function (e. g. crane horn) is activated.

To deactivate the features, press the start button until the status LED flashes green. Then the transmitter is ready to operate again.



The safety features do not relieve the operator of his responsibility to turn off the transmitter with the STOP switch when not in use.



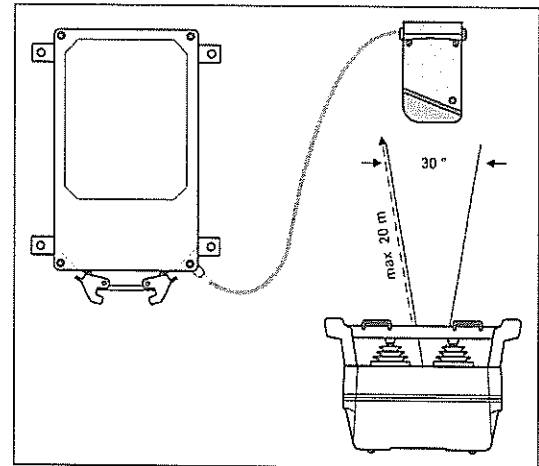


radiomatic® infrakey

The radio system can only be activated via an infrared link between the transmitter and the receiver. This increases the safety of operation, i.e. the machine can not become inadvertently enabled.

radiomatic® infrakey operates either with an infrared module in the receiver housing (radiomatic® infrakey internal) or with the offset infrared antenna focus I (radiomatic® infrakey external).

To activate radiomatic® infrakey, actuate the start button on the transmitter.



Function of radiomatic® infrakey with focus I



Notes:

- The range of the infrared beam is max. 20 m (66 ft).
- The angle of radiation is 30°.
- The front panel of the receiver must be visible (only radiomatic® infrakey internal).

Joystick with Deadman Function

In order that it is possible to issue control commands the button integrated into the joystick must be pressed before the joystick is moved. The function then reverts to self-locking and remains effective until the joystick is back in the zero position. This enables the avoidance of potential risks through the unintentional actuation of the joystick.

Vibration Alarm

With the vibration alarm, the operator can be informed of an impending need to change the battery and/or potential dangers on the machine through the vibration of the transmitter. This information can be for example pre-warnings for high wind speeds or threatening excess crane loads.

Front Panel Lighting

With the front panel lighting potential dangers resulting from incorrect operation, based on poor visibility, can be prevented. The operator simply switches on multiple LEDs, which are integrated into the rollover bar, with a switch or button on the transmitter.



Shut-off on Implausible Control Commands

The automatic shut-off will activate after a sequence of multiple questionable movement commands. If for example, the operator moves the joystick successively in different directions in an irregular manner. This function protects the operator and the whole work environment from potential dangers as well as the machine from wear resulting from rapid and erratic movements.

Depending on the ordered version this function can operate in three different ways:

- The complete radio system is shut down.
- Safety-relevant functions are deactivated.
- A previously defined function (e. g. crane horn) is activated.

To deactivate the function, press the start button until the status LED flashes green. Then the transmitter is ready to operate again.

Micro Drive

With the micro drive function the speed of the machine is limited to a preselected level. Even at full movement of the joystick/linear lever, the operator can not exceed this speed limit. In this manner demanding drive maneuvers can be managed and inexperienced users can be protected from potential dangers that can result from "speeding".

Orthogonal Drive (Electronic Cross Gate)

With the orthogonal drive function dangerous situations, caused by unintentional diagonal movements are being prevented. The operator will have to return the joystick back to zero position before another directional command can be activated. This function is suitable for example for situations where the operator has to make precision commands in confined areas. Diagonal movements are not possible.

User Identification

The "user identification" function with the HBC Smart Card enables a simple personalization of the radio system as well as the storage of all user profiles in the radio system. Safety relevant functions can be released to authorized personnel only and unauthorized users can be protected of potentially dangerous situations. In addition the radio system can store user-related all operating processes as well as the respective on time of the radio system. This data can be read from the radio system and shows how long the radio system was in use and how the individual operators used the various functions of the radio system.

Enabling switch

The two-step enabling switch provides enhanced safety during maintenance and service work on or in the machine as well as for applications with multiple users. In order to transmit control commands to the machine, the operator has to keep the switch pushed into the first step. Only then the other operating elements are activated. If the operator releases the button or pushes it into the second step (e.g. as the result of a cramp), all machine functions are immediately stopped. With this, the operator is protected from dangerous unintended movements of the machine in case he should lose consciousness or no longer has control over the transmitter.

If an application is controlled by more than one operator, movement commands can only be performed if all operators keep the enabling switch pushed into the first step.



Frequency Management

Fixed Frequency

If the identification plate in the battery compartment of the transmitter shows a frequency value (e.g. 433,500 MHz), the transmitter operates with a fixed frequency.

Please contact your service department if the frequency has to be changed because the radio channel is already assigned to another user.

Manual Frequency Switching

If the identification plate in the battery compartment of the transmitter shows the label **man**, the transmitter features manual frequency switching.

This function can be used to change the radio channel during radio operation.

Actuate the start button into the first step until an acoustic signal sounds. Then release the button.

Please contact your service department if all available frequencies are occupied.

radiomatic® AFS

If the identification plate in the battery compartment of the transmitter shows the label **AFS**, the transmitter is equipped with radiomatic® AFS (Automatic Frequency Selection).

When activating the transmitter radiomatic® AFS will check if the present radio channel is free. If the radio channel is occupied, the system automatically finds and saves a free radio channel.

If the radio channel currently in use is occupied by another radio control system, you must switch the transmitter off and on again in order to allow radiomatic® AFS to switch to a free radio channel.

The radiomatic® AFS option also includes the manual frequency switching function.



Note:

If radiomatic® AFS is to perform optimally, all the other radio systems in the immediate working environment (e.g. the factory hall or building site) should be switched on before starting to use the radio system for the first time. This allows radiomatic® AFS to detect automatically which radio channels are already being used in the working area, and thereby to choose a suitable free channel for its own use.

In addition, when switching the radio system on for the first time, the user should make sure that his distance from the radio receiver and from the machine is a realistic reflection of the working situation.

radiomatic® AFM

If the identification plate in the battery compartment of the transmitter shows the label **AFM** the transmitter is equipped with radiomatic® AFM (Automatic Frequency Management).

radiomatic® AFM detects available radio channels constantly. If the radio channel currently in use is occupied by another radio control system, radiomatic® AFM switches automatically to a free radio channel.

DECT

DECT technology is an extremely convenient method for uninterrupted radio control without frequency conflicts. The operator always works on a free radio channel and does not need to make manual settings.

2.4 GHz technology

2.4 GHz technology works with automatic frequency coordination and thus ensures interruption-free working in areas with many radio users. Manual frequency coordination is not necessary. With the worldwide frequency band, 2.4 GHz technology can be used all over the world.



Catch-Release

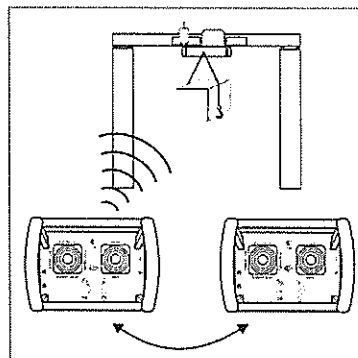
Via the Catch-Release option two or more transmitters can control a machine alternately.

When the receiver is switched on, the machine can initially be controlled via any associated transmitter. Once the receiver was taken over by one transmitter, the other transmitters no longer have access.

Take over machine

1. Switch the transmitter on.
2. Enter the "Catch" command on the transmitter and actuate the start button.

The access rights for the machine remain with that transmitter until the "Release" command is issued by that transmitter.



Release machine

1. Enter the "Release" command on the transmitter.
2. Switch the transmitter off.

The access rights for the machine are cancelled. Machine control can be taken over by another transmitter.

Operating Example:

Transmitter 1 has taken over the machine. Transmitter 2 is to be given control.

1. Enter the "Release" command on transmitter 1.
2. Switch transmitter 1 off.
3. Switch transmitter 2 on.
4. Enter the "Catch" command on transmitter 2 and actuate the start button.

Transmitter 2 now has sole access to all machine functions.



Notes:

- If a receiver has already been adopted by a transmitter can be displayed via a lamp on the machine.
- If the operating voltage of the receiver fails, the receiver returns to the starting condition in which it can be adopted by any transmitter. If necessary, the receiver must be adopted anew.
- If the transmitter is deactivated without the command "Release" having been issued, the other transmitters have no access to the receiver. The starting condition described above can only be resumed by deactivating the operating voltage at the receiver.



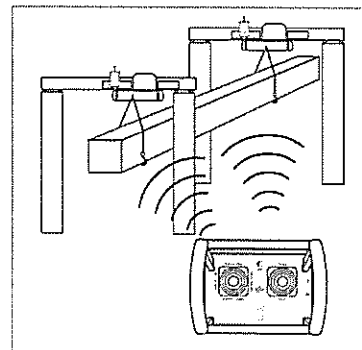
Tandem Operation

Tandem Operation T1

The radio system consists of 1 transmitter and 2 receivers for 2 machines. The transmitter can control the machines individually or in parallel.

The machines are selected at the transmitter via a rotary switch:

- A** only machine A
- A+B** machine A + machine B
- B** only machine B



Tandem Operation T2

The radio system consists of 2 transmitters and 2 receivers for 2 machines. Both transmitters are master transmitters and can control the machines individually or in parallel.

During normal operation transmitter 1 controls machine A and transmitter 2 controls machine B. In order to be able to switch to machine B or A+B at transmitter 1, for example, the key must be removed from transmitter 2 and inserted in transmitter 1.

The machines are selected at the transmitter via a rotary switch:

- A** only machine A
- A+B** machine A + machine B
- B** only machine B

Operating Example: Control of machine A + B via transmitter 1.

1. Switch transmitter 1 and 2 off and remove the key from transmitter 2.
2. Insert the key from transmitter 2 in transmitter 1.
Machine selection via transmitter 1 is activated.
3. Turn the rotary switch of transmitter 1 to A+B.
4. Switch transmitter 1 on and actuate the start button.

The radio system now operates in tandem mode.



Warning:

For safety reasons, it is imperatively required that only one key is available for each transmitter. The spare key must be stored at a superior, authoritative position and only be handed out in clarified cases.



Tandem Operation TM/TS

The radio system consists of 2 transmitters and 2 receivers for 2 machines. One transmitter is a master transmitter and can control the machines individually or in parallel. The other transmitter is a slave transmitter and can only control machine B.

In order to be able to switch to machine B or A+B at the master transmitter, the key must be removed from the slave transmitter and inserted in the master transmitter.

The machines are selected at the transmitter via a rotary switch:

- A only machine A
- A+B machine A + machine B
- B only machine B

Operating Example: Control of machine A + B via master transmitter.

1. Switch master and slave transmitter off and remove the key from slave transmitter.
2. Insert the key from slave transmitter in master transmitter.
Machine selection via master transmitter is activated.
3. Turn the rotary switch of master transmitter to A+B.
4. Switch master transmitter on and actuate the start button.

The radio system now operates in tandem mode.



Warning:

For safety reasons, it is imperatively required that only one key is available for each transmitter. The spare key must be stored at a superior, authoritative position and only be handed out in clarified cases.



Catch-Release-Tandem Operation

With the Catch-Release-Tandem Operation two or more transmitters can control several machines alternately.

Each machine is equipped with a receiver that can receive and monitor all transmitter frequencies. After activating the receivers all transmitters have equal access to the radio control system.

Take over machine

1. Switch the transmitter on.
2. Turn rotary switch on the transmitter to the respective position.
3. Enter the "Catch" command on the transmitter and actuate the start button.

The transmitter with control over the machine(s) retains the access to the receiver until the operator has issued the "Release" command.

Release machine

1. Enter the "Release" command on the transmitter.
2. Switch the transmitter off.

The access rights for the machine(s) are cancelled. Machine control can be taken over by another transmitter.

Operating Example:

Transmitter 1 has taken over machine A. Transmitter 2 is to be given control over machine A+B.

1. Enter the "Release" command on transmitter 1.
2. Switch transmitter 1 off.
3. Switch transmitter 2 on.
4. Turn rotary switch on transmitter 2 to A+B.
5. Enter the "Catch" command on transmitter 2 and actuate the start button.

Transmitter 2 now has sole access to all machine functions.



Notes:

- If a receiver has already been adopted by a transmitter can be displayed via a lamp on the machine.
- If the operating voltage of the receiver fails, the receiver returns to the starting condition in which it can be adopted by any transmitter. If necessary, the receiver must be adopted anew.
- If the transmitter is deactivated without the command "Release" having been issued, the other transmitters have no access to the receiver. The starting condition described above can only be resumed by deactivating the operating voltage at the receiver.

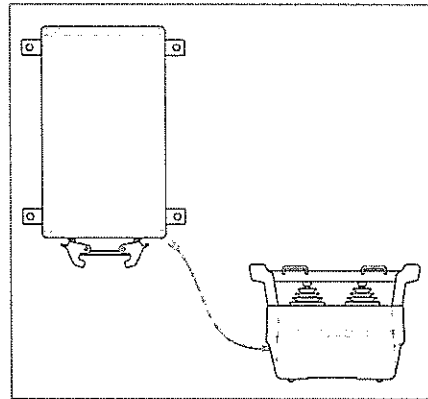


Cable Control

With a cable you can generate a direct data connection between the transmitter and receiver. The radio transmission is disabled. At the same time, the power supply of the transmitter is provided through the cable, as well.

Connecting the cable

1. Switch the transmitter off.
2. Remove the screw lock on the transmitter and receiver.
3. Connect the transmitter and the receiver with the cable. Ensure that the connector is locked.
4. Switch the transmitter on.



Notes:

- If you connect the cable while working with the system, the transmitter will switch off automatically. Actuate the start button to switch to cable operation.
- When the system is in cable mode the transmitter will receive the supply voltage from the receiver, i.e. the transmitter can be used without the battery.
- If you disconnect the cable from the transmitter and receiver, the system will switch off automatically. Actuate the start button to switch back to radio operation.

RF-amplifier

If the transmitter is equipped with an RF-amplifier, please refer to the transmitter wiring diagram. There you can also find the directions on how to activate the RF-amplifier.

Utilization of Button ① as Shift Key

The RPM+ and RPM- buttons have a dual function.

If the button ① is kept depressed and the RPM+ resp. RPM- button is also activated, the Motor Start resp. Motor Stop command will be output.

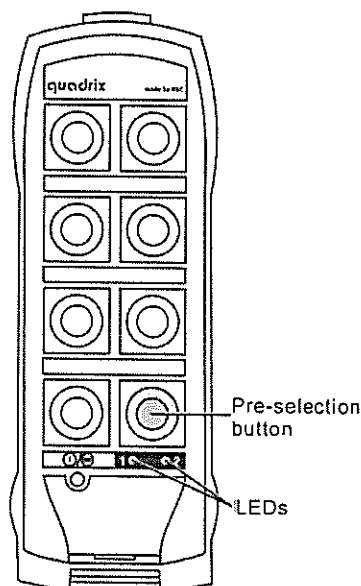


Pre-selection of Trolley or Hoist

The operator is able to select the trolley or hoist that he wishes to control. It is also possible to simultaneously control both trolleys/hoists, for example in order to transport particularly long or wide loads.

The selected trolleys or hoists are displayed by means of two LEDs.

Pre-selection is deactivated after the transmitter is switched on. The pre-selection button must be pressed in order to activate pre-selection.



Press the pre-selection button one time:

LED 1 illuminates

Trolley 1 or hoist 1 is selected

Press the pre-selection button two times:

LED 1 and 2 illuminate

Trolley 1 and 2 or hoist 1 and 2 are selected

Press the pre-selection button three times:

LED 2 illuminates

Trolley 2 or hoist 2 is selected

Press the pre-selection button four times:

LED 1 and 2 illuminate

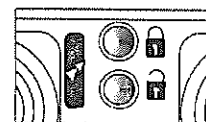
Trolley 1 and 2 or hoist 1 and 2 are selected

etc.

Pre-selection is deactivated when the transmitter is switched off via the STOP switch.

Feedback by LED

Using this function, system or machine data can be displayed on the transmitter by LEDs.



Bank switch





By switching operating levels via rotary switch or push button, the operator can choose between different operating levels. The number of available commands can be multiplied, even for small transmitters.



Rotary Switch for Preselected Speed

Using the rotary switch it is possible to choose between four maximum machine speeds, which are set in accordance with the customer's requirements.

The symbols for the speed adaptation have the following meanings:

-  = maximum speed 100 %
-  = maximum speed, limited to 75 %
-  = maximum speed, limited to 50 %
-  = maximum speed, limited to 25 %

Transmitter Key up

With the transmitter key up function, radio commands are only transmitted at the touch of a key and the transmitter will automatically be switched off after 7 seconds of non-use. For example, self-monitoring gates can thus be opened or closed by several operators.

During longer breaks the transmitter must be switched off by pressing the STOP switch.

The "transmitter key up" function also saves battery power.



Caution:

The transmitter key up function does not relieve the operator of his responsibility to turn off the transmitter with the STOP switch when not in use.

radiomatic® CPS

With radiomatic® CPS (= Continuous Power Supply), the battery of the radio control can be changed without interrupting power. For this, the transmitter is equipped with 2 battery compartments. If a battery has to be changed, the LED blinks red and the process automatically switches to the other battery in the second battery compartment without interruption. The radio system remains active. By means of 2 LEDs, the operator can at all times see which battery is in use and if a battery needs to be charged.

This function is ideal if long and interruption-free crane or machine operations are required.

radiomatic® iBAR

radiomatic® iBAR stands for a newly developed, intelligent over-roll bar. With this, the function range of the control can be considerably expanded.

radiomatic® iBAR can be configured with diverse additional operating elements, e.g. push buttons. In addition, LCDs for data indication can be integrated.

Slewing Gear Release



Note:

Whenever the command "slewing gear release" is actuated by means of the radio control, it is important that the respective check be made.

Due to the above, a clearly visible indicator lamp should be installed on the machine.

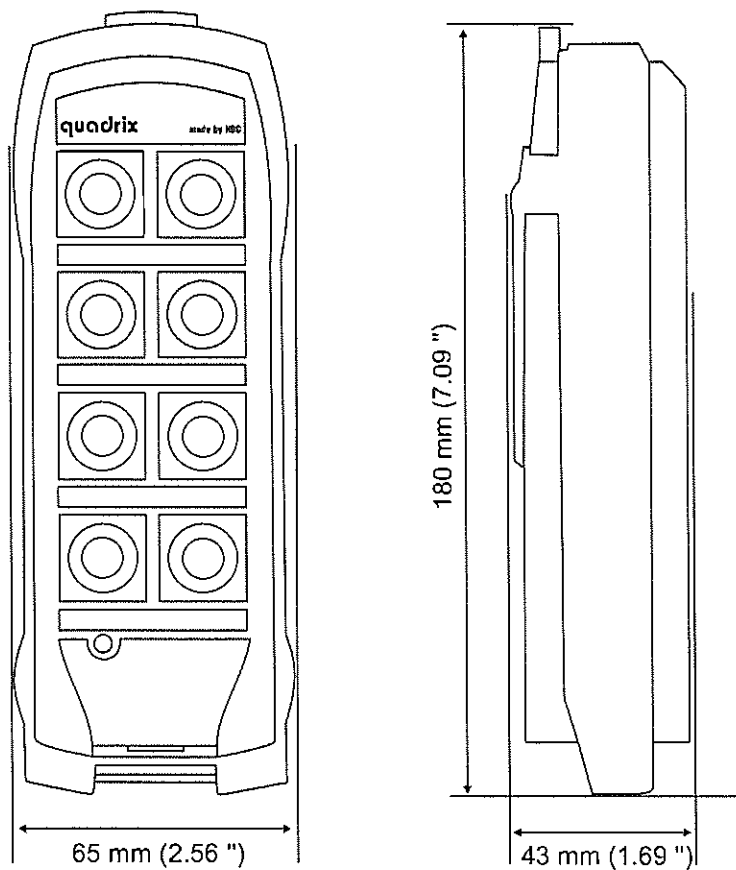


Technical Data

Max. number of control commands	16
Unique system addresses	Over 1.000.000 combinations
Supply voltage	3,6 V
Safety function	E-STOP: The mains supply is cut off by a STOP switch. Therefore, the criteria for an elimination of errors according to EN ISO 13849-2 chapter D.5.3., table D.8 (non-opening of contacts) are met. The performance level of the respective receiver applies.
Frequency ranges	308 – 338 MHz, 405 – 475 MHz ¹ , 865 – 870 MHz, 902 – 928 MHz, 1210 – 1258 MHz ¹ 2402 – 2480 MHz DECT: 1790 – 1930 MHz ¹ Not all frequency ranges available.
Channel spacing	12,5 / 20 / 25 / 50 / 250 kHz 2,4 GHz: 1 MHz DECT: 1,728 MHz
Antenna	Internal
Battery type	BA223030 (NiMH)
Battery capacity	2100 mAh
Continuous operating time	ca. 30 h
Operating temperature range	-25 °C ... +70 °C (-13 °F ... +158 °F)
Housing material	Impact-resistant plastic
Dimensions	180 x 65 x 43 mm (7.1 x 2.6 x 1.7 ")
Weight (incl. battery)	ca. 360 g (0.8 lb.)
Protection class	IP 65



Dimensions





Troubleshooting


Note:

Please check the functions using the cabin or cable controls first!

Problem	Possible Cause	Remedy
Transmitter does not react when switched on.	<ul style="list-style-type: none"> – No power. 	<ul style="list-style-type: none"> – Check battery contacts for damage or contamination. – Insert a fully charged battery into the battery compartment. – Recharge battery.
Low-power indication after minimal operating time.	<ul style="list-style-type: none"> – Battery contacts are contaminated or damaged. – Battery not charged. – Battery defective. 	<ul style="list-style-type: none"> – Check battery contacts for damage or contamination. – Recharge battery. – Ensure that recharging process runs correctly. – Check transmitter functions using a fully charged or replacement battery.
The display in the transmitter flashes green but it is not possible to effect control commands.	<ul style="list-style-type: none"> – Receiver has no voltage. – No radio communication. – "Crane On" command has not been given. 	<ul style="list-style-type: none"> – Check the connecting cable to the receiver. – Check the functions via the LEDs in the radio status panel of the receiver.
Some commands are not carried out.	<ul style="list-style-type: none"> – Receiver defective. – Interruption in the connecting cable to the machine. 	<ul style="list-style-type: none"> – Check if all connecting cables and cable junctions are tight.

If none of the measures mentioned resolve the problem, then please contact your service technician, dealer or HBC-radiomatic GmbH.



Maintenance

The radio control system is virtually maintenance-free. Please observe the following points:

- Check the STOP switch functionality at regular intervals. Dirt deposits on the switch can hinder the mechanism and impair the function.
- Check the rubber bellows or rubber seals of the operating elements at regular intervals for leak-tightness. Replace immediately if cracks appear since the penetration of dirt and humidity may damage the function of the operating elements.
- Never use a high-pressure cleaner or sharp or pointed objects to clean the transmitter.
- Charge and discharge transmitter batteries regularly.

In the Event of a Fault



Warning:

Never operate a machine with a faulty or defective radio control system!

- Never try to repair the electronics of the radio control system! Opening the transmitter or receiver housing terminates the manufacturer guarantee.
 - Send any defective or faulty equipment to your local distributor or to the manufacturer. They are experts and have the necessary know-how and OEM spare parts.
 - Always send in the complete radio system (transmitter, receiver, batteries, battery charger, connection cables, and other equipment) and attach a detailed fault description.
 - Do not forget to enclose your address and telephone number so that we can get in touch with you quickly if necessary.
- To avoid damage during transport, use the original packing supplied with the radio control system, otherwise pack securely. Send the consignment to your distributor or to the following address:

HBC-radiomatic GmbH
Haller Str. 45 – 53
74564 Crailsheim, Germany
Phone: +49 7951 393-0
Fax: +49 7951 393-50
E-Mail: info@radiomatic.com
- If you wish to bring a defective radio system to your distributor or the factory by yourself, we kindly ask you to make an appointment in advance.

For an overview of our worldwide service and sales contacts, please visit our website www.hbc-radiomatic.com under "Contact".



Frequency list for EU member states, EFTA states, and Turkey

Country block (cf. type plate)	Frequency range in MHz	Duty cycle	Power	Channel spacing	Labeling according to RTTE directive	Country codes according to ISO 3168																										SI	TR	UK
						AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IS	IT	LI	LU	LV	MT	NL	NO	PL	PT			
AT-2	440,5250 – 441,4750	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AT-3	439,3900 – 439,4300	100%	10 mW e.r.p.	20 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CZ-1	430,0000 – 433,1000	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DE-2	456,1700 – 458,4300	100%	10 mW e.r.p.	20 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DE-3	466,1700 – 466,4100	100%	10 mW e.r.p.	20 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DK-1	433,5750 – 434,0250	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DK-2	445,1250 – 445,8750	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-1	433,1000 – 434,7500	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-2	433,1000 – 434,6750	100%	10 mW e.r.p.	12,5 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-3	869,7250 – 869,9750	100%	5 mW e.r.p.	25 KHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-4	434,0750 – 434,7750	100%	10 mW e.r.p.	25 KHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-5	434,0750 – 434,7750	100%	10 mW e.r.p.	25 KHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-6	434,0750 – 434,7750	100%	10 mW e.r.p.	25 KHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EU-7	434,0750 – 434,7750	100%	10 mW e.r.p.	12,5 KHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FI-1	408,5750 – 408,8250	100%	10 mW e.r.p.	12,5 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FI-2	406,4000 – 408,6000	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FI-3	442,5250 – 442,7500	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FI-4	468,2750 – 468,6750	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FR-1	407,7000 – 407,9250	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NL-3	450,9300 – 451,1100	100%	10 mW e.r.p.	20 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NO-2	440,0000 – 442,0000	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NO-3	440,7250 – 441,7250	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SE-1	438,0250 – 439,9750	100%	10 mW e.r.p.	25 KHz	CEI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DECT	1880 – 1900	100%	10 mW e.i.r.p.	1,728 MHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TC240	2402 – 2480	100%	100 mW e.i.r.p.	1 MHz	CE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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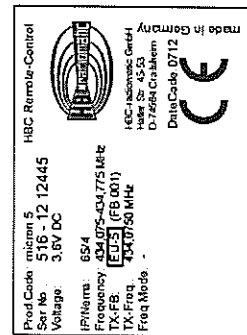
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X = May not be used in the respective country
✓ = May be used in the respective country

Exemplary type plate



As of 07/2012
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EC Declaration of Conformity

in accordance with EC Machinery Directive 2006/42/EC, Annex II 1 A and R&TTE Directive 1999/5/EC, Annex III

The manufacturer:
HBC-radiomatic GmbH
Haller Straße 45 – 53 • 74564 Crailsheim • Germany



hereby declares that the following product: **Transmitter quadrix**

safety component according to the Machinery Directive (2006/42/EC),
conforms to all applicable provisions of the Machinery Directive (2006/42/EC).

The designated product also adheres to the following European directives in regards to their protective goals:

2006/95/EC Low Voltage Directive
..... (see Annex I, 1.5.1 of the Machinery Directive 2006/42/EC)
2004/108/EC Electromagnetic Compatibility

The following harmonized standards were applied:

EN ISO 13849-1:2008/AC:2009 Safety of machinery - Safety-related parts of control systems
..... Part 1: General principles for design
EN 60204-1:2006/AC:2010 Safety of machinery - Electrical equipment of machines
..... Part 1: General requirements
EN 60204-32:2008 Safety of machinery - Electrical equipment of machines
..... Part 32: Requirements for hoisting machines
EN 60950-1:2006+A11:2009+A1:2010+ Information technology equipment - Safety
A12:2011 Part 1: General requirements
EN 13557:2003 + A2:2008 (Annex C) ... Cranes - Controls and control stations
EN 301 489-1:2008-04 V1.8.1 Electromagnetic compatibility and Radio spectrum Matters (ERM)
..... Part 1: Common technical requirements
With Short-Range Devices:
EN 301 489-3:2002-08 V1.4.1 Electromagnetic compatibility and Radio spectrum Matters (ERM)
..... Part 3: Specific conditions for Short-Range Devices (SRD)
EN 300 220-2:2007-06 V2.1.2 Electromagnetic compatibility and Radio spectrum Matters (ERM)
..... Part 2: Harmonized EN covering essential requirements under article 3.2
..... of the R&TTE Directive
With DECT systems:
EN 301 489-6:2008-08 V1.3.1 Electromagnetic compatibility and Radio spectrum Matters (ERM)
..... Part 6: Specific conditions for DECT equipment
EN 301 406:2009-07 V2.1.1 Digital Enhanced Cordless Telecommunications (DECT) covering the
..... essential requirements under article 3.2 of the R&TTE Directive -
..... Generic radio
With 2.4 GHz systems:
EN 301 489-17:2009-05 V2.1.1 Electromagnetic compatibility and Radio spectrum Matters (ERM)
..... Part 17: Specific conditions for Broadband Data Transmission Systems
EN 300 328:2006-05 V1.7.1 Wideband transmission systems; Data transmission equipment operating
..... in the 2,4 GHz ISM band and using wide band modulation techniques;
..... Harmonized EN covering essential requirements under article 3.2 of the
..... the R&TTE Directive

The following national regulations were applied:

ZH 1/547:1976 Guidelines for radio control units of cranes
..... (except of number 12: key switch)
BGR 149:1995 Rules for the safety of equipment for wireless transmission of
..... control commands

Person responsible for documentation: Martin Schuster

Place and date:

Crailsheim, 6.11.2012

Valid signature:

Name:

Wolfgang Brändel
(Managing Director)



**Model LSR-CT
AC Amps Input
Load Spectrum Recorder
Operation and Instruction Manual**

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1 Introduction



1.1 Software updates

Software version LS0.2 issued 09/11/09 has a modified SWP calculation and a minimum 20% load value when the motor is drawing current. There is also a facility to use the new **FULL LOAD** function to perform a calibration in AC Amps or to calibrate in %. The new **LIVE** display will show the AC Amps if this method of calibration is chosen or will show 0 to 100% if this method of calibration is used.

1.2 General description

This manual contains information for the installation and operation of the LSR-CT Load Spectrum Recorder. Signal input to the instrument is 0 to 5 Amps AC. From this input the instrument calculates and displays Safe Working Period, Run Time, Starts and Overloads. The values for each hoist class are shown in the table below and these values will reduce as the hoist is operated. If any of these values reaches zero the relay contacts will open.

Hoist Class	SWP (hrs)	Run Time (hrs)	Starts	Overloads
M1	100	800	97000	1000
M2	200	1600	216000	1000
M3	400	3200	480000	1000
M4	800	6300	1134000	1000
M5	1600	12500	3000000	1000
M6	3200	25000	7500000	1000
M7	6300	50000	18000000	1000
M8	12500	100000	42000000	1000

The values for these 4 parameters are available for viewing via the  and  buttons. The display for each of the above variables is shown as:

CLAS - allows selection of hoist class
SAFE - allow adjustment of Safe Working Period
run - allows adjustment of Run Time
Start - allows adjustment of Starts
OL00 - allows adjustment of Overloads
LIVE shows values based on calibration units
LOAD shows input load % reading

Values greater than 5 digits will be rounded into thousands to fit onto the 5 digit display. The **P** button can be used to show finer resolution values where truncation is required to fit onto the display. For example Run Time (**run**) may display the value **791** indicating 791 hours remain. By pressing the **P** button the display will show a higher resolution e.g. a display of **152.47** after pressing the **P** button would indicate that the remaining time is 791 hours 52 minutes and 47 seconds. This higher resolution display is available for Safe Working Period, Run Time and Starts where truncation is required to fit onto the 5 digit display. This higher resolution is useful to observe that the instrument is actually functioning without the need to wait for extended periods.

The value displayed for Safe Working Period, Run Time, Starts or Overloads will display negative values if load continues to be applied after a value reaches zero. The Starts and Overloads will only show negative values if extra starts occur after Starts display has reached zero or extra overloads are applied after the Overloads display has reached zero. The hoist can be made to operate for a short period after a value has reached zero, refer to section 1.5.

1.3 Value adjustment and lockout timer

Once a hoist class in the range 1 to 8 is selected a lockout timer will start which will cause some of the functions to become not accessible after 1 hour of Run Time. Separate function tables in this manual show which functions are accessible before the lockout timer has timed out and after the lockout timer has timed out, see pages 8 and 9.

To access the Class and other variables you must enter via **CAL** mode, refer to page 10. The displays shown for each variable are:

CLAS - allows selection of hoist class

SAFE - allow adjustment of Safe Working Period

run - allows adjustment of Run Time

Start - allows adjustment of Starts

OL0d - allows adjustment of Overloads

The purpose of the lockout timer is to allow some time for adjustment of the variables Safe Working Period, Run Time, Starts and Overloads. Prior to the timeout of the lockout timer the values for each of these variables may be adjusted. This allows a new instrument to be adjusted down to the values of a failed instrument it is replacing. The values can not be adjusted to any higher values than the maximum value of the class selected e.g. for Class 1 Starts can be adjusted up and down but the maximum value will be 97000.

If the class is changed before the lockout has timed out the 1 hour timer will begin again i.e. the timer will restart allowing 1 hour for adjustment.

1.4 Hoist Class 0

Class 0 is the default class i.e. when supplied the instrument will be set to class 0 at the **CLASS** function. Class 0 can be used to test the instrument with no time limit i.e. when Class 0 is selected the lockout timer does not operate. Class 0 is not a valid hoist class and a hoist class of 1 to 8 must be selected for normal operation.

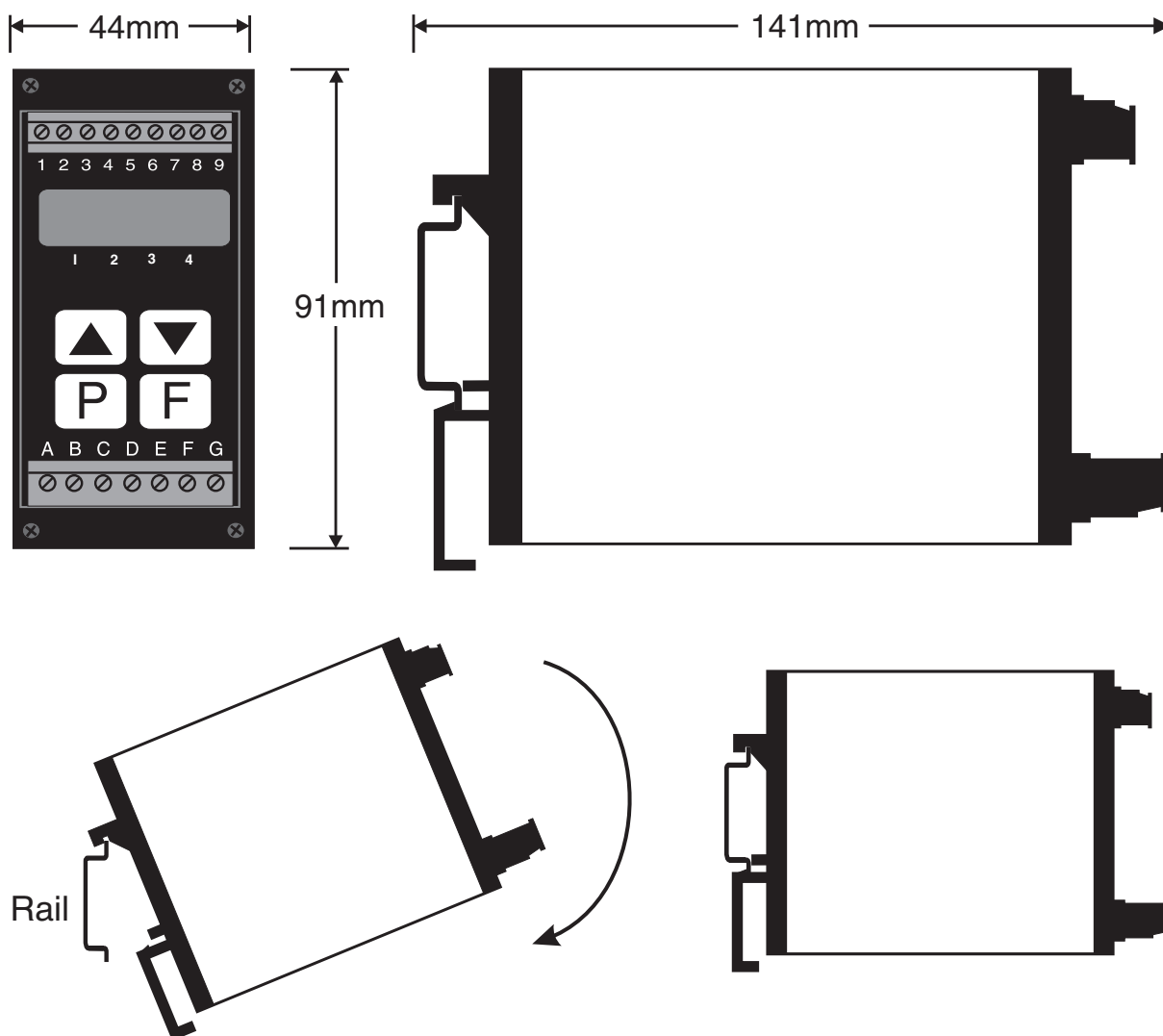
1.5 Relay indicator and relay override

The relay indicator light is below the 7 segment display. When number “1” is lit up in red this indicates that the relay is closed i.e. that the indicator is still counting down. When this relay indicator is blank but the 7 digit display is on it indicates that one of the variables has reached zero and the relay has opened.

To allow loading in progress to be completed once the relay is open the relay can be overridden a maximum of 5 times of 1 hour Run Time duration each. To override the relay (i.e. make the relay close) press and hold the **P** button until the indicator light “1” comes on. This indicates that the relay has been overridden once and is again closed. The hoist will be operational again for 1 hour run time. After 5 such override operations the relay cannot be overridden further.

2 Mechanical installation

The instrument is designed for DIN rail mounting. The instrument clips on to 35mm DIN standard rails (EN50022). Cut the DIN rail to length and install where required. To install the instrument simply clip onto the rail as shown below. To remove the instrument lever the lower arm downwards using a broad bladed screwdriver to pull the clip away from the DIN rail.

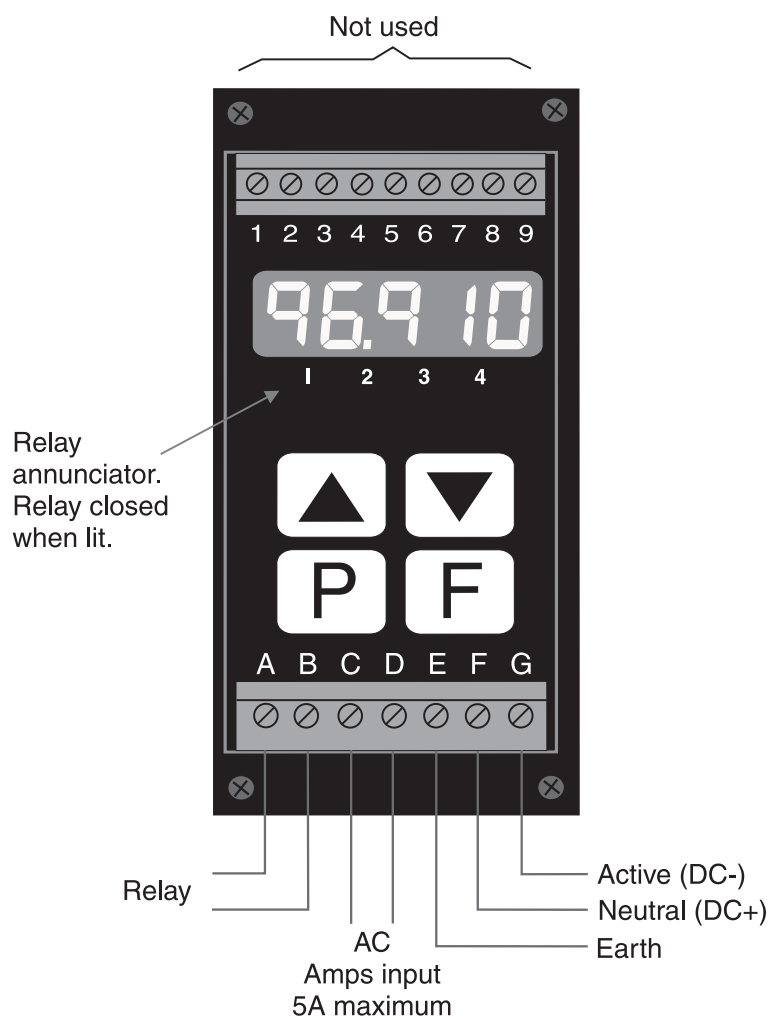


3 Electrical installation

The LSR Meter is designed for continuous operation and no power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. The terminal blocks allow for wires of up to 2.5mm² to be fitted for power supply and relay. Connect the wires to the appropriate terminals as indicated below.

Refer to connection diagrams provided in this manual to confirm proper selection of voltage, polarity and input type before applying power to the instrument. When power is applied the instrument will cycle through a display sequence, indicating the software version and other status information, this indicates that the instrument is functioning. Acknowledgement of correct operation may be obtained by applying an appropriate input to the instrument and observing the resultant reading.

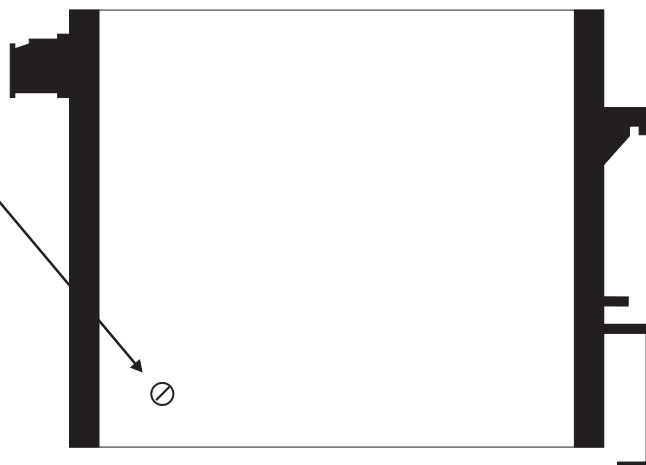
Note that the power supply type is factory configured. Check power supply type before connecting. Relay outputs are voltage free contacts.



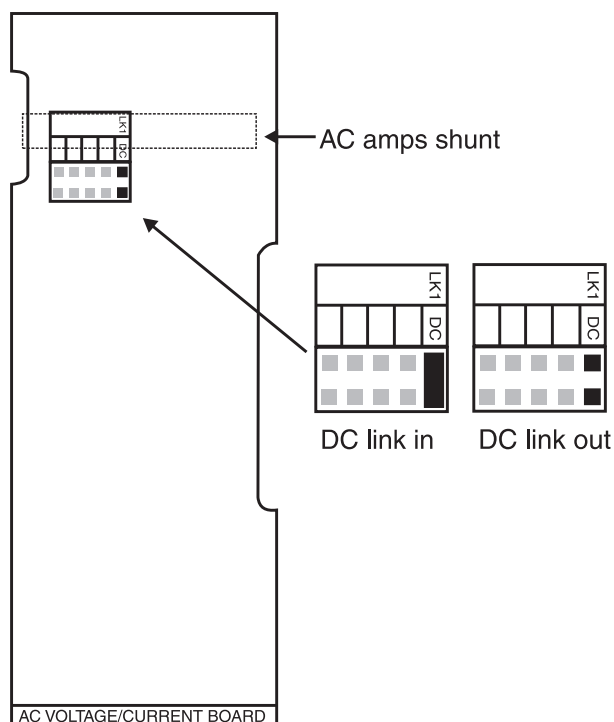
3.1 Configuring the input board

Remove the circuit board from the case following the instructions below.

Remove the connectors,
the four front bezel screws
and the earth screw
at the side of the case.
Hold the front bezel and
slide out the circuit boards.



The AC amps input board plugs into the main board at connector P2 which is marked “INPUT BOARD”. Link settings for the AC amps input board are as shown below. Only one user selectable link is fitted to the AC amps board, this is the “DC” link LK1. If LK1 is in then any DC components in the waveform will be taken into account in the true RMS calculations. If LK1 is out then any DC components in the input will be ignored. The link is normally left out for AC measurement.



4 Function table showing all functions

The functions seen below are accessible only before the lockout timer times out.

Functions in this first table are available in **FUNC** or **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
bri ght	Display brightness level	1 to 15	15		6.2 / 11

Functions in this second table are available only in **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
run uAL	Run Timer threshold	0.0 to 100.0	1.0		6.3 / 11
OLo d dLAY	Overload delay in seconds	0.0 to 60.0	2.0		6.4 / 11
CLASS	Hoist class	0 to 8	0		6.5 / 11
SAFE	Safe Working Period	n/a	Max for class		6.6 / 12
run	Run Time	n/a	Max for class		6.7 / 12
Start	Starts	0 to max. for class	Max for class		6.8 / 12
OLo d	Overloads	0 to max. for class	Max for class		6.9 / 12
dCp t	Decimal point for L I V E display	0.0 , 1.0 , 0.02 , 0.003 or 0.0004	0		6.10 / 13
FLt r	Digital filter	0 to 8	2		6.11 / 13
FULL LOAD	Full load value	0 to 99999	0		6.12 / 13
dFLt di SP	Default display	SAFE or L I V E	SAFE		6.13 / 13
CAL 1	First live input calibration scaling point	Any display value	0.0		6.14 / 14
CAL 2	Second live input calibration scaling point	Any display value	100.0		6.15 / 14
CAL OFSt	Calibration offset adjustment	Any display value	n/a		6.16 / 14

5 Function table showing normal operating functions

The functions seen below are accessible after the lockout timer times out.

Functions in this first table are available in **FUNC** or **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
briGht	Display brightness level	1 to 15	15		6.2 / 11

Functions in this second table are available only in **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
run UAL	Run Timer threshold	0.0 to 100.0	1.0		6.3 / 11
OLd dLAY	Overload delay in seconds	0.0 to 60.0	2.0		6.4 / 11
dCPt	Decimal point for LIVE display	0.0 , 1.0 , 0.02 , 0.003 or 0.0004	0		6.10 / 13
FLtr	Digital filter	0 to 8	2		6.11 / 13
FULL LOAD	Full load value	0 to 99999	0		6.12 / 13
dFLt di SP	Default display	SAFE or LIVE	SAFE		6.13 / 13
CAL 1	First live input calibration scaling point	Any display value	0.0		6.14 / 14
CAL 2	Second live input calibration scaling point	Any display value	100.0		6.15 / 14
CAL OFSt	Calibration offset adjustment	Any display value	n/a		6.16 / 14

6 Explanation of functions

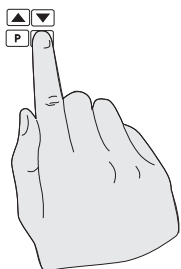
The setup and calibration functions are configured through a push button sequence. The three push buttons located at the rear of the instrument (also at the front on some display options) are used to alter settings. Two basic access modes are available:

FUNC mode (simple push button sequence) allows access to display brightness adjustment only.

CAL mode (power up sequence plus push button sequence) allows access to all functions including calibration parameters.

Once **CAL** or **FUNC** mode has been entered you can step through the functions, by pressing and releasing the **F** push button, until the required function is reached. Changes to functions are made by pressing the or push button (in some cases both simultaneously) when the required function is reached. See the flow chart example on the following page.

Entering **CAL** Mode



1. Remove power from the instrument. Hold in the **F** button and reapply power. The display will indicate **CAL** as part of the "wake up messages" when the **CAL** message is seen you can release the button.



2. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button.

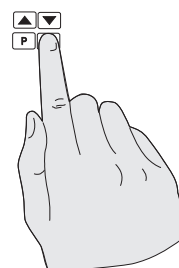


3. Within 2 seconds of releasing the **F** button press, then release the **▲** and **▼** buttons together. The display will now indicate **FUNC** followed by the first function.

Note: If step 1 above has been completed then the instrument will remain in this **CAL** mode state until power is removed. i.e. there is no need to repeat step 1 when accessing function unless power has been removed.

Entering **FUNC** Mode

No special power up procedure is required to enter **FUNC** mode.



1. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button.






2. Within 2 seconds of releasing the **F** button press, then release the **▲** and **▼** buttons together. The display will now indicate **FUNC** followed by the first function.

6.1 Explanation of Functions

6.2 Display brightness

Display: **brgt**
 Range: **1** to **15**
 Default Value: **15**

Displays and sets the digital display brightness. The display brightness is selectable from **1** to **15**, where **1** = lowest intensity and **15** = highest intensity. This function is useful for improving the display readability in dark areas or to reduce the power consumption of the instrument. To set brightness level go to the **brgt** function and use the  or  push buttons to set the value required then press  to accept this value.

6.3 Run Timer input threshold in %

Display: **run UAL**
 Range: **0.0** to **100.0**
 Default Value: **1.0**

Sets the load limit below which the Run Timer and Safe Working Period will not decrement. This function can be used when it is found that there is some current flow through the input when the hoist is not lifting. For example if this function is set to **3.0** the Run Time and Safe Working Period clocks will only decrement when the load is 3% or higher. The number of Starts will only decrement when the input value exceeds that set by the **run UAL** function. To disable this function and enable the timer at any input above zero set the function value to **0.0**.

6.4 Overload delay in seconds

Display: **OLod dLAY**
 Range: **0.0** to **60.0**
 Default Value: **2.0**

Sets the overload delay period in seconds. This function can be used to stop the display registering an overload due to excessive startup current rather than a genuine overload. Set the time to slightly greater than the maximum time for the startup current to stabilise i.e. time for the startup current to register a value below 100.0%. This function can be disabled by setting the value to **0.0**.

6.5 Hoist class

Display: **CLASS**
 Range: **0** to **8**
 Default Value: **0**

This function is used to select the hoist class. Class 1 to 8 should be selected for actual hoists whilst Class 0 is not a genuine hoist class but can be used for testing and calibrating the hoist without the lockout timer being activated.

6.6 Safe Working Period

Display: **SAFE**
Range: n/a
Default Value: Max for class

This function allows the initial adjustment of the Safe Working Period (SWP) in hours. This function is only accessible whilst the hoist class is selected as 0 or before the lockout timer times out. The number of hours run to be subtracted from the Safe Working Period is calculated as follows:

$$\text{Hours run for 1 hour of SWP} = \left(\frac{100}{\text{Displayed percentage value}} \right)^3$$

Examples:

1 hour at 100% or above is stored as 1 hour
 2.9 hours at 70% is stored as 1 hour
 8 hours at 50% is stored as 1 hour
 64 hours at 25% is stored as 1 hour

Any value below the threshold set at the **run URL** function will be taken as a zero input and therefore the SWP will not be decremented whilst the load reading is below this threshold.

If the motor is running the minimum value used for the calculation will be 20%.

6.7 Run Time

Display: **run**
Range: n/a
Default Value: Max for class

This function allows the initial adjustment of the Run Time in hours. This function is only accessible whilst the hoist class is selected as 0 or before the lockout timer times out. Run Time is calculated as the total time a current above the level set at the **run URL** is present.

6.8 Starts

Display: **Start**
Range: 0 to max. for class
Default Value: Max for class

This function allows the initial adjustment of Starts value. This function is only accessible whilst the hoist class is selected as 0 or before the lockout timer times out. The number of starts will decrement when the input value rises above the threshold set at the **run URL** function.

6.9 Overloads

Display: **OLd**
Range: 0 to max. for class
Default Value: Max for class

This function allows the initial adjustment of Overloads value. This function is only accessible whilst the hoist class is selected as 0 or before the lockout timer times out. Overloads are calculated

as one overload for any load over 110% of the calibrated value. The **OL0d dLAY** function can be used to prevent initial high startup current registering as an overload.

6.10 Decimal point for **LI UE** display

Display: **dCPE**
 Range: **0.0. 1.0.02.0.003** or **0.0004**
 Default Value: **0**

Sets the decimal point for **LI UE** display values and the selected number of decimal points will appear when the **LI UE** value is displayed and will also be seen during the calibration process.

6.11 Digital filter

Display: **FLtr**
 Range: **0** to **8**
 Default Value: **2**

Displays and sets the digital filter value. Digital filtering uses a weighted average method of determining the display value and is used for reducing display value variation due to short term interference. The digital filter range is selectable from **0** to **8**, where **0** = none and **8** = most filtering. Use **▲** or **▼** at the **FLtr** function to alter the filter level if required. Note that the higher the filter setting the longer the display may take to reach its final value when the input is changed, similarly the relay operation and any output options will be slowed down when the filter setting is increased. To set the digital filter value go to the **FLtr** function and use the **▲** or **▼** push buttons to set the required value then press **F** to accept this selection.

6.12 Full load value

Display: **FULL LOAd**
 Range: **0** to **99999**
 Default Value: **0**

Sets the full load value to be used in conjunction with the calibrated values to determine what is a 100% load. This value will take on the number of decimal points set by the **dCPE** function but will still calculate the **LOAd** value to one decimal place. If left at 0% then the value entered as the **SCLE** value when calibrating will be assumed to be 100%. See the calibration examples for further details on how this function is used.

6.13 Default display

Display: **dFLt dI SP**
 Range: **SAFE** or **LI UE**
 Default Value: **SAFE**

Sets the instruments default display. The default display can be set to **SAFE** if the safe working period is required as the default display or to **LI UE** if another type of unit was used in the calibration process e.g. AC Amps and this is required as the default display. The default display is the display value shown when the instrument powers up. If the instrument is toggled to an alternative display then it will return to the default display after a period of approximately 20 seconds.

6.14 First calibration scaling point

Display: **CAL 1**
Range: Any display value
Default Value: **0.0**

First scaling point (0.0%) for 2 point calibration scaling. Refer to the “Calibration” chapter.

6.15 Second calibration scaling point

Display: **CAL 2**
Range: Any display value
Default Value: **100.0**

Second scaling point (100.0%) for 2 point calibration scaling. Refer to the “Calibration” chapter.

6.16 Calibration offset adjustment

Display: **CAL OFFSE**
Range: Any display value
Default Value: n/a

Calibration offset adjustment. Refer to the “Calibration” chapter.

7 Calibration

The load spectrum recorder can be calibrated at any time i.e. calibration is not locked out by the lockout timer. The % value can be viewed at the **LOAD** display and if required alternative scaling units (e.g. AC Amps) used during calibration can be viewed at the **LIVE** display.

Note that if the motor is not running the **LOAD** value displayed will be **0.0** and for any values above **0.0** and up to **20.0** the value **20.0** will be displayed i.e. minimum load display when the motor is running will be **20.0**.

7.1 Two point calibration

Two point calibration using **CAL 1** and **CAL 2** are provided as well as a calibration offset adjustment using the **CAL OFFS** function.

The load spectrum recorder requires a 2 point calibration. If required the display can be calibrated in engineering units e.g. AC Amps which is then converted to a load % value using the **FULL LOAD** function. Although the **FULL LOAD** function allows calibration at an input less than 100% for best accuracy it is recommended to use 100% level inputs when calibrating unless it is not possible to do so. Alternatively a calibration using 0% and 100% inputs can be used. When calibration has been completed the load % display should be checked again with the hoist at 0% and 100%. The Run Time and Safe Working Period values will decrement if the **LOAD** display is showing above 0% when the hoist is not in use.

If calibrating using engineering units such as AC Amps then the **DECP** function can be used to give the required number of decimal points for this display (**LIVE** value).

The calibration procedure is as follows:

1. At the **CAL 1** function apply a zero load to the input and press the **▲** and **▼** buttons simultaneously. A live reading should be seen. If the live reading is steady press the **F** button and move to step 2. below. If the live reading is not steady press the **P** button to exit and examine the input.
2. If the **F** button was pressed at the end of the step above the message **SCAL 1** should be seen followed by a value. If required use the **▲** or **▼** button to adjust the value to zero e.g. **0.0** then press the **F** button to accept this input.
3. The display should give the message **CAL End** followed by the second calibration message **CAL 2**.
4. At the **CAL 2** function apply a known load 100% load if using 0 to 100% calibration to the input and press the **▲** and **▼** buttons simultaneously. A live reading should be seen. If the live reading is steady press the **F** button and move to the step below. If the live reading is not steady press the **P** button to exit and examine the input.
5. If the **F** button was pressed at the end of the step above the message **SCAL 2** should be seen followed by a value. If required use the **▲** or **▼** button to adjust the value to the required units **100.0** if using 0 to 100% calibration then press the **F** button to accept this input.
6. If the calibration was undertaken using engineering units such as AC Amps go to the **FULL LOAD** function and enter the full capacity in these units. e.g. if AC Amps were used the **FULL LOAD** function should be set to **5** (or **5.0** etc.) as 5 amps is the 100% input level

for this instrument. If the calibration was carried out using 0 to 100% scaling values then the **FULL LOAD** setting should be zero.

Calibration is now complete.

Examples

1. The procedure for scaling in AC amps with an input of 0A and 2.5A with 5A being the full input range is as follows. This is shown as an example of calibrating using less than 100% input level. If possible in an on site calibration always use 100% input level e.g. 5A in this example.

Set the **dcPct** function to **0.1**

At the **FULL LOAD** function enter the value **5.0**

At the **CAL 1** function input 0A.

At the **SCL 1** function enter the value **0.0**

At the **CAL 2** function input 2.5A

At the **SCL 2** function enter the value **2.5**

Press and release the **F** until the **FUNC End** message is seen.

When the process is completed the **LOAD** display will show values from 0.0 to 100.0% and the **LIVE** display will show the actual AC Amps present from **0.0** to **5.0**. Note that although 2.5A was used in this example any input current from 1A to 5A could have been used with appropriate **SCL 2** values.

2. The procedure for scaling so that both the **LIVE** and **LOAD** displays show 0.0 to 100.0%.

Set the **dcPct** function to **0.1**

At the **FULL LOAD** function enter the value **100.0**

At the **CAL 1** function input 0A.

At the **SCL 1** function enter the value **0.0**

At the **CAL 2** function input 5A

At the **SCL 2** function enter the value **100.0**

Press and release the **F** until the **FUNC End** message is seen.

When the process is complete both the **LOAD** and **LIVE** displays will show 0.0 to 100.0%. Note that if this type of calibration is used then a **FULL LOAD** value of **0.0** will be taken as being 100.0% since zero % is not a valid value.

7.2 Offset calibration

The calibration offset is a single point adjustment which can be used to alter the calibration scaling values across the entire measuring range without affecting the calibration slope. This method can be used instead of performing a two point calibration when a constant measurement error is found to exist across the entire range. To perform a calibration offset press the **▲** and **▼** buttons simultaneously at the **CAL OFFS** function. A “live” reading from the input will be seen, make a note of this reading. Press the **F** button, the message **SCALE** will now be seen followed by the last scale value in memory. Use the **▲** or **▼** button to adjust the scale value to the required display value for that input. For example if the “live” input reading was **50.0** and the required display value for this input was **51.2** then adjust the **SCALE** value to **51.2**. Press the **F** button to accept changes or the **P** button to abort the scaling. If the scaling has been accepted the message **OFFS End** should be seen.

8 Error messages

Error message	Description
SPAN Err	Live inputs used in calibration are too close in value. The change in input must be at least 10% of the 5A range between live input calibration points CAL 1 and CAL 2 . Recalibrate using inputs further apart in value. If you are certain that the inputs are far enough apart but still see the SPAN Err message then ignore the message and continue with the calibration. At the end of the calibration check to see if the display calibration is correct and if not recalibrate using the same inputs.
- - - -	This message indicates that the input signal is higher than 5A. Check that the input is within the 0-5A range
-or-	This message indicates the display value is too big to display. This message would only normally be seen where a calibration error exists. Recalibrate if necessary
Unstable display	If the display is not stable the usual cause is either that the input signal is unstable or that the calibration scaling was incorrectly attempted. Measure the signal input current to check for stability. If the signal input is stable recalibrate the display
ds 2223 FAI L	This message indicates that the display is unable to write to the memory chip. The instrument should be returned to the manufacturer for repair.

9 Specifications

9.1 Technical specifications

Input:	0 to 5A AC
Impedance:	<50mΩ
Accuracy:	0.5% when calibrated for 0-100% live input calibration
Sample rate:	7.5 samples per second
ADC Resolution:	1 in 20,000
Isolation:	Between input and power supply or output 2kV for 30 seconds
Conversion Method:	Dual slope ADC
Microprocessor:	HC68HC11
Ambient temperature:	-10 to 60° C
Humidity:	5 to 95% non condensing
Display:	LED 5 digit 7.6mm + alarm annunciator LEDs
Power supply:	AC 240V, 110V, 48V, 42V, 32V or 24V 50/60Hz or DC isolated wide range 12 to 48V Note: supply type is factory configured.
Power consumption:	AC supply 4 VA max, DC supply typically 60mA at 24V
Output (standard):	1 x relay, Form A, rated 5A resistive at 240VAC.

9.2 Physical characteristics

Case size:	44mm(w) x 91mm(h) x 141mm(d)
Connections:	Plug in screw terminals (max. 2.5mm ² wire for power and relays, max. 1.5mm ² wire for remote input)
Weight:	470 gms

10 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of two years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) must be returned to the manufacturer freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.

This document is the property of the instrument manufacturer and may not be reproduced in whole or part without the written consent of the manufacturer.

This product is designed and manufactured in Australia.