



Qatar Company for
Airports Operation
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MATAR

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المطارات
مطار



MAINTENANCE MANUAL

ELEVATING WORK STATION 20 FT (NEP) ELEVATING WORK STATION 10 FT (NEP/WEP)

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Reference Documents

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1. Introduction:

The safeties of our employees are very important when performing any preventive and reactive maintenance. We need to be aware of all the risks in or around the equipment's while performing preventive or reactive maintenance. This manual will give you additional safety information and the risks of accident or death in our equipment, all employees are encouraged to comply with the acceptable procedures to minimize the risk of accident around our working environment.

Safety first

Our primary objectives are to ensure the safety of the employee while working in the equipment. Each technician should become familiar with the equipment and to comply with the general departmental safety rules. Supervisors must enforce safe work practices through strict adherence to safety rules. Most accidents can be prevented if everyone uses assigned safety equipment & PPE's and follows the established safety rules and acceptable procedures.



Symbols

Risk levels that point toward hazardous situations that can cause personal injuries and possible damage to the transport equipment.



DANGER

This DANGER label is used when an imminently hazardous situation WILL result in death or serious injury if not avoided.

WARNING

This WARNING label is used when potentially hazardous situation COULD result in death or serious injury if not avoided.

CAUTION

This CAUTION label is used when a potentially hazardous situation MAY result in minor or moderate injury or equipment damage if not avoided.



Environmental protection information



Warning! Automatic start-up



DANGER

This symbol warns about electrical hazards that can lead to severe injuries and potential death due to electrical shock.

Only a qualified electrician must be permitted to proceed with any associated work.



Warning! Risk of crushing limbs



Caution! Infrared ray (light barriers)




Warning! Hot surfaces - risk of burning

Caution! Trip hazard

Ear protection

Safety gloves

Safety helmet

Warning! Stay clear of moving parts

No unauthorized personnel beyond this point

Safety goggles

Safety footwear

WARNING
Makes sure you are wearing proper PPE before operating the equipment.

WARNING

*Know where to locate the first aid kit and how to get help in case of emergency.
Know where to locate the emergency evacuation route on your area.*


DANGER
When testing the functionality of the equipment, make sure your colleagues working with you are aware that you will operate/run the equipment.

DANGER

When handling electrical components, the risk of injury, severe burns and possible fatal accident caused by electrical shock are always present!

The following rules mentioned in this maintenance manual must be obeyed:

1. Safety regulations,
2. Rules for the prevention of industrial accidents,
3. Guidelines and generally accepted engineering rules,
4. Personnel requirement to training.

Noncompliance with these safety instructions can place personnel at risk of injury and can cause damage to the transport equipment during: transport, installation, initial start-up, operation, and/or maintenance and repair work.

While working on the transport equipment, the current regulations for the prevention of industrial accidents must be complied with and all generally accepted engineering standards must be obeyed.

Compliance with the following rules and regulations is mandatory:

1. Safety regulations
2. Accident prevention instructions
3. Guidelines and generally accepted engineering rules.

All personnel with long hair must use appropriate hairnets, loose clothing, jewelry including rings must not be worn as they risk being pulled into or being caught by moving machine parts. Serious injuries are likely.

Provide appropriate tools and supplies for the operation of the transport equipment.

Refer to the following procedure for other safety requirements and procedures prior to maintenance in EWS:

- ❖ LSME-MD-04-002 - Risk Assessment
- ❖ LSME-MD-02-002 - Lock out / Tag-out (LOTO)
- ❖ LSME-MD-03-004 - Equipment Request and Hand Over Procedure
- ❖ LSME-HS-02-009 - Risk of Accident in our Equipment



2. Overview:

The fully automatic material handling system for the NDIA Cargo Terminal mainly consists of the Unit Load Device and the Consignment System.

The NDIA Cargo Terminal key elements are:

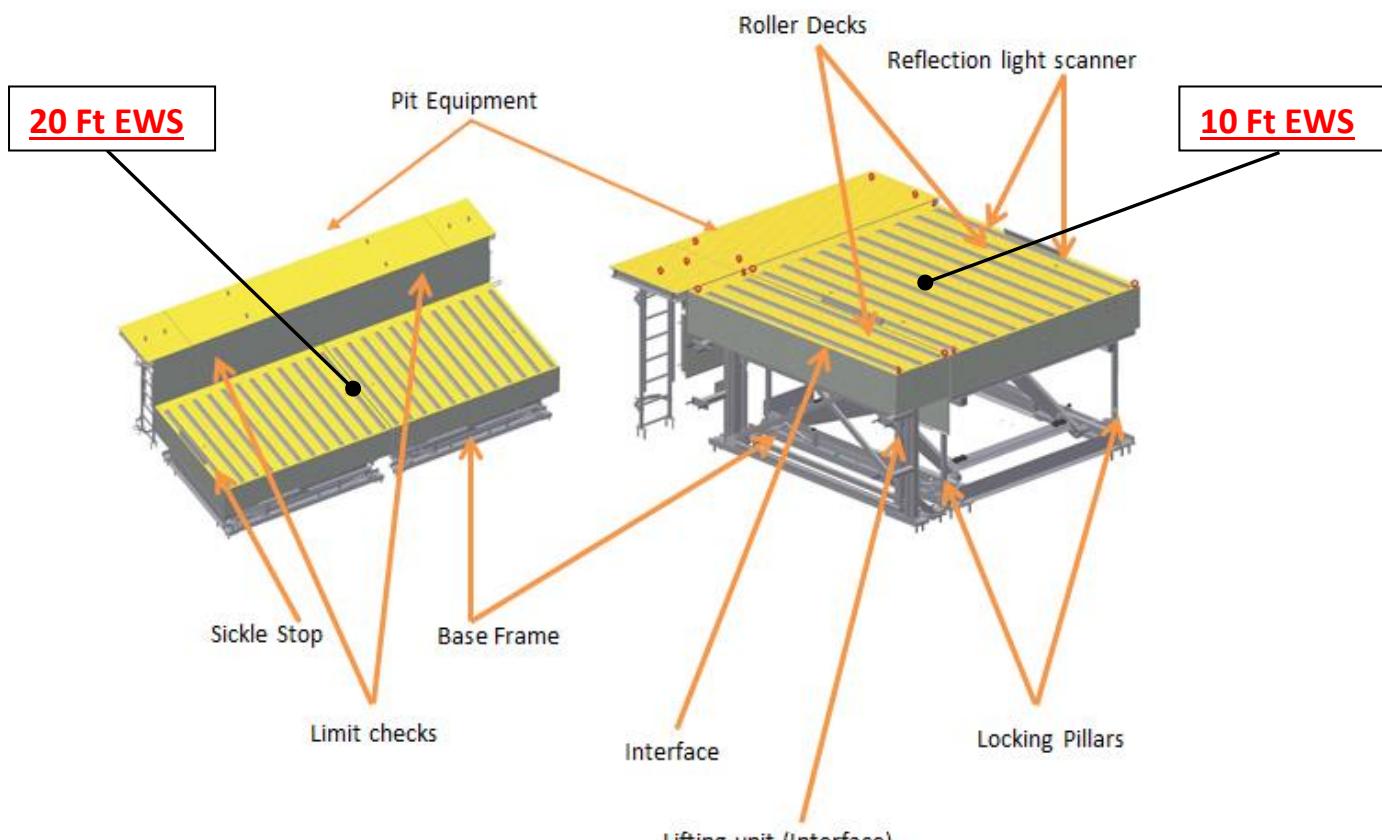
- ULD System horizontal transport carried out by TVs in the different levels;
- ULD System vertical transport carried out via hoists;
- Build and Break area serving ULD System via TVs and Consignment System via vertical hoists.
- Integral cold storage area at South side of ULD System.
- 4 levels Consignment storage area with transport carried out by Stacker Cranes.

The ULD "lift and run" principle provides the customer with very high performance, flexibility and availability. This is achieved by splitting the horizontal transport (Transfer Vehicle (TV)) and the vertical transport (Hoists). As separate components, the Elevating Work Stations are integrated in the complete ULD transport and handling system.

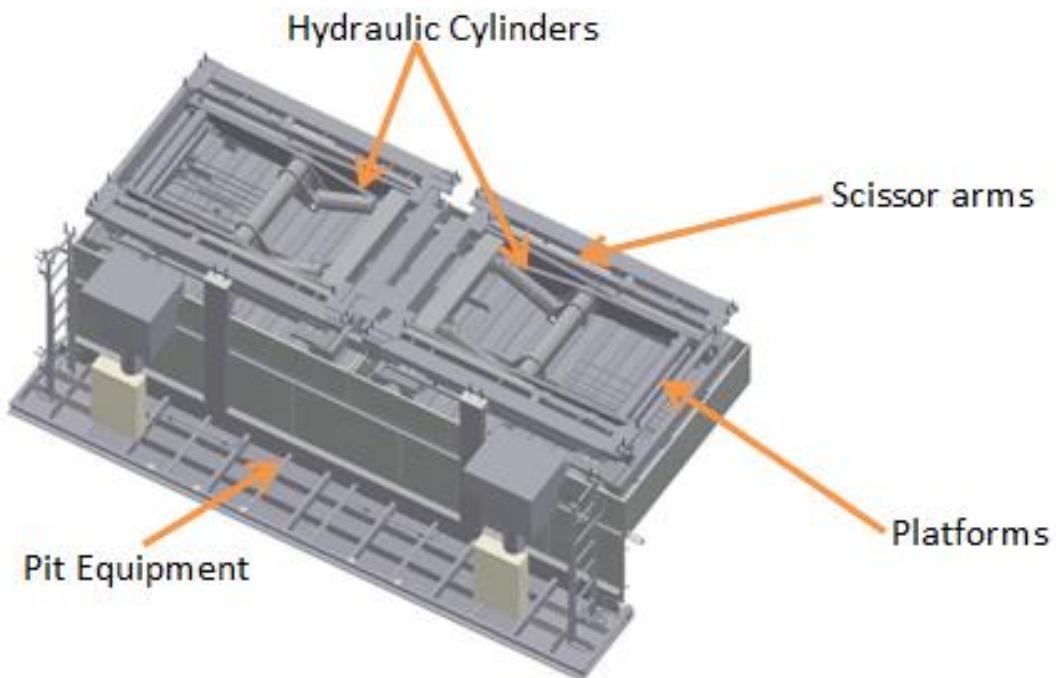
During the Corrective & Preventive Maintenance of the equipment, it is also mandatory to follow all the safety rules & regulations.

3. General assembly (Basis structure)

Side View EWS 20 Ft & 10 Ft



Bottom View of EWS 20 Ft



Interface:

Interface EWS 10ft have separate guide frame, roller deck unit, lifting unit & skirts. The lifting unit consists of two hydraulic cylinders, limit stops and guiding rolls. The hydraulic cylinders are connected to the guiding frame and the roller deck. The hydraulic unit provides the hydraulic cylinders with pressure. The hydraulic cylinders are equipped with an external mechanical limit stop and are protected against the penetration of foreign particles and moisture by a sealing system.



Interface



(Size50*620) Hydraulic cylinder interface



BASE FRAME 20ft:

The 20ft elevating work station is consisted of two 10ft elevating work stations in line; the platforms are connected. The base frame of each elevating work station is a strong welded structure carrying the lifting mechanism and the locking pillars. The base frame as part of the elevating work station is installed in a pit. The base frame is connected to the foundation of the pit by anchor bolts.



Base frame built in condition

SKIRTS:

The EWS is equipped with a skirt to protect the operator and to prevent moving of objects below the scissor lifting table. The skirt is arranged all-around of the Roller decks.



Skirts

Locking pillar:

Each of the 10ft elevating work stations is equipped with four locking pillars. The locking pillars are pivoting connected to the base frame. The locking pillars are operated by one hydraulic cylinder each. The locking pillars are used for the drive over support and for maintenance.

Note: - During the Maintenance (PM/CM) always put locking pillar upward direction.



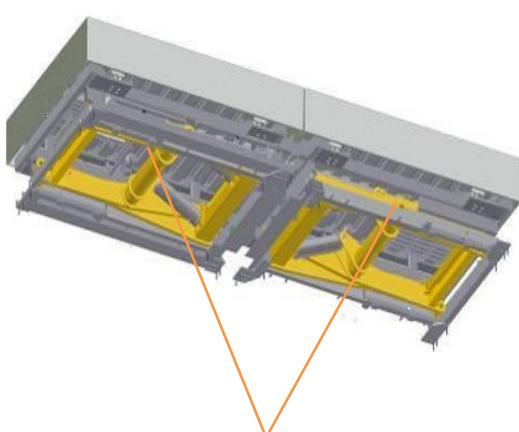
Hydraulic Cylinder (Locking pillar) 40/25*200

The hydraulic unit provides the hydraulic cylinders with pressure. The hydraulic cylinders enable the positioning of the locking pillars. Each locking pillar is operated by one hydraulic cylinder.



Scissor arm:

The scissor lifting system includes two sets of an outer and an inner pair of scissor arms. With helps of two crossbeams each of the two pairs of scissor arms is connected in a torsion-free way. To transmit the power of the hydraulic cylinder to the scissor arm pairs, the hydraulic cylinder is fixed eccentrically to the scissor centre bearing. At the bottom side the inner pair of scissor arms is moveable (pivoted) connected to the base frame. The top side is equipped with two castor rolls that compensate the height variations of the scissor lift by moving on the running surfaces of the upper frame. At the bottom side the outer pair of scissor arms is equipped with two castor rolls that compensate the height variations of the scissor lift by moving on the running surfaces of the base frame. The top side is moveable (pivoted) connected to the platform. At each bearing point there is one grease fitting arranged for easy realisation of the lubrication.



Scissor arm built in condition



Castor Roller



Scissor arms with bearing points

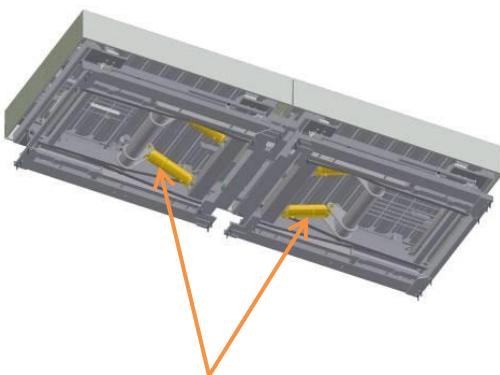
Hydraulic Power pack:

The hydraulic power pack is a compact unit mounted in the pit with a drip pan in case of oil leakage. To prevent failures, two hydraulic pumps with two motors are provided. The hydraulic unit provides the required operating pressure for the hydraulic cylinders; controlling is conducted by a control valve with 24 V DC magnetic coils. Further components are Direction control valve, Pressure control valve, Pipe brake valve, throttle valve Pressure excess release valve. In case of trouble, the scissor lift can be lowered to the lower limit position by an emergency lowering valve.



Hydraulic cylinders (Scissor lift) 140*530

Each of the two scissor systems is equipped with two hydraulic cylinders. The hydraulic unit provides the hydraulic cylinders with pressure. The hydraulic cylinders are equipped with a mechanical limit stop and are protected against the penetration of foreign particles and moisture by a sealing system.



Hydraulic Cylinder built in condition

Buffer for locking pillar:

Rubber buffer used as shock stop for the limitation of locking pillar



Platform:

The 20ft elevating work station consists of two 10ft elevating work stations in line; the platforms are connected. Each platform is a welded sturdy structure to which the Roller deck is connected. The bottom side of the upper frame incorporates the bearings for the moveable (pivoted) connected outer pair of scissor arms. Furthermore the bottom side includes the running surfaces for the castor rolls of the inner pair of scissor arms.

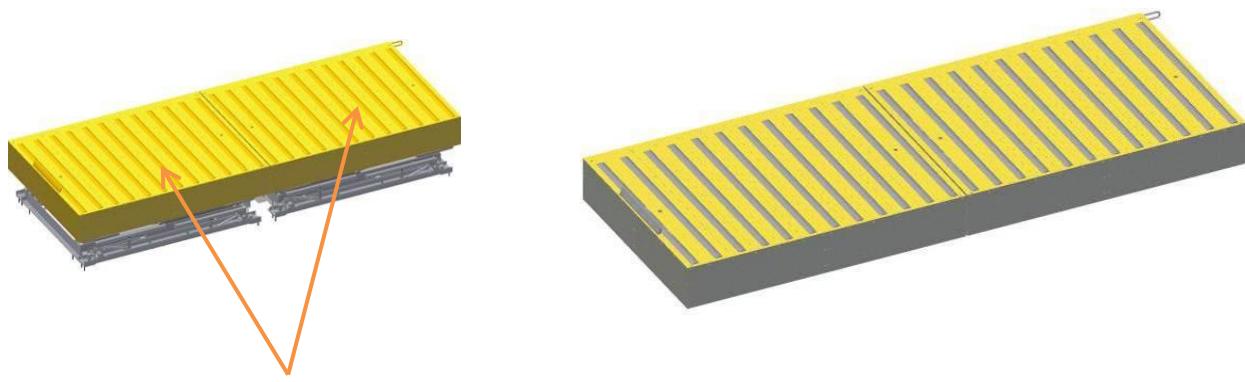


Platform built in condition

Roller Deck:

EWS 20ft equipped with two roller decks. Each roller deck consists of a support frame and the rollers bedded in the support frame. A drive system, incorporating roller chains and sprockets, drives the rollers. The drive energy is exerted by a geared motor.

The roller deck is screwed to the platform of the scissor lifting table.

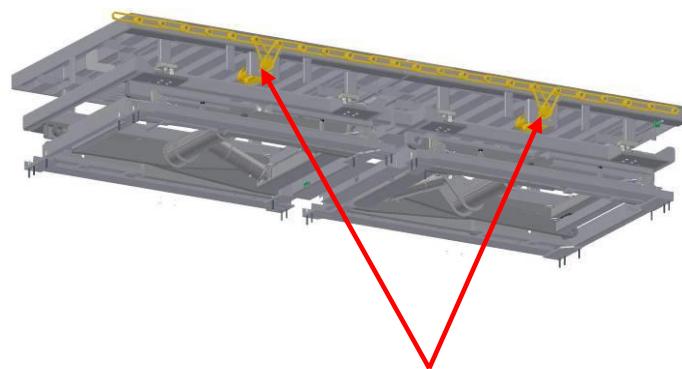


Roller Deck built in condition

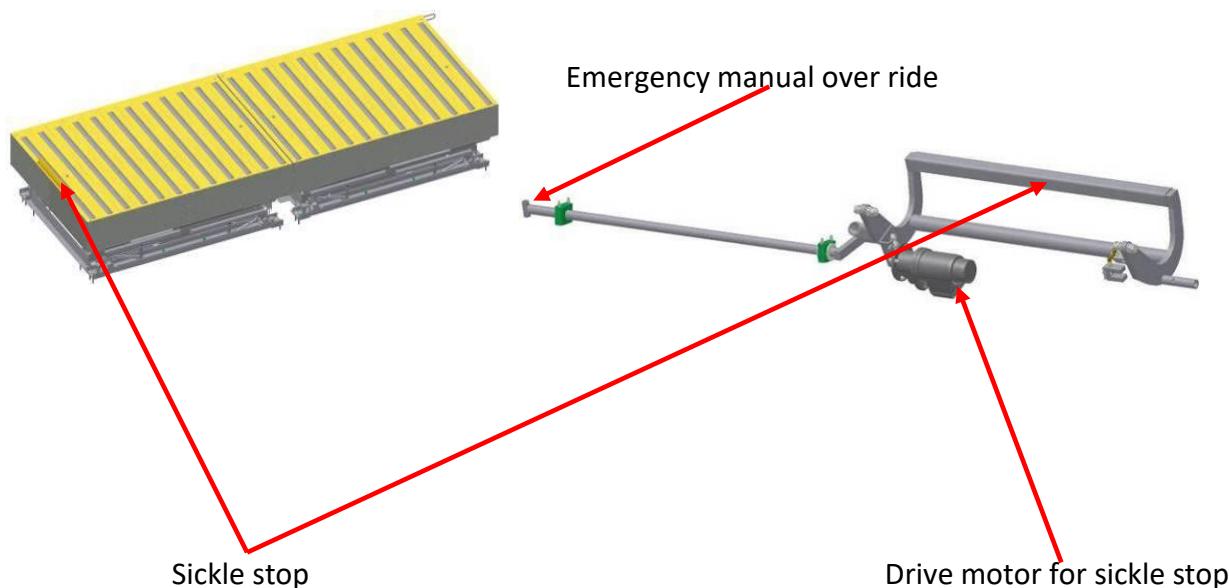


Drive system for the roller Deck:-

Each roller deck is motor driven by a separate drive system. The power is transmitted by roller chains and sprockets. In case of emergency, the drive of the roller deck can be disconnected by a manual emergency actuation.


Drive System for the roller deck
Sickle stop:

This device enables stopping the ULDs during transportation on the transport equipment. The stop is realized by the sickle stop. The sickle stop is actuated with help of a geared motor and an eccentric actuation system. In case of emergency or trouble, the emergency manual override can be actuated by a hand lever. In doing so, the sickle stop is lowered and the ULD can be moved manually.



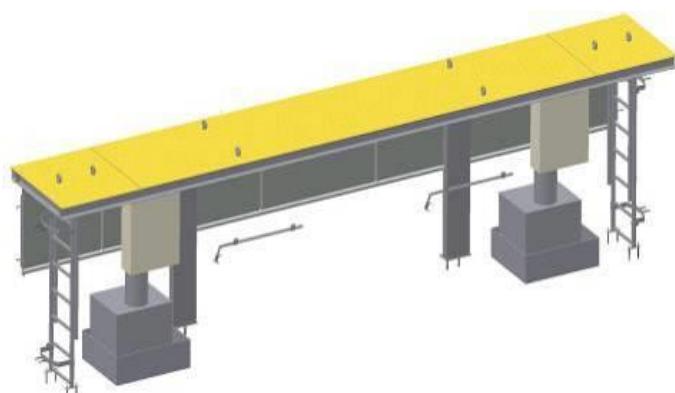
Load Cell:

Arranged at each of the four corners of both roller decks there is one load cell. To prevent damaging the transport system, the load cells are installed for detecting harmful overloads (maximum permitted load = 13,600 kg. Furthermore, the load cells detect the weight for process purposes (e.g. load balancing within aircraft, etc.).

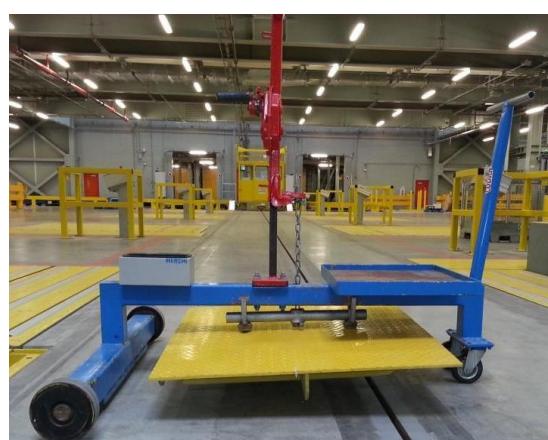
**Pit Equipment:**

The pit equipment's consists of:

- cover for the hydraulic power pack
- base frame for the pit
- covering of the pit
- ladder complete



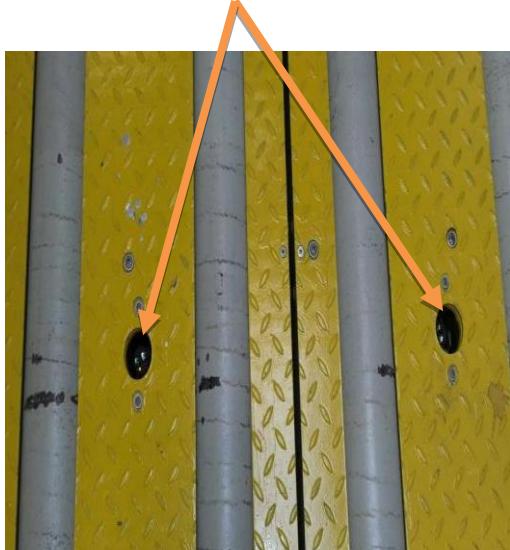
- Special equipment for open/closing the pit cover:



Hydraulic Pressure gauge, Connectors, Hose & valves:**EWS Work station****Lever for locking pillar**

Sensors and switches:

Photo cell (Reflection light scanner)



Proximity switch locking Pillar



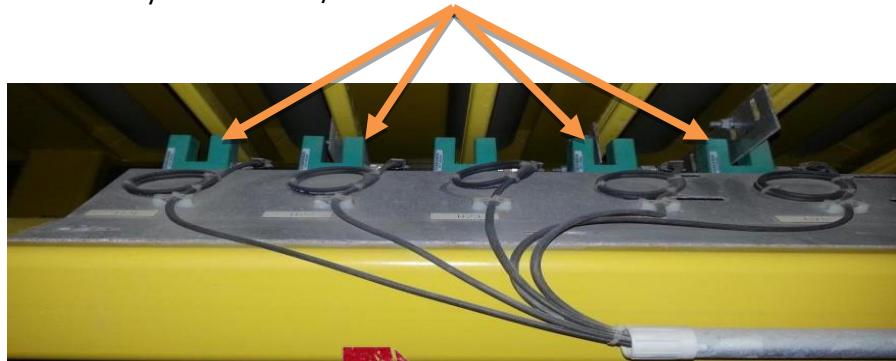
Light barrier



Proximity switch sickle stop



Proximity switch above/below floor level & above 508lb/ below 508



4. Machine data:

EWS data:

Self-weight	approx. 2 x 7,130 kg
Dimensions:	
Length	7,232 mm
Width	2,710 mm
Collapsed height (top of roller / floor of pit)	1,000 mm
Lowest position (top of walk way / floor level)	- 1,000 mm
Highest working position (top of roller / floor level)	508 mm
Highest position (maintenance mode) (top of roller / floor level)	600 mm
Operating voltage	415 V / 50 Hz
Horizontal conveying speed (Roller deck)	0.3 m/s
Lifting speed	50 mm/s
Load capacity	13,600 kg
Max. drive over capability	30 kN wheel load

Drive data for Long drive (roller deck):

Manufacturer	Danfoss Bauer
Motor Type	BG40-47/D08LA4-TOF-SL-S/E008B8-SP
Ratio	53.69
Voltage	415 V
Frequency	50 Hz
Phases	3
Insulation Class	F
Output Speed	26.5 rpm
Output Torque	395 Nm
Power	1.1 kW
rpm	1,400 rpm



Drive for sickle stop

Manufacturer	Danfoss Bauer
Motor Type	BG06-31/DU4LA4-TOB-S/E003B4
Ratio	66.79
Voltage	415 V
Frequency	50 Hz
Phases	3
Insulation Class	F
Output Speed	20.5 rpm
Output Torque	27.5 Nm
Power	0.06 kW
rpm	1,350 rpm

Hydraulic power unit

Manufacturer	HOERBIGER
Voltage	415 V
Frequency	50 Hz
Power	2 x 4.0 kW
Drive speed	1,420 U/min
Pressure	210 bar
Oil flow	2 x 11.6 l/min
Solenoid voltage	24 V / DC
Tank volume	120 l

Operating Condition & Sound level

Ambient temperature	0 °C to 35 °C
Max. relative humidity	65 %
Ambient illumination	150 lux
Sound level	<75db



5. Spare parts list:

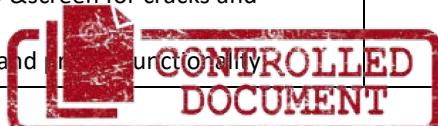
Sub-assembly	Manufacturer	Part.No.
Retaining ring 35 x 1, 5	Lödige	0340710
Retaining ring 38 x 1,75	Lödige	0340771
Retaining ring 80 x 2,5	Lödige	0340823
Stop - Buffer	Lödige	0370029
Photo cell	Pepperl& Fuchs	0410346
Limit switch inductive	Pepperl& Fuchs	0410684
Spring	Lödige	0430212
Load cell 50 kN	Lödige	0633075
Contactor 24VDC	Siemens	1000048
Pillow block bearing RASEY 30	Lödige	1008720
Roller chain 3/4" 48 chain links	Lödige	1008869
Roller chain 3/4" 44 chain links	Lödige	1012394
Contactor type reverser	Siemens	1004156
Input card 2DI	Beckhoff	1004681
Profibus DP bus coupler	Beckhoff	1005469
Input card 8DI	Beckhoff	1005507
Bus function terminal	Beckhoff	1027290
Proximity switch	Pepperl& Fuchs	1065379
Self-aligning bearing	Lödige	1069369
Input card 4DI	IFM Electronic	1071471
Reflector	Pepperl& Fuchs	1077138
Reflection photo cell	Pepperl& Fuchs	1077155
Output card 2DRO	Beckhoff	1079020
Roller Ø133 x 10 x 2,460 mm	Lödige	1083263
Spur geared motor 0.06 kW, 20.5 U/min, 50 Hz	Danfoss Bauer	1090250
Motor circuit breaker 9...12A	Siemens	1091521
Helical geared motor 1.1 kW, 26.5 U/min, 50 Hz	Danfoss Bauer	1091837
Manual coupler 3/4"	Lödige	1100716
Hydraulic power pack	HOERBIGER	1111570
Hydraulic cylinder 40 / 25	Lödige	1122976
Sheet 3 mm	Lödige	1123576
Load cell 50 kN	Lödige	1149656



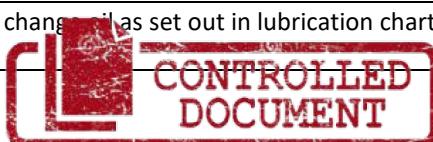
Sub-assembly	Manufacturer	Part.No.
Filter cartridge for RF 0100 10 micrometre	Lödige	1152724
4/3 – way – valve NG06	Lödige	1152729
4/3 – way – valve NG06	Lödige	1152731
Pressure relief valve	Lödige	1152732
Lowering control valve Pmax = 320 bar	Lödige	1152733
Three phase AC motor 4.0 kW	Lödige	1152735
Connector 6 pin	Weidmüller	
Connector 10 pin	Weidmüller	

6. Performing Maintenance Activities:

Sr.no	Maintenance point	Maintenance Activities	Maintenance interval
1	General	<ul style="list-style-type: none"> special occurrences , break downs, documentation 	QC Check
2	visual check	<ul style="list-style-type: none"> damage, corrosion, cleanliness, surroundings 	
3	sickle stop	<ul style="list-style-type: none"> check damage, soft running, oiling if needed 	
4	All Sensors	<ul style="list-style-type: none"> Clean as Required 	
1	Function	<ul style="list-style-type: none"> Functional test of all drive units (manual) 	1 month Check
2	Cleanliness	<ul style="list-style-type: none"> Cleaning grease and oil. 	
3	HPP	<ul style="list-style-type: none"> Check for oil leakage check for abnormal noise when it is running check function of the emergency lowering valve 	
	Hydraulic Cylinder	<ul style="list-style-type: none"> Check for oil leakage noise and oil coating on the piston rod 	
4	pivot point	<ul style="list-style-type: none"> Check for the damage, noise and easy pivoting 	
5	Roller Deck gear motor	<ul style="list-style-type: none"> Check for abnormal noise 	
6	Connections	<ul style="list-style-type: none"> check connections from motor and initiators 	
7	All sensors	<ul style="list-style-type: none"> functional test check fixing inspection adjustment, adjust if needed check for damage 	
8	Limit switches	<ul style="list-style-type: none"> check for function , cleanliness 	
9	Switches, push buttons, lamps	<ul style="list-style-type: none"> Functional test Check for the damage Check for sign post 	
10	Pit cover	<ul style="list-style-type: none"> check for damages, corrosion , fixing 	
11	Pit Ladder	<ul style="list-style-type: none"> check for damages, corrosion , fixing 	
12	Pit lighting	<ul style="list-style-type: none"> Check if it is working. 	
13	Skirts	<ul style="list-style-type: none"> check for damages, corrosion , Gap adjustment 	
14	Maintenance struts(Locking pillar)	<ul style="list-style-type: none"> check function, wear, damages, cracks 	
15	PC printer cabinet	<ul style="list-style-type: none"> clean all surfaces check window &screen for cracks and transparency check mouse and keyboard functionality 	



16	General safety device	<ul style="list-style-type: none"> • Function test safety device/ switches • Check for the damage Emergency Estop &Key switch 	
17	Weight Scale	<ul style="list-style-type: none"> • check for damages, function and dirt • check expiry date of calibration is valid 	
1	HPP	<ul style="list-style-type: none"> • Check oil level • Replace oil filter when indicator indicates for replacement • clean accumulated dust on HPP • no noise, heat increases, unusual Vibrations form HPP motor & pump 	3 month Check
2	Roller deck	<ul style="list-style-type: none"> • check for leakage oil of gear Motor • check rollers for damages, and replace if necessary • check rollers for abnormal noise when it is turning • Inspection roller chain wear, damage, lubrication • check chain sprocket for wear, adjustment, damage • Check roller bearings noise, heat increases, unusual vibrations • Check level from the top of rollers. 	
3	Weight Scale	<ul style="list-style-type: none"> • Check weight , if necessary calibration • Check for guide wheels wear, abnormal noise bearing, positioning 	
4	General safety Device	<ul style="list-style-type: none"> • Check limit switches for damage and wearing 	
1	HPP	<ul style="list-style-type: none"> • Air filter cleaned from compressed air • Check Pipe and fixing connection for leakage , damage, corrosion • look for lose bolts and fixings (torque) 	6 month Check
2	Roller Deck	<ul style="list-style-type: none"> • Check Function of the gear motor brake. If braking effect decrease replace the brake • Check Clutch function, wear, damage, lubrication • Check chain elongation, max 3 % • Check for damages, fixing, gap in-between pit and deck min 5 mm • Look for lose bolts and fixings (torque) 	
1	General	<ul style="list-style-type: none"> • visual check of the supporting construction for cracks weld 	
2	Sign posts	<ul style="list-style-type: none"> • check for completeness, damage, readability 	
3	HPP	<ul style="list-style-type: none"> • change hydraulic oil if necessary • Check Hydraulic hose pipe expiry date (printed on the tube) 6 years after manufacturing date. Replace if necessary • Pipe brake valve check function leakage • Check function of Emergency lower Valve 	
4	Roller deck/sickle stop gear motor	<ul style="list-style-type: none"> • change oil as set out in lubrication chart 	



Preventive maintenance procedures:

1. After receiving the PM plan, arrange the materials, tool ,manpower and required PPE to perform the task
2. Call control room to get the equipment , to perform the task
3. After the equipment is in out of service, make the equipment off mode or manual mode
4. Barricade the area specially near opening cover pit.
5. Prepare the surrounding area and organize all components that are required to ensure a smooth workflow.
6. Perform the task with all safety measures
7. After completing the task, fill the check list and write comments if any.
8. Always remember to perform functionality test in the end of PM activities (except QC check)
9. Remove the tools, materials ,PPE, warning signs from the equipment
10. Make the system auto mode and call control room to reset and
11. Don't leave the system till the system is in auto mode (Coordinate with control room)

Lubrication Points:
Arrow mark showing the grease points of EWS bearings


Lubrication on disconnect clutch longitudinal drive

Gear motor – longitudinal drive

Gear motor – sickle stop

Roller chains

EWS Bearing points


7. Lubricating points and procedures:
Lubricating Procedure

- Use the proper PPE, tools and lubricants for the job
- Clean the bearing nipple first to avoid any particles going inside that might cause clogging in the nipple and damage the bearing.
- Apply appropriate and specified lubrication only, and make it sure that you pump out the old grease.
- After applying the lubrication clean always the excess lubricants on the bearing, nipple and surface.



List of lubricant using& locations

Sr.no	Description	Name of the lubricant using
1	Roller deck chain oil	ISO-VG-100
2	EWS bearing points (Castor rollers) Grease	NLGI-GRADE-2
3	Roller deck Helical Gear motor g oil	ISO-VG-220
4	Sickle stop Helical gear motor oil	ISO-VG-220
5	Hydraulic oil for HPP	ISO-VG-46

8. Bolt tightening torques

Torque for nuts and bolts:

Please use the tightening torque values of nuts and bolts, listed in the table below.

Size in mm	Screws and nuts made of steel with metric standard threading and connecting-surface measurements as DIN 912, 931, 934 etc.					Screws and nuts acc. to DIN 931/933/934 made of A2/A4, property class -70		HV-screw-connections DIN 6914/6915	
	4.6	5.6	8.8	10.9	12.9			Steel grade galvanized	raw slightly oiled
MA in Nm, coefficient of friction = 0.14 μ									
M4	0,9	1,2	2,7	3,9	4,6				
M5	1,8	2,4	5,3	7,8	9	3,8			
M6	3,1	4,1	9	13,5	16,2	6,6			
M8	7,6	9,9	23	32	39	15,8			
M10	15	20	44	65	75	31,5			
M12	26	35	77	112	130	54	90	108	
M14	41	56	121	180	211				
M16	64	85	189	279	328	130	225	315	
M18	87	117	270	387	450				
M20	124	166	382	550	639	253	405	540	
M22	167	225	522	740	864		585	810	
M24	211	283	657	945	1098	242	720	990	
M27	315	423	990	1395	1620		1125	1485	
M30	427	571	1305	1890	2205		1485	1980	
M33	580	778	1800	2520	3060		1980	2430	
M36	972	1296	2340	3330	3870		2520	3420	
M39	1197	1602	3060	4320	5040				

Torque for concrete bolt (Base bolt of EWS &Interface):

Please follow the below chart for concrete bolts torque

	M8	M10	M12	M16	M20	M24	M27	M30
Torque in Nm	10	20	40	80	150	200	270	300



9. Trouble, Corrective Measures:

Normal trouble shoot: Roller deck

No.	Fault	Possible Cause	Measures
1	Roller deck does not convey	No power supply	Check fuses and cables for interruptions Check and set motor protection Check limit switch and relay for faulty contact or mechanical defect Check main power supply Check power supply control system Check control cabinet
		Power drop	Check for low-resistance short
		Motor defective	Replace gearbox motor
		Roller chain(s) broken	Replace roller chain(s)
2	Roller deck drive runs, but roller deck does not convey	Coupling unlocked	Move eccentric to correct position and lock lever
3	Motor hums or is noisy	Bearing defective	Replace gearbox motor
4	Gear unit leakage	Defective radial shaft seal	Replace gearbox motor
5	Motor is too warm	Supply voltage exceeds the rated voltage by more than 5 %	Check power supply Test rated current with ammeter
		Short in the stator windings	Replace gearbox motor
		Incorrect quantity or type of lubricant in the gear unit	Check oil level Check that lubricant corresponds to the vendor's recommendations
		Insufficient cooling air: cooling air channels blocked	Clean cooling air inlet and outlet
		Fan defective	Replace motor
		Frequency controller defective	Replace frequency controller
6	Motor runs too slowly; too fast or accelerates too rapidly	Gearing broken	Replace gearbox motor
7	Motor runs, drive shaft does not turn	Brake disc worn	Replace gearbox motor
8	Motor does not brake	Brake is contaminated with brake dust	Clean with vacuum cleaner
		Relay not switching	Check cable Check relay switching voltage
10	Load unit is not positioned exactly	Light scanner defective	Replace light scanner
		Light scanner dirty	Clean light scanner
		Light scanner set incorrectly	Adjust light scanner
		Deck drive defective or drive chain is broken	Check wheel deck drive; Check roller deck drive



Normal trouble shoot: Hydraulic Unit

No.	Fault	Possible Cause	Measures
1	Lift unit does not lift	No power supply	Check fuses and cables for interruptions
			Check and set motor protection
			Check limit switch and relay for faulty contact or mechanical defect
			Check main power supply
			Check power supply control system
			Check control cabinet
		Power drop	Check for low-resistance short
2	Motor hums or is noisy	Motor defective	Replace gearbox motor
3	Motor is too warm	Supply voltage exceeds the rated voltage by more than 5 %	Check power supply Test rated current with ammeter
		Short in the stator windings	Replace gearbox motor
		Incorrect quantity or type of lubricant in the gear unit	Check oil level Check that lubricant corresponds to the vendor's recommendations
		Insufficient cooling air: cooling air channels blocked	Clean cooling air inlet and outlet
		Fan defective	Replace gearbox motor
4	Pump is noisy	Hydraulic pump cavitation or penetration of air into the system	Replace pump
		Low oil level	Refill oil
		Wrong oil viscosity	Change oil
		Suction filter jammed	Clean or replace filter



No.	Fault	Possible Cause	Measures
5	Oil heating up	Contaminants stuck in relief valve	Clean or replace the valve
		Low oil level	Refill oil
		Fan not running	Replace fan
		Dirty oil	Change oil
		Excessive pump wear	Replace the pump
		Relief valve set too low	Replace the valve
6	Hydraulic pump not responding quickly enough or not enough flow present	Relief valve pressure set improperly or relief failing	Replace the valve
		Low oil supply	Clean or replace filter
		Hydraulic pump is worn or damaged	Replace the pump
		Valve not shifting all the way	Replace the valve
7	Oil foaming, air in oil	Air leak in hydraulic pump suction side	Replace the pump
		Oil level low	Refill oil
		Wrong oil in tank	Change oil
		Pump shaft seals or access plates could be drawing air into the system	Replace seals

After repair maintenance

No.	Fault	Possible Cause	Measures
1	Motor does not start up or only with difficulty	Designed for delta circuit but connected in star	Correct circuit
		Voltage or frequency deviate considerably from rated value	improve mains conditions
2	Motor does not start up in star circuit, but starts in delta	Insufficient torque in star circuit	Switch on directly if delta circuit switch-on current not too high
		Contact fault on star / delta switch	Repair contact fault
3	Motor is too warm	Motor connected in delta	Switch circuit to star
		Supply voltage exceeds the rated voltage by more than 5 %	Set correct mains voltage
		Insufficient cooling air: cooling air channels blocked	Clean cooling air inlet and outlet
		Cooling air too warm	Ensure good supply of fresh air
		Bearing seized or stiff movement	Replace gearbox motor
		Supply line has loose contact (temporary failure of one phase)	Repair loose contact
		Fuse tripped	Reset fuse
4	Motor has incorrect direction of rotation	Motor connected incorrectly	Interchange two phases
5	Gear unit is too hot	Lubricant not refilled	Refill
6	Gear unit runs noisily	Lubricant not refilled	Refill



7	Malfunction	Incorrectly spare parts installed	Order original spare part from manufacturer
8	Assembly does not start	Incorrectly or not wired	Wire correctly
9	Assembly runs noisily or abnormally	Adjustment instructions not observed	Adjust correctly

10. Replacement of components:

Prior to the replacement of components:

Prepare the surrounding area and organize all components that are required to ensure a smooth workflow.
Only use suitable removal/installation equipment and tools.
Ensure that the workplace used for the removal of the parts is clean.

How to check elongation of chain:

1. Before check the elongation & replacing the chain, check the chain size. It was written in the side plate of chain-link (Example:-B8, B10, B12 etc.)
2. Chain size $8B=1/2$ inch, $10B=5/8$, $12B=3/4$, $14B=7/8$, $16B=1$ inch
3. Use suitable gauge to measure the elongation (Shown in figure below)
4. Keep the tip of the gauge, between the chain rollers, if the tip of the gauge touches both side of roller, it means chain elongated up to 3%. Immediately replace the chain.



How to replace the chain in EWS roller decks:

- Open EWS Cover
- Find the chain connecting link & keep in good Position for easy removable
- Remove the spring clip from connecting link By screw driver or plier
- Remove chain link & then remove chain .Check the length of the chain & Replace
- Remove chain spring clip

Open EWS cover



Remove chain link



Remove the chain link



How to replace Locking pillar hydraulic cylinder 40/25*200:

- Lift the elevating workstation to the maintenance position (Above transfer level)
- Press the spool of Direction control valve manually by 3 mm Allen key or rod
(Note:- for 20ft Press Spool K5 DC Valve for 10ft K7 valve)
- Mean time Swing out the locking pillar which you going to replace the cylinder
- Lower the elevating workstation down by Emergency release valve so that it rest on the other locking pillar
- Make Sure that system pressure must be zero& HPP power off
- Remove sensor connection &Mark the sensor bracket & remove
- Remove the hydraulic connection from hydraulic cylinder
- Remove the retaining ring A20 x 1.2 and the washer from the piston end of the cylinder
- Pull the Pin out from the relevant hydraulic cylinder
- Remove the retaining ring A20 x 1.2 and the washer from tail of cylinder holding pin
- Pull the Pin out from the relevant hydraulic cylinder
- Remove the hydraulic cylinder
- Replace the removed hydraulic cylinder with a new hydraulic cylinder
- The assembly is carried out in reverse order.





NOTE: -When working in Hydraulic system please makes sure pressure must be released/ (Zero bars).

K7 DC valve spool manually operating



Swing out the locking pillar



Removing sensor connector



Removing sensor bracket



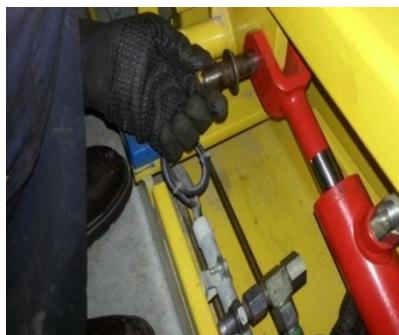
Removing Hydraulic connection



Removing Retain ring (Cir-clip)



Pulling the pin out from the cylinder



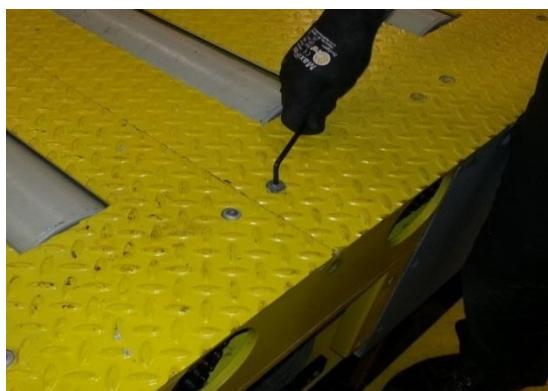
Removing the retain ring (Cir-clip) from tail end



How to replace the rollers & its bearing:

- Remove the relevant side cover by unscrewing the M8 Allen screws
- Remove the top cover of EWS by unscrewing the M8 Allen screws
- Remove the retaining ring from the shaft
- Remove the chain & sprocket from the roller shaft
- Remove the inner retaining ring from both sides from side beam.
- Provide 30 mm packing piece under the roller to hold, and hit the roller from opposite end by mallet hammer
- The shaft and self-aligning bearing came out from the side beam. Remove the bearing from bearing puller
- Replace bearing if necessary
- Remove the roller if necessary replace it
- Once it displaced from bearing, remove the roller
- The assembly is carried out in reverse order
- Before assembling the new roller, check the dimension of rollers and check is there any damage on the bearing seating area (size of the roller Dia 133*10*2460mm)

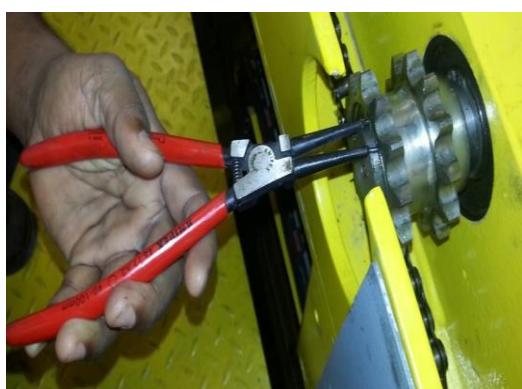
Remove top cover EWS



Removing sprocket open side cover



Removing Cir-clip from sprocket



Bearing shifted from side beam



How to replace the load cell:

- Lift the relevant roller deck to free the load cell.
- Loosen the hexagon screws M20(4 pieces) at the relevant load cell and remove the hexagon screws
- Loosen cylinder head screws M16 (4 pieces) at the base plate and remove
- Remove the load cell
- Replace the removed load cell with a new load cell
- The assembly is carried out in reverse order

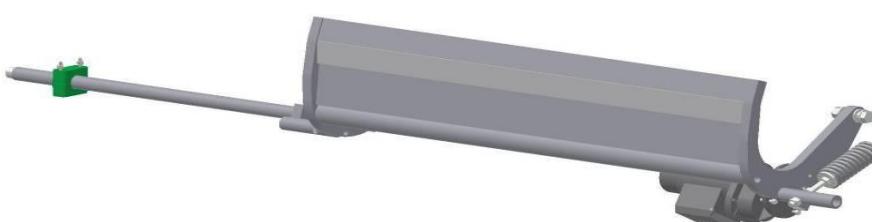
Load cell



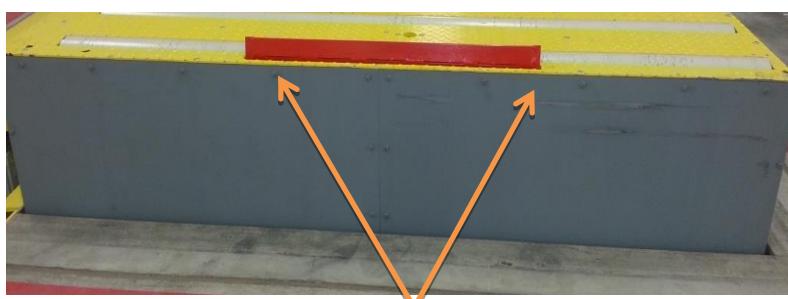
Hexagon screw M20

How to replaced sickle stop spring:

- Measure the length of Sickle stop From top of the EWS (should be > 50mm)
- Loosen the hexagon socket screws M8 (9 pieces) at the front covering and remove the hexagon socket screws
- Remove the front cover
- Loose the counter nut from 19 mm spanner to remove the surface tension of the spring
- Remove the spring
- The assembly is carried out in reverse order



Sickle spring



Remove front cover by loosen the hexagon Socket screw




Measure the length of Sickle stop

Measure & Loose the counter nut from M19 spanner


How to measure the oil level in Hydraulic tank:

- Drive the EWS up to transfer level
- Now check the oil level ,if it is below the red line, then you should fill the oil up to 30 mm from the red line
- Make sure that hydraulic oil should be ISO-VG-46
- Always Follow the instruction written in the tag ,(Shown in figure)



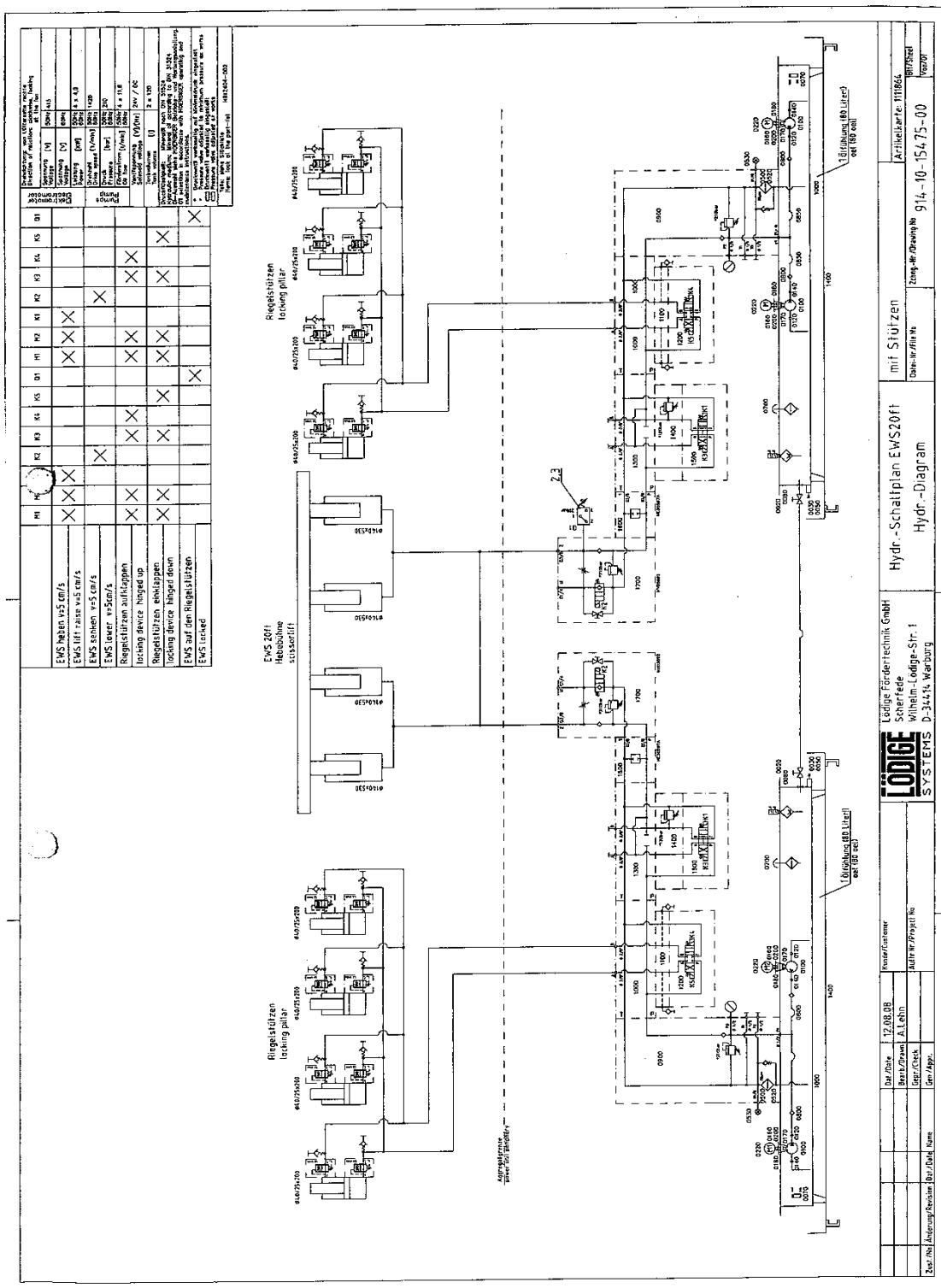
How to replace Helical geared motor 1.1 kW & Roller chain 3/4":

- Isolate motor power
- Loosen the hexagon socket screws M8 at the cover sheet and remove the hexagon socket screws
- Remove the cover sheet
- Remove the chain as mentioned earlier in previous chapter
- Loosen the hexagon socket screw (M5 Allen key) at the drive shaft and remove the hexagon screw subsequently pull the manual coupler from the drive shaft
- Dis assemble the manual coupler
- Slightly loosen the hexagon screws M10 (4 pieces) of the motor
- Loosen the counter nut M10 (2 pieces) of adjusting screws .Loosen the adjusting screws m10 by turning them counter clockwise
- Remove Hexagon screws M10 of the motor
- Remove the motor
- The assembly is carried out in reverse order
- After assembling ensure the proper chain tension should be approximately $\frac{1}{2}$ of the chain pitch
- Over tensioning should be avoided

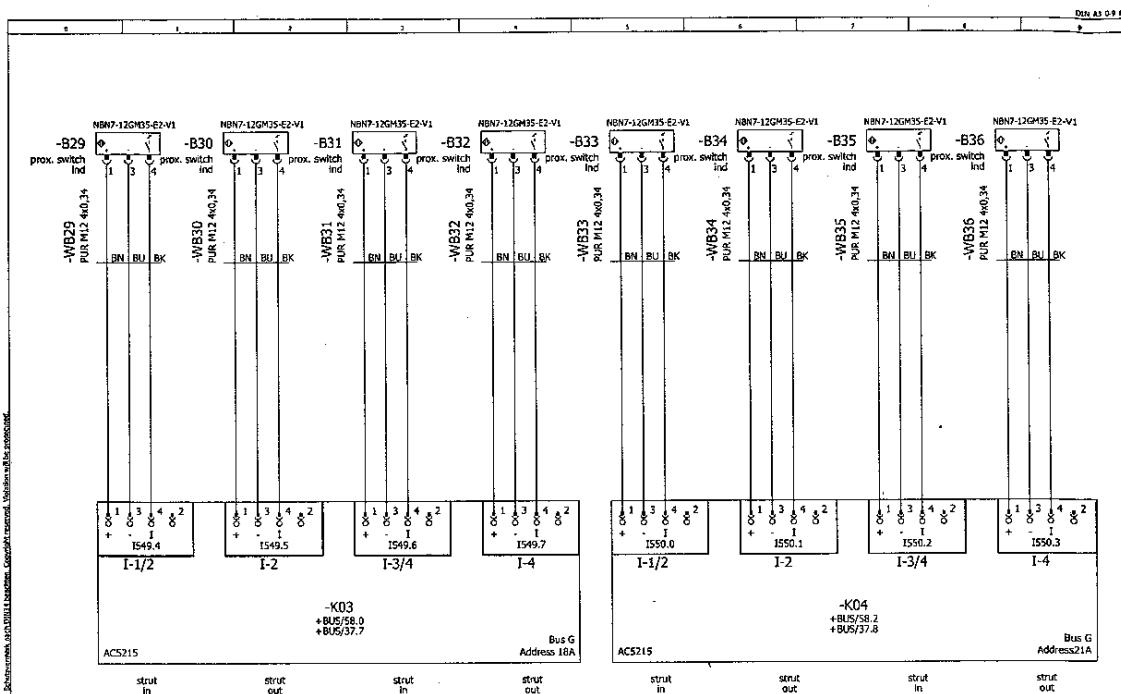


Counter nutM10 Manual couplerMotor mounting bolts M10

Hydraulic diagram for EWS 20ft

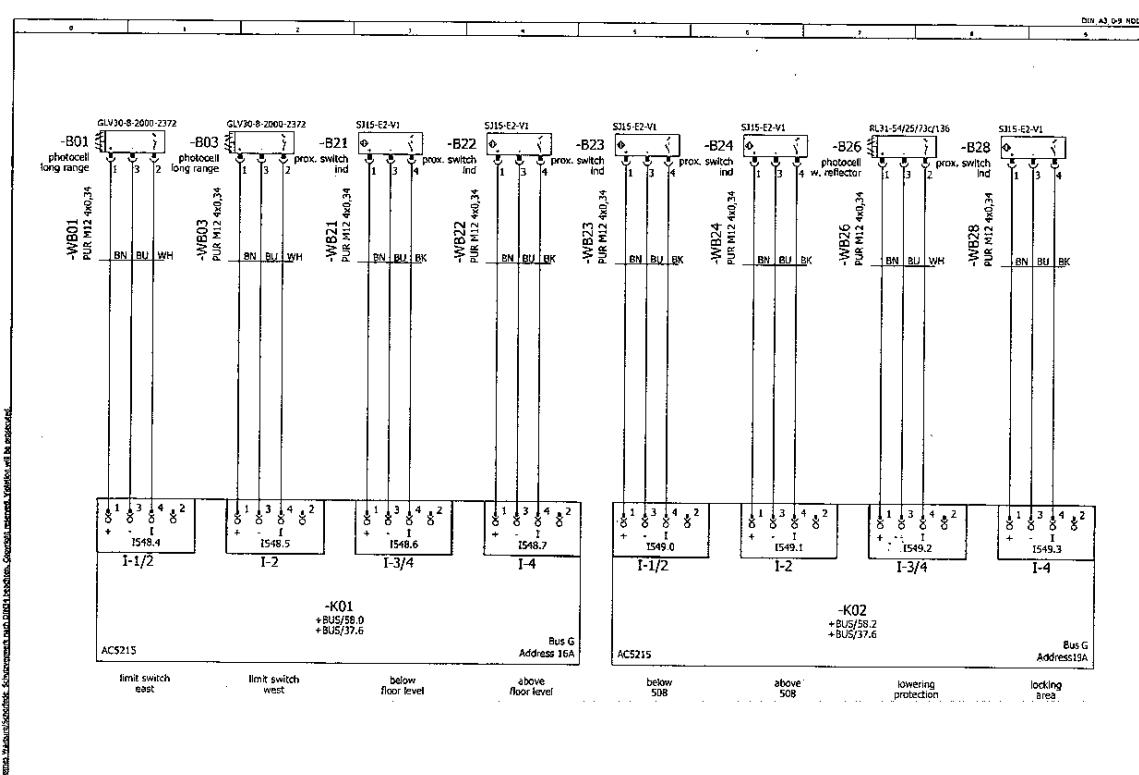


Sensors/switches position:



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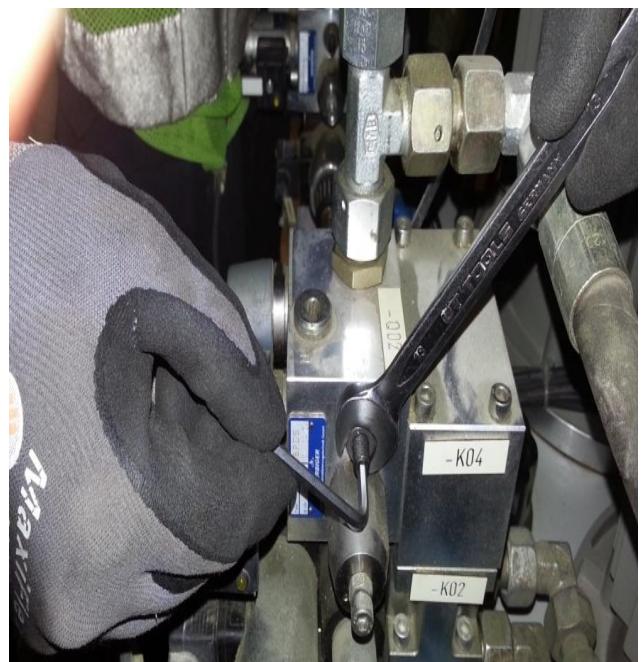
11. How to perform the pipe brake valve test:

- To perform the task, need 2 people. One should stand near the work station to operate & another one stands near the power pack to adjust the throttle valve
- Measure the return speed of the EWS from transfer level to home position by stop watch
- Average speed approximately 15 to 17 seconds
- EWS should be in home position when performing the task
- Put EWS in manual mode
- Bring the load on the top of the EWS (at least load should be more than 2 tons)
- See the Figure ,forklift on the top of the equipment (approx. machine weight 2.5 tons)
- Unlock the throttle valve screw & Turn 3 full round anti clock wise direction & lock it, by using 13 mm spanner & 4 mm Allen key.
- Raise the EWS approximately 200mm above the floor level and stop.
- Press lowering button, When you start lowering immediately pipe brake valve activates
- Bring the throttle valve screw in its original position(Turn 3 round clockwise)
- Raise the EWS again approximately 250mm above the floor level. (Note:-To deactivate the pipe brake valve ,EWS should raise up)
- Lower the EWS again
- Remove load on the equipment
- Check the speed ,adjust the throttle valve if necessary
- Don't raise the EWS up to the maintenance position during the pipe brake valve test.

Load on EWS



Throttle valve adjustment



12. Sensor position

For EWS 10ft:-

Sensor number	Location
B1,B2,B3,B4	Deck sensor EWS
B9 & B12	Stopper down
B10& B13	Stopper up
B20	Lower stop interface
B24(For interface)	Slow down interface
B25	508 level interface
B31,B29,B35,B33	EWS locking pillar IN
B34,36,30,32	EWS locking pillar out
B24	Above 508 Level
B23	Below 508
B21	Below floor level
B22	Above floor level
B28	Locking area
B26	Lower protection

For EWS 20ft:-

Sensor number	Location
B1,B3	Deck sensor EWS
B12	Stopper down
B13	Stopper up
B25	508 level interface
B31,B29,B35,B33	EWS locking pillar IN
B34,36,30,32	EWS locking pillar out
B24	Above 508 Level
B23	Below 508
B21	Below floor level
B22	Above Floor level
B28	Locking area
B26	Lower protection

Important note about sensor position:

- If EWS is in home position, the sensor B22 (Above floor level) & B21 (Below floor level) Should sense together
- If EWS is in 508 Level (transfer level),then the Sensor B23(below 508Level) &B24 (Above 508 level) should sense together
- To make the EWS lower when it is in home position, before lowering , EWS start raise up to 100 mm from the floor level and it stops, this position is the position of locking area B28
- In interface there is a slowdown sensor (B24) provided between the home position & the transfers level. After sensing B24 sensor, interfaces rising speed reduced up to transfer level



Important notes about sickle stop position:

- Sickle stop should down when EWS is in home position.
- Sickle stop should up when EWS start up
- If sickle stop not going down after the home position, following step to be check
- Check Interface lower stop sensor
- Check EWS home position sensor
- Check hydraulic pressure switch which is mounted on the power pack manifold (shown in figure)

13. Hydraulic pressure switch:

Hydraulic pressure switches used in EWS to monitor the pressure & pass the information to PLC through the pressure switch sensor which is mounted on the head of the pressure gauge. Normal set pressure SP-1 is 20 bars & Set pressure SP-2 is 270 bar. When system pressure reaches more than 270 bars, EWS stops immediately. If the pressure in the system is more than 20 bar, when it is in home position, the stopper will not go down.



14. Air vent procedure

MCC-14 EWS (WEP) 10ft Hydraulic power pack has the provision of removing air clogging in the system. Air inside the hydraulic system is one of possible causes of variation in speed or oil not pumping up.

- Put the machine in manual mode
- There are 2 air vent connectors for each pump. Select the connector & open one by using 22 mm spanner.
- Open the filter cover(oil filling point)
- One end of the hose pipe connects with connector & another end of the hose pipe should keep it to hydraulic oil filling point(shown in figure)
- Hold the hose pipe firmly
- Press the contactor manually of the same pump motor up to 10 seconds
- You can see the oil start flowing from the hosepipe , if there is no oil flow please repeat the procedure once again
- Once the oil starts flowing, stop the motor and remove the hose pipe & re-fix the connector.
- Do the procedure for next pump same as above
- Start the machine move up & down for 2 to 3 times.

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Hydraulic Connectors for air vent



Removing Connector



Fixing hose pipe hydraulic



Oil filter



Hose connection



Motor contactor

