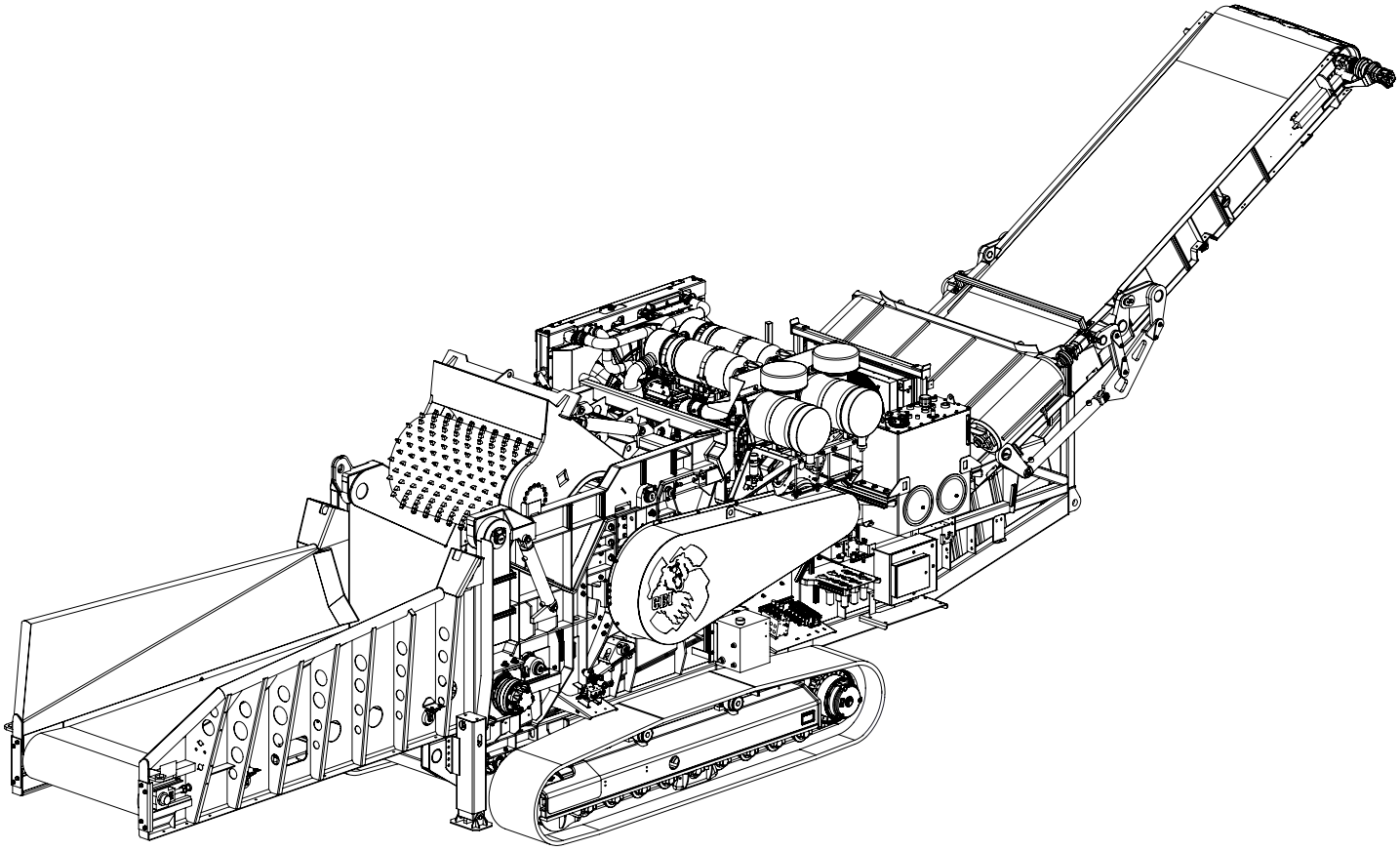
TEREX®
Environmental Equipment

CBI
A TEREX BRAND

CBI 6400CT

HORIZONTAL CHIPPER / GRINDER



Operations Manual

Issue Date: . . . . . January 2021
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Revision No.: 3.0
Part No:. 71910011
Original Instructions

WORKS FOR YOU.™

Record of Revisions

Revision Number	Reason for Change	Date
1.0	First release	June 2019
2.0	Operation section updated	August 2019
2.1	Belt tensioning updated in Maintenance Chevron 1000 oil updated in Maintenance	June 2020
3.0	Chapter 5 Operation Remote updated	October 2020

WARNING Operating, servicing and maintaining this equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. These chemicals can be emitted from or contained in other various parts and systems, fluids and some component wear by-products. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your equipment and vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment or vehicle and after operation. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

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1 Introduction

1.1 Machine Information

(1) Serial Number(s)

Your machine is equipped with various components some of which have their own serial numbers. It is imperative to record and track all individual component serial numbers. Component serial number information may be necessary for parts ordering, product update, or warranty purposes. The following is a list of the serial numbers for individual components intended to assist in the recording of serial numbers. It is the responsibility of the machine owner to ensure that all component serial numbers are recorded and kept up to date.

CBI 6400CT - Serial No.	019099
CAT C27 Engine - Serial No.	AT400826

1.2 Notes to the Operations Manual

This operations manual contains important information on how to operate the machine safely and correctly. Read this manual carefully to learn how to operate your machine. Failure to do so could result in personal injury or equipment damage. Consider this manual a permanent part of your machine. Keep it with the machine at all times. If this manual gets damaged or lost, please contact Terex to order a replacement manua

There is a separate engine manufacturer's manual which should also be read and understood prior to any operation or maintenance of the machine.

Included with this manual is a USB which contains the original language version of this manual which is English.

The following procedure bar indicates the start of a procedure. Any safety warnings related to the procedure will be highlighted before the procedure.

PROCEDURE

Any results from a step in the procedure will be indicated in italic below that step. The end of a procedure is indicated with a line under the last step or the last image in a procedure.

Follow all applicable safety regulations and recommendations in this manual as appropriate to your machine and the situation/conditions prevailing at the time.

Federal, State, National and Local laws and safety regulations must be complied with at all times to prevent possible danger to person(s) or property from accidents or harmful exposure.,

Terex will NOT be responsible for addressing environmental issues and/or health and safety protection measures for the machine installation as a whole and will bear NO responsibility for ensuring compliance with any regulations and/or statutory requirements that may apply unless specifically included in the Contract of Sale.

INFORMATION AND ADVICE

If you need any information or advice regarding your machine please contact:

Terex Environmental Equipment

22 Whittier Street

Newton, New Hampshire 03858

Telephone: 1-(603)-382-0556

(1) Units

Within this operations Manual figures shown within brackets ( ) after the Metric unit of measure are approximate conversions from the actual metric measurement of the item concerned to the imperial measurement.

(2) Optional Equipment

Terex machines can include optional equipment and/or special features additional to the standard specification. These may affect the information given in this operations manual. Take note of any variations to the standard procedures and/or component specifications.

1.3 Operations Manual Storage Locations

Manuals should be stored in a dry location that is convenient for plant operational and maintenance personnel to easily access.

To order additional and/or replacement copies of this manual, please refer to this manual's part number and serial number as found on the front cover when contacting your Terex customer service center.

Contact information is contained in the Contacting the Manufacturer section.

1.4 About This Manual

(1) Manual Intent

This manual provides component assembly and part number information for assistance with maintenance and replacement part identification of the machine. The manual is considered to be part of the machine and as such must always accompany it. If ownership of equipment changes the manual must be provided to the succeeding owner. All personnel involved in operation of the machine must read and fully understand the manual content. Personnel must also be made aware of the safety procedures when working with the machine.

(2) Manual Disclaimer

No part of this document may be reproduced, altered or published without prior consent of Terex. Terex reserves the right to adjust or alter equipment it produces, as well as manual content, at its sole discretion. Terex does not accept liability for misuse or negligence of the machine as it pertains to manual content. Please contact Terex with any questions regarding the manual or its content. For more information, see Publication Feedback.

(3) Date of Publication

The intent of this publication is to provide the most up to date information on your machine as possible. In order to ensure accuracy and quality of content, publications are continuously updated. It is the machine owners' responsibility to ensure that their publications are kept current. The date of publication is provided to assist in determining which revision is present.

Date of publication: January 12, 2021

1.5 Machine Identification

Your machine is fitted with an identification plate. An illustration of the ID plate is shown in Figure 1.1. The serial number, model number, machine weight, date of manufacture, and, if applicable, vehicle identification number (VIN) and gross axle weight rating for the machine is stamped onto this ID plate. Identify and record all data present on the ID plate. This information is necessary for part, service, and warranty support. If the ID plate ever becomes damaged or is missing, contact Terex immediately for replacement instructions.

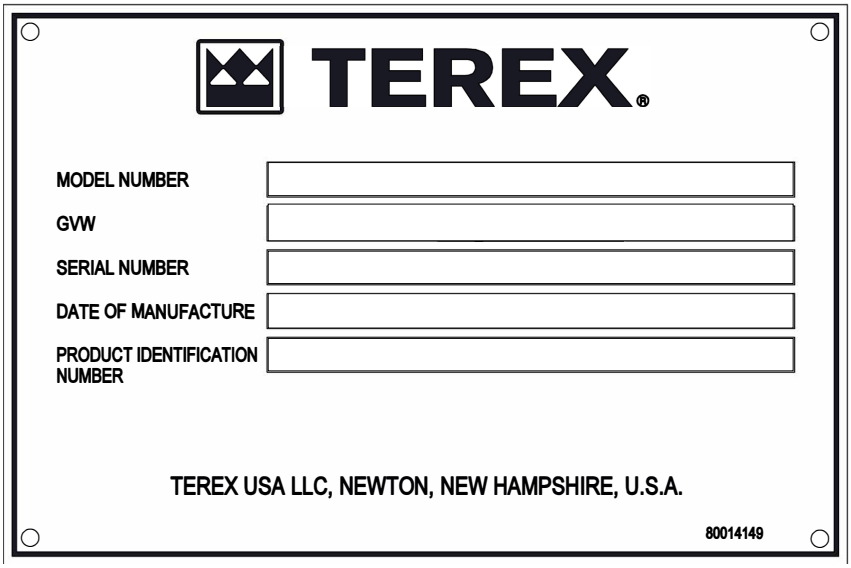

Figure 1.1 - Machine Serial Plate Location

1.6 Intended Use

This manual is written to give you the information necessary to safely operate and properly maintain the machine, as well as maximizing its return.

Terex will provide you with service and replacement parts, but by carefully following all instructions in this operation manual, operating costs can be kept to a minimum.

The purpose of your machine is to produce consistent wood chips. It is designed and built to accept occasional foreign objects, except metals which can cause extensive internal damage. It is strongly recommend that any metals present be removed from feed stock. Compliance with the operating instructions, the performance of maintenance work as specified, and adherence to maintenance intervals are all aspects of proper use. Use of this product in any other way is prohibited and contrary to its intended use.

1.7 Foreseeable Misuse

In addition to a description of the intended use, this sections demands to include information about the reasonably foreseeable misuse. Examples include, but are not limited to the following.

This machine is not to be used in a residential area.
This machine is not designed for use within a potentially explosive environment.
This machine is not designed for underground use.
This machine is designed for grinding and chipping logs only; do not process other material apart from that in which the machine is designed to process.
Ensure that the correct LOTO procedure is in place before cleaning or performing maintenance or repairs.
Ensure that the personnel keep clear of the underside of the discharge conveyor as there may be material discharged in this area.
The machine must not be ridden when moving between operating positions. This includes the engine platform, infeed/discharge conveyors, or any other platforms on the machine.

1.8 Prohibited Use

Operating the machine outside of its recommended range of applications or for any use which it is not intended,will result in a loss of any guarantee. The manufacturer or supplier cannot be held liable for any damage or injury resulting from such misuse.

Use of this product in any way other than its intended use is prohibited. The manufacturer will not be liable for any damage resulting from such use.

1.9 Declaration of Conformity

This machine is in conformity with the provisions of the EC Machinery Directive 2006/42/EC together with appropriate EN Harmonised Standards and National BS Standards and Specifications.

This machine is CE marked in accordance with the relevant European new approach directives, current at the time of CE certification and reflected in the equipment Declaration of Conformity. Any modifications or amendments to the equipment without the prior consent of the manufacturer may invalidate the CE compliance of this equipment.

A Declaration of Conformity certificate is applicable to each machine. Refer to section 11 for an example of a Declaration of Conformity certificate. The original copy of the certificate is sent out with the machine.

1.10 Warranty

Refer to Warranty section for an example of the warranty. It is important that it is read and fully understood.

1.11 Bulletin Distribution and Compliance

Safety of product users is of paramount importance to Terex. Various bulletins are used by Terex to communicate important safety and product information to dealers and machine owners. The information contained in bulletins is tied to specific machines using the machine model and serial numbers. Distribution of bulletins is based on the most current owner on record along with their associated dealer, so it is important to register your machine and keep your contact information up to date. To provide for the safety of personnel and the reliable continued operation of your machine, be sure to comply with actions indicated in all safety and product notices.

1.12 Supplemental Manuals

Your machine is constructed of many components, some of which have their own associated publications. Although some individual component information may be present in this publication, this is intended as a reference and is not a full or accurate account of all individual component information. It is imperative to always consult the OEM manuals for specific and accurate product information. The following is a partial list of individual component manuals intended to assist owners in identifying the necessary supplemental manuals for their machine.

It is the responsibility of the machine owner to ensure that all supplemental manuals are identified, kept up to date, and that all individual OEM guidelines and procedures are followed.

- CAT C27 Engine – Operation and Maintenance Manual, PN: SEBU8097-09
- CAT C27 Engine – Parts Manual, PN: SEBP4496-40
- Flexxaire Fan – TAC Elite (FX) Fan Series Manual, PN: 01523 Rev 12

Always consult the OEM manuals for specific component product information.

1.13 Replacement Parts

(1) Genuine Replacement Parts

Occasionally your machine may require replacement parts. Optimal fit and function of components can only be assured through the use of genuine replacement parts. The use of aftermarket replacement parts without written consent from Terex may void your product warranty. Genuine replacement parts are only available through Terex authorized parts representatives.

(2) Replacement Part Ordering Procedure

In order to ensure accuracy of your replacement parts it is critical to have the necessary information available when placing an order. The purpose of this section is to assist the operator in ordering parts quickly and easily from your authorized parts representative. It is important that this procedure be followed every time replacement parts are ordered.

1. Identify Machine

Acquire the machine model number, serial number, and date of manufacture from the machine's identification plate. For detailed information, see Machine Identification.

2. Identify Parts / Components

Locate the components needed in the owner's parts manual (PM) and record their part numbers and the diagrams corresponding page reference numbers.

3. Contact Terex

Contact your authorized parts representative with your specific machine data and corresponding part information for quick and accurate replacement parts.

(3) Parts Department Contact Information

The following contact information should be used when ordering replacement parts for your equipment. Genuine replacement parts are only available through Terex authorized parts representatives.

Terex Parts Department: +1 (888) 224 4647 ext. 1

1.14 Terex Authorized Service

(1) Terex Authorized Service Assistance

Occasionally your machine may require service or maintenance not outlined in the supplied manuals. Terex will provide, upon request, qualified service technicians for phone assistance, field assistance, or general training of personnel. Qualified service technicians are only available through contacting Terex authorized service representatives.

(2) Service Assistance Requisition Procedure

In order to ensure accuracy of your replacement parts it is critical to have the necessary information available when placing an order. The purpose of this section is to assist the operator in ordering parts quickly and easily from your authorized parts representative. It is important that this procedure be followed every time replacement parts are ordered.

1. Identify Machine

Acquire the machine model number, serial number, and date of manufacture from the machine's identification plate. For detailed information, see Machine Identification.

2. Identify Parts / Components

Create a detailed list of problematic parts, components, symptoms, or services you need assistance with.

3. Contact Terex

Contact your Terex authorized parts representative with your specific machine data and corresponding part information for quick and accurate replacement parts.

(3) Parts Department Contact Information

The following contact information should be used when requesting service assistance for your equipment. Genuine Terex service information and technicians are only available through Terex authorized service representatives. Terex service fees, terms, and conditions may apply.

Terex Service Department: +1 (888) 224 4647 ext. 2

1.15 Publication Feedback

(1) Publication Feedback

Occasionally it may be necessary to contact Terex regarding the content in the publication. In an effort to produce world class documentation we encourage your feedback. For feedback to be properly received by Terex, all comments must be submitted using the procedures and contact information specified in this section.

(2) Publication Feedback Reporting Procedure

Occasionally your Terex publication may contain errors or omissions. In an effort to keep our documents as accurate, convenient, and as relevant as possible, we encourage your feedback. The purpose of this section is to familiarize readers with the information needed when reporting errors and omissions in publications to Terex.

1. Record Serial Number

Record your machine's serial number.

2. Record Publication Information

Record the publication number and revision level of the document; in print manuals this is located on the spine.

3. Record Personal Information

Record your contact information so that the technical publications department may contact you if necessary.

4. Record Location of Content in Question

List the chapter number, section number, and page number of the content that you're contacting Terex about.

5. Record Feedback

Give a detailed list of all errors, omissions, or comments that you would like to be reviewed.

1.16 Contacting the Manufacturer

At times it may be necessary to contact the manufacturer of this machine. When you do, be ready to supply the model number and PIN number of your machine, along with your name and contact information. At minimum, the manufacturer should be contacted for any of the following reasons:

- Accident reporting
- Questions regarding product applications and safety
- Standards and regulations compliance information
- Questions regarding product modifications
- Current owner updates, such as changes in machine ownership or changes in your contact information (See Transfer of Machine Ownership).

Please contact:

Terex Environmental Equipment

22 Whittier Street

Newton, New Hampshire

Telephone: 1-(603)-382-0556

1.17 Transfer of Machine Ownership

If you are not the original owner of this machine, provide the model number and serial number of your machine. Also include your name and the date of the transfer of ownership. It ensures that you are the owner on record for this machine, allowing you to receive any applicable notices and advisories in a timely manner.

1.18 Copyright

To order additional copies contact your local Terex dealer.

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2 Safety

This safety section covers a wide variety of hazardous situations, (but not necessarily limited to those described), which may or may not apply to any specific machine installation. They are given for general guidance only to assist the operator in setting up and maintaining an appropriate regime for the protection of health and safety. Where the machine is supplied for incorporation into plant/equipment designed, supplied and located by others, Terex cannot be aware of particular hazards that may be present or might occur and therefore accept no liability for addressing or resolving these issues.

2.1 General Safety

The following signs and designations are used in the manual to designate instructions of particular importance.

(1) Safety Alert Symbol

The safety alert symbol is used on safety signs and throughout this manual to alert you to potential personal injury hazards. Obey all messages that follow this symbol to avoid injury or death.

Conduct thorough risk assessments and mitigate identified risks in accordance to the assessment. For more information related to machine safety, please refer to the safety section of the manual.

(2) ANSI / ISO Hazard Classification System

A multi-tier hazard classification system is used to alert you to potential personal injury hazards. Signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard. Signal words used without the safety alert symbol relate to property damage and protection only. All are used as attention-getting devices throughout this manual as well as on ANSI / ISO type decals and labels fixed to the machine.

⚠ DANGER

DANGER Indicates a hazardous situation that, if not avoided, will result in death or serious injury. (Contains white letters on red background).

⚠ WARNING

WARNING This indicates a hazardous situation that, if not avoided, could result in death or serious injury. (Contains black letters on orange background.

⚠ CAUTION

CAUTION This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. (Contains black letters on yellow background).

(3) Property Damage Messages

The signal word NOTICE, shown without the safety alert symbol, is used throughout this manual and on machine labels to address specific practices, or draw attention to supplemental information that is not related to personal injury.

NOTICE

This indicates information considered important, but not hazard related. This is a message related to property damage. The safety alert symbol is not shown with this danger classification.

(4) California Proposition 65 Warnings

⚠ WARNING

Operating, servicing and maintaining this equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. These chemicals can be emitted from or contained in other various parts and systems, fluids and some component wear by-products. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your equipment and vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment or vehicle and after operation. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

2.2 Hazard Decals

Your Terex equipment is fitted with several specific hazard warnings throughout. The purpose of these individual warnings is to familiarize personnel with the nature, severity, and proper technique for dealing with specific hazards on the machine. Before operating equipment review and become familiar with all specific hazard warnings.

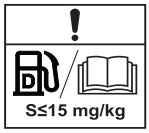
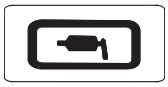
Ensure that all specific hazard warnings are clean, legible, and present. Decals should be cleaned with water and a light detergent; solvents or harsh chemicals may dissolve the decals or their adhesive. If hazard decals are missing or are found to be illegible, order replacements from Terex immediately.

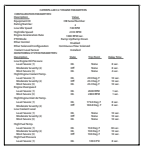
Become familiar with and adhere to all hazard decals. Failure to comply may result in severe injury to personnel.

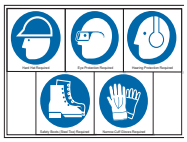
(1) Description of Safety Symbols

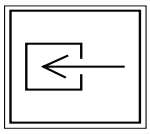
Table 2.1 - Description of Safety Symbols

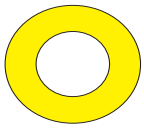
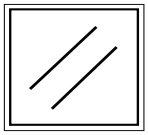
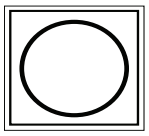
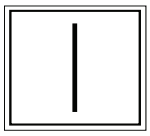
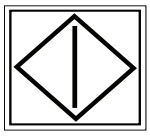
Symbol	Description
	Warning Secure Mag Pan Before Transport See owners manual for further instructions
	Warning Energized equipment
	Warning Guards must be in place
	No person
	Emergency stop

Symbol	Description
	Low sulphur diesel fuel
	Explosion and burn hazard Avoid smoking around the machine
	Radio Transmitter
	Hazard Reversible cooling fan
	Read manual
	Grease point

Symbol	Description
	Hydraulic oil tank
	Hazard Unexpected machine movement; body entanglement risk Use remote control to maintain a safe distance from the machine
	Hazard Unexpected machine movement; body entanglement risk Use remote control to maintain a safe distance from the machine
	Caterpillar C27 Engine Parameters
	Emission Control Information
	No unauthorized entry; no personnel are permitted no approach the machine during running

Symbol	Description
	Entanglement warning Keep back from machine when material is being loaded
	Utilize PPE A safety helmet, safety goggles, hearing protection, safety gloves, and safety boots are required during use and while performing maintenance work on the machine
	Pinch point
	Warning When replacing or reflashing the ECM
	Stay clear of idler; entanglement risk
	Falling hazard; do not ride conveyor

Symbol	Description
	Hydraulic oil fill port
	Hot surface
	Replace guarding before operating
	Electrical lockout/tagout (LOTO)
	Track crush hazard
	Track crush hazard

Symbol	Description
	Hazard Injection warning
	E-Stop ring
	Reset button
	Off button
	On button
	Start button

Symbol	Description
	Noise level: 105 dB

Please refer to Figure 2.1 and Figure 2.2 for decal placement on this machine.

(2) Decal Locations

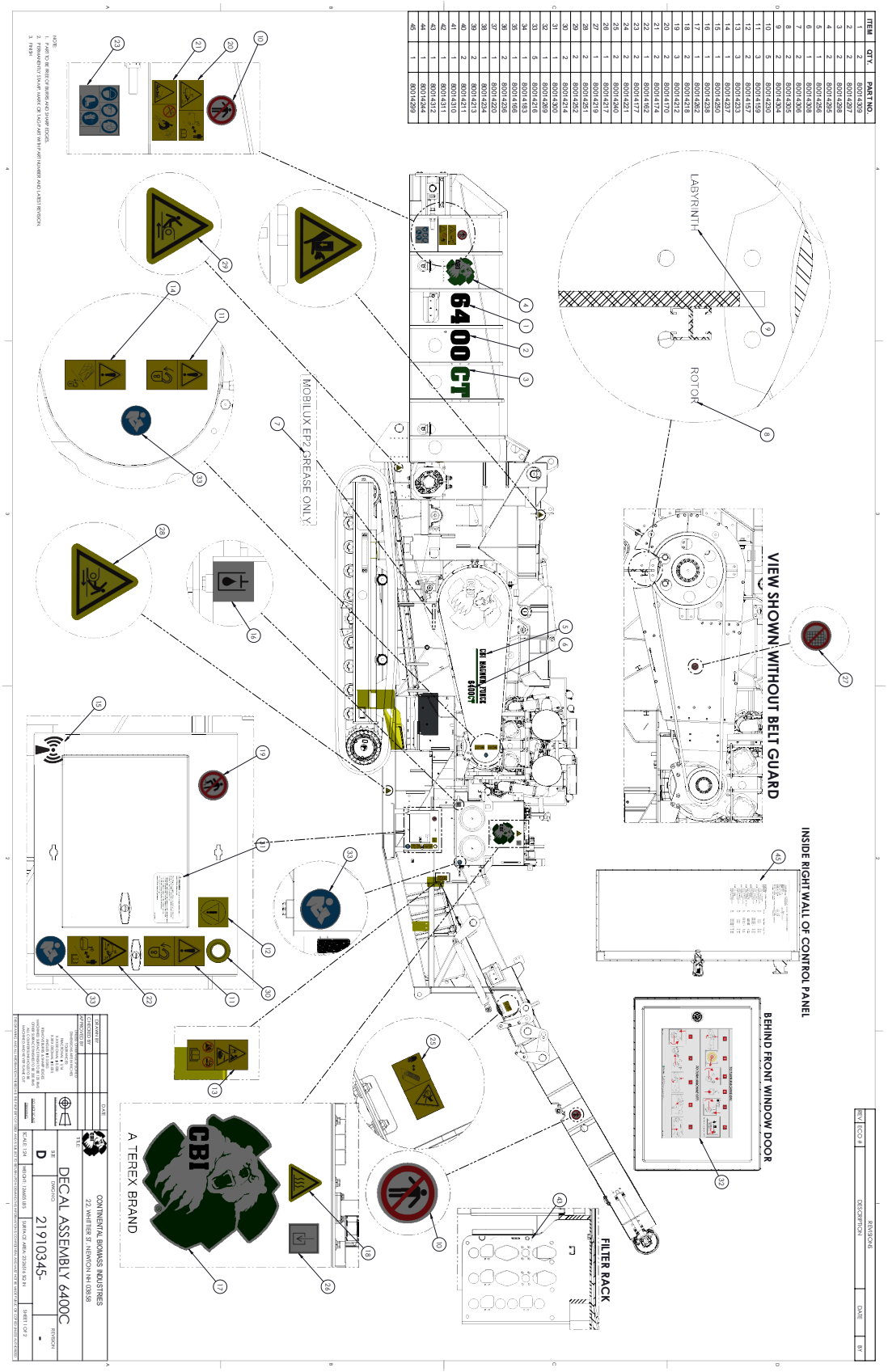


Figure 2.1 - Decal Location

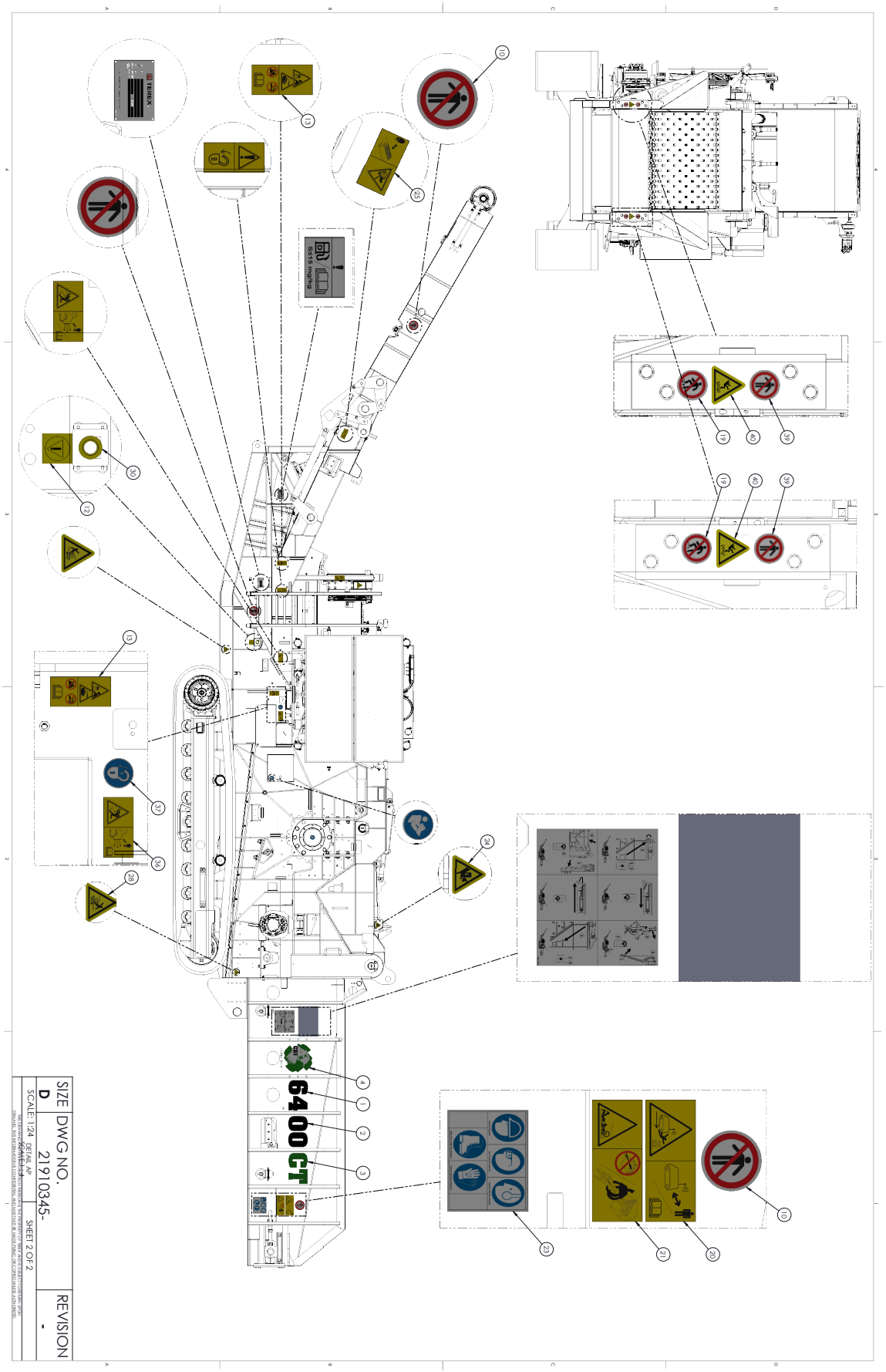


Figure 2.2 - Decal Location

Lvl	Typ	Seq	Part Number	Revision	Alt	Description	Qty/Parent		Required Qty	
			21910345	**-**		**DECAL ASSEMBLY, 6400CT**			1.00	EA
1	Mtl	10	.80014309	-		DECAL, 64	2.00	EA	2.00	EA
1	Mtl	20	.80014297			DECAL, 00 (ZERO. ZERO)	2.00	EA	2.00	EA
1	Mtl	30	.80014298			DECAL, CT	2.00	EA	2.00	EA
1	Mtl	40	.80014295			DECAL, BEAR LOGO 18", ATB	2.00	EA	2.00	EA
1	Mtl	50	.80014256	A		DECAL, CBI MAGNUM FORCE	1.00	EA	1.00	EA
1	Mtl	60	.80014308	-		DECAL, 6400CT	1.00	EA	1.00	EA
1	Mtl	70	.80014306	-		DECAL, "MOBILUX EP2 GREASE ONL	2.00	EA	2.00	EA
1	Mtl	80	.80014305	-		DECAL, "ROTOR"	2.00	EA	2.00	EA
1	Mtl	90	.80014304	-		DECAL, "LABYRINTH"	2.00	EA	2.00	EA
1	Mtl	100	.80014230	-		DECAL, NO PERSON 6 IN DIA ISO	5.00	EA	5.00	EA
1	Mtl	110	.80014159	-		DECAL, ENERGIZED EQUIPMENT	3.00	EA	3.00	EA
1	Mtl	120	.80014157	-		DECAL, EMERGENCY STOP (E-STOP)	2.00	EA	2.00	EA
1	Mtl	130	.80014233	-		DECAL, HAZARD, EXPLOSION - BUR	3.00	EA	3.00	EA
1	Mtl	140	.80014237	-		DECAL, HAZARD, GUARDS MUST BE	1.00	EA	1.00	EA
1	Mtl	150	.80014250	-		DECAL, RADIO TRANSMITTER ISO	1.00	EA	1.00	EA
1	Mtl	160	.80014238	-		DECAL, HYDRAULIC OIL TANK	1.00	EA	1.00	EA
1	Mtl	170	.80014262	-		DECAL, BEAR LOGO 14", ATB	1.00	EA	1.00	EA
1	Mtl	180	.80014218	-		DECAL, HOT SURFACE ISO	2.00	EA	2.00	EA
1	Mtl	190	.80014212	-		DECAL, NO STEP ISO	3.00	EA	3.00	EA
1	Mtl	200	.80014170	-		DECAL, UNEXPECTED MACHINE MOVE	2.00	EA	2.00	EA
1	Mtl	210	.80014174	-		DECAL, ENTANGLEMENT	2.00	EA	2.00	EA
1	Mtl	220	.80014162	-		DECAL, UNEXPECTED MACHINE MOVE	1.00	EA	1.00	EA
1	Mtl	230	.80014177	-		DECAL, MANDATORY PROTECTIVE EQ	2.00	EA	2.00	EA
1	Mtl	240	.80014221	-		DECAL, PINCH POINT ISO	2.00	EA	2.00	EA
1	Mtl	250	.80014240	-		DECAL, STAY CLEAR OF IDLER	2.00	EA	2.00	EA
1	Mtl	260	.80014217	-		DECAL, FILL PORT ISO	1.00	EA	1.00	EA
1	Mtl	270	.80014219	-		DECAL, DO NOT OPER WITH GUARD	1.00	EA	1.00	EA
1	Mtl	280	.80014251	-		DECAL, HAZARD CRUSH BY TRACK	2.00	EA	2.00	EA
1	Mtl	290	.80014252	-		DECAL, HAZARD CRUSH BY TRACK	2.00	EA	2.00	EA
1	Mtl	300	.80014214	-		DECAL, BLANK E-STOP RING ISO	2.00	EA	2.00	EA
1	Mtl	310	.80014300	-		DECAL, WITH DIESEL ENGINE, CA	1.00	EA	1.00	EA
1	Mtl	320	.80014269	-		DECAL, MD4 LOADING	1.00	EA	1.00	EA
1	Mtl	330	.80014216	-		DECAL, READ MANUAL ISO	5.00	EA	5.00	EA
1	Asm	340	.80014183	A		SERIAL PLATE, ENGRAVED	1.00	EA	1.00	EA
1	Mtl	350	.80014166	-		DECAL, LOW SULPHUR DIESEL FUEL	1.00	EA	1.00	EA
1	Mtl	360	.80014236	-		DECAL, HAZARD, REVERSIBLE COOL	2.00	EA	2.00	EA
1	Mtl	370	.80014220	-		DECAL, ELECTRICAL LOTO ISO	1.00	EA	1.00	EA
1	Mtl	380	.80014234	-		DECAL, HAZARD, INJECTION	1.00	EA	1.00	EA
1	Mtl	390	.80014213	-		DECAL, NO PERSON ISO	2.00	EA	2.00	EA
1	Mtl	400	.80014211	-		DECAL, FALLING HAZARD ISO	2.00	EA	2.00	EA
1	Mtl	410	.80014310	-		DECAL, SERVICE SEQUENCE 6400CT	1.00	EA	1.00	EA
1	Mtl	420	.80014311	-		DECAL, 6400 LUBE PORTS	1.00	EA	1.00	EA
1	Mtl	430	.80014312	-		DECAL, PRESSURE SWITCH PLATE	1.00	EA	1.00	EA
1	Mtl	440	.80014244	-		SIGN, WARNING, WHEN REPLACING	1.00	EA	1.00	EA
1	Mtl	450	.80014299	A		DECAL, C27/C32 T4F ENGINE PARA	1.00	EA	1.00	EA

Figure 2.3 - Decal BOM

2.3 Safety Basics

Establishing and adhering to standardized safety practices minimizes your risk on the job site. Most accidents that include product operation, maintenance, and repair are caused by failure to observe basic safety rules and precautions. Whenever working on or around Terex equipment, keep in mind that your safety is in your hands. At the same time, the safety of your coworkers is in your hands too. Never operate a machine until you fully understand its capabilities and limitations. Ensure to adhere to all safety guidelines set forth in the operations and maintenance manuals as well as by local and regional regulatory authorities. Remember that the information in the operations and maintenance manuals is not all inclusive; Terex cannot anticipate every potential hazard.

The safety guidelines in this manual are designed to supplement your existing training program and do not constitute a complete safety training program.

This safety section covers a wide variety of hazardous situations, but not necessarily limited to those described, which may or may not apply to any specific machine installation. They are given for general guidance only to assist the operator in setting up and maintaining an appropriate regime for the protection of health and safety. Where the machine is supplied for incorporation into plant/equipment designed, supplied and located by others, Terex cannot be aware of particular hazards that may be present or might occur and therefore accept no liability for addressing or resolving these issues.

2.4 Safety Guidelines

(1) General Safety

The machine is to be used only for the purpose it was designed and intended for.
Follow maintenance and service schedules as required.
Replace missing or illegible safety and warning decals with authorized replacements.
Inspect the machine daily prior to start up. Observe that all safety features are in place.
Operate only when all guarding is in place and secured. Do not operate if guards are missing.
Ensure that the operator is familiar with and has thorough knowledge of all machine functions.
Be aware at all times of the hazards that operating the machine may present.
If the machine is in need of repair or service, complete before operating the machine again.
Never operate a machine with any safety equipment removed or bypassed.
Never stand or climb on the machine when it is operating. Do not allow others to stand or climb on the machine either. The machine must be at complete stop before performing maintenance or service on it.
Do not open any covers or doors while the machine is operating.
Do not allow metal objects to pass through the machine.
Take necessary precautions against fire hazards when welding on the machine.
Clean the machine every day with pressurized air.
Do not allow combustible material to buildup, thereby creating a fire hazard.
Keep flammable materials away from the machine; dispose of properly.
Always keep an approved fire extinguisher nearby the machine.
Always follow the necessary rules and regulations of the road during transportation if applicable.

(2) Personal Safety

Before operation the operator(s) must:

Have received specific and adequate training in the task to be carried out.
Have read and understood the operations manual and the Safety Signs in this manual and around the machine(s).
Knows the location and function of controls and safety features such as emergency stop buttons and safety guards.
Be aware of all moving parts of the machine. Keep sufficient distance away.
Do not attempt to lift heavy components alone; use more than one person or use crane.
Be aware of uneven surfaces when working on the machine.
Do not allow machine controls to come in contact with grease or other lubricants. Keep hands clean.
Any work on and/or with the machine must be executed by trained, reliable and authorized personnel only. Statutory minimum age limits must be observed.
Work on the electrical system and equipment of the machine must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.

(a) Personal Protective Equipment (PPE)

In its most generic sense, Personal Protective Equipment (PPE) is anything you can wear that will protect yourself from injury. PPE should be considered a last line of defense against injury on the job. It is an employee's job to know and understand when PPE is necessary and how to properly use it.

Where possible when working close to machinery, only do so when they are stopped. If this is not practical, remember to keep tools, test equipment and all other parts of your body well away from the moving parts. Loose or baggy clothing can get caught in running machinery.
For reasons of safety, long hair must be tied back or otherwise secured, garments must be close fitting and no jewelry such as rings may be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts.
Always wear correctly fitting (EN/ANSI approved) protective clothing.
Protective clothing includes: Hard Hat, Safety Glasses, Ear Protection, Dust Mask, Close fitting Overalls, Steel Toed Boots and a High Visibility Vest.

(3) Hydraulic and Pneumatic Safety

Only persons having special knowledge and experience in hydraulic and pneumatic systems may carry out work on hydraulic and pneumatic equipment. Never disable or alter any hydraulic circuit or component without consulting with Terex.
Relieve all pressure in the hydraulic system by returning all controls to the neutral position. Turn off the machine and isolate power supply before any pipes, filter caps, filters or hydraulic fittings are disconnected or removed. De-pressurize all system sections and pressure pipes (hydraulic system, compressed air system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.
Check for leaks in tanks or tubing with flashlights or other proper equipment. Never use an open flame to check for leaks. Always use a piece of cardboard to check for leaks. Do not use your hand. Hydraulic fluid under pressure can penetrate the skin causing serious injury. Wear personal protective equipment, including goggles and gloves.
Check all lines, hoses and screwed connections regularly for leaks and obvious damage. Splashed oil may cause injury and fire. Repair any damage immediately.
Hydraulic and compressed air lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements.
Always practice extreme cleanliness servicing hydraulic components.
Do not exceed safe limits. Never set a pressure relief valve to a pressure higher than that set at the factory.
For questions concerning accumulators, which are pressure-containment vessels, contact Terex. Malfunctioning valves or poor maintenance practices can result in build-up of extremely high hydraulic and/or pneumatic pressures inside the accumulator.

(4) Electrical Safety

Work on the electrical system or equipment may only be carried out by a skilled and qualified electrician or by specially instructed personnel under the control and supervision of such an electrician and in accordance with applicable electrical engineering rules and regulations.
Use only original fuses with the specified current rating. Switch off the machine immediately if trouble occurs in the electrical system.
When working with the machine, maintain a safe distance from overhead electric lines. If work is to be carried out close to overhead lines, the working equipment must be kept well away from them. Check out the prescribed safety distances.
If your machine comes into contact with a live wire, warn others against approaching and touching the machine and have the live wire de-energized.
If provided for in the regulations, the power supply to machines and parts of machines, on which inspection, maintenance and repair work is to be carried out, must be cut off. Before starting any work, check the de-energized parts for presence of power and ground or short circuit them in addition to insulating adjacent live parts and elements.
The electrical equipment of the machine is to be inspected and checked at regular intervals. Defects such as loose connections or scorched or otherwise damaged cables must be rectified immediately.
Necessary work on live parts and elements must be carried out only in the presence of a second person, who can cut off the power supply in the case of danger by actuating the emergency shut off or main power switch. Secure the working area with a red and white safety chain and a warning sign.
Use insulated tools only.
Before starting work on high voltage assemblies and after cutting out the power supply, the feeder cable must be grounded and components such as capacitors short-circuited with a grounding rod.
Tracked machines may be wired with negative earth. Always observe correct polarity.

(5) Residual Risks

Operators must be aware of any and all residual risks that are associated with the machine. Examples include, but are not limited to the following. Safety precautions must be taken to ensure personnel aren't put at risk. Always pay attention to machine warning decals, signs, and pictographs.

Crush hazards
Entanglement hazards
High-pressure injection
Noise hazards
Thermal hazards (engine and exhaust systems)
Impact hazard from the underside of the discharge

2.5 Work Area Safety

(1) General Work Area Guidelines

Operators must have received specific training in all operating and service tasks as required for the safe operation and service of the machine. Operators must know the location and correct operation of all controls and safety features such as remote stop buttons and isolator switches. Operators must be aware of all moving parts on the machine.
Keep the work area as neat and as clean as practical. Keep your equipment clean and free of dirt and grease so it can be checked for loose, cracked or broken parts. Replace defective parts as soon as they are discovered.
The guards provided are designed and manufactured to ensure so far as reasonably practicable that the machinery and plant on which they are fitted can be operated safely and without risk to health when properly used. However, it cannot be guaranteed that the guards provided will meet the requirements laid down by individual Inspectors and any additional guard and/or modification to guarding supplied, which may be required for any reason whatsoever, will be charged as an addition to the contract price.
Walkways should only be used when the machine is turned off, unless to perform specific maintenance procedures which require the machine to be operational. In this instance, only suitable trained and authorized personnel equipped with the correct PPE should be allowed access and the machine must be running empty and cleared of all material beforehand.
Always check that walkways and handrails are fully secured in place before using.
Do not smoke or allow smoking near flammable solvents. Use non flammable solvents for cleaning parts and equipment. Know where fire extinguishers and other fire suppression equipment are located and learn how to use them.
Always use hoisting equipment for heavy loads. Regularly check hooks, cables, shackles and chains for stretch and wear. Never overload hoists, cranes or other lifting devices.
Avoid electrical and static sparks and any open flame while handling, storing, moving or pouring fuels, electrolytes for batteries, hydraulic fluids or coolants.

(2) Safety Warnings and Labels

You can be injured if you do not obey the safety instructions as indicated on warning signs. Observe all safety instructions and warnings attached to the equipment.
Ensure that safety instructions and warnings attached to the equipment are always complete and perfectly legible. Keep warnings and instruction labels clean and up to date.
Replace unreadable or missing labels with new ones before operating the machinery. Make sure replacement parts include warning or instruction labels where necessary.

(a) Modifications

Never make any modifications, additions or conversions which might affect safety without the supplier's approval. In the event of safety relevant modifications or changes in the behavior of the machinery during operation, stop the machine and lock out immediately and report the malfunction to the competent authority/person.

2.6 Transportation Safety

Before transporting the machine, observe the prescribed transport position, admissible speed and itinerary. Only use appropriate means of transport and lifting gear of adequate capacity. Know the overall height to avoid contacting overhead obstructions such as bridges, power lines, etc.
The preparations to move equipment by an articulated lorry should be supervised by a minimum of two persons. Ensure persons transporting the machine adhere to all safety signs and procedures.
Before transportation on public roads, ensure the machine has been properly secured with no loose material left in or on the machine. Always observe the valid traffic regulations and, if necessary, ensure beforehand that the machine is in a condition compatible with these regulations.
Extreme caution is required when transporting machinery on site. Soft or uneven ground may cause accidents. On sloping terrain, always adapt your traveling speed to the relevant ground conditions. Never change to a lower gear on a slope. Always change gear before reaching a slope.
The machine is remote controlled and may start without notice. Stay clear of the machine. The machine must be loaded and transported only in accordance with the operating instructions. For maneuvering the machine, observe the prescribed transport position, admissible speed and itinerary. Use only appropriate means of transport and lifting equipment and where applicable of adequate capacity. The re-commissioning procedure must be strictly in accordance with the operating instructions. Before traveling with the machine, check that the braking and any signaling and lighting systems are fully functional. Before setting the machine in motion always check that the accessories have been safely stowed away.
On a wheeled machine, ensure wheel nuts are torqued in accordance with Torque Specifications. Check your tires for:
- Correct pressure - Cuts or bulges - Nails or spikes - Uneven or excessive wear - Missing Valve Caps
Check your wheels for:
- Damaged rims - Missing or loose wheel nuts or bolts - Obvious misalignment
Have cuts or punctures repaired by authorized personnel before adding air. Beware that an over-inflated tire can explode and cause serious injury or death.
In transit, the magnet pan can undergo a kite effect at highway speeds; this can cause the pan to break loose. Secure the magnet pan with straps during transportation. Or, depending on the date of machine manufacture, secure the magnet pan retainer kit.

2.7 Operational Safety

(1) General Guidelines

Before attempting to operate the machine, DO read, fully understand and observe the contents of this manual, as well as any other relevant manual for other equipment incorporated in the machine. Study all safety signs on your machine.
It is emphasized that all safety aspects are checked before starting the machinery.
Make sure that you fully understand the operating procedures for the machine before attempting to start.
Take the necessary precautions to ensure that the machine is used only when in a safe and reliable state.
Operate the machine only for it's designed purpose and only if all guarding, protective and safety orientated devices, emergency shut-off equipment, sound proofing elements and exhausts, are in place and fully functional.
NEVER leave the machine unattended while it is in operation.
Before starting, walk completely around the machine. Make sure no one is under it, on it or close to it.
Let other workers and bystanders know you are starting up and do not start until everyone is clear of the machine.
Before moving the machine (if applicable), ensure that everyone is clear from the surrounding area.
DO NOT allow a build up of solid material or dust in any part of the machine. In the event of material blockage, any malfunction or operational difficulty, stop the machine immediately and lockout. Have any defects rectified immediately.
Be alert and watch for pinch points, closing mechanisms, and falling parts when working on or around any machinery. Keep hands and tools clear. In-running nip points on moving machinery can cause serious injury or even death. Do not reach into unguarded machinery. Your arm could be pulled in and amputated. Switch off and lockout the machine before removing any safety devices or guarding.
Never work or stand beneath machinery or attachments as it is raised or lowered. Never work or stand beneath machinery as they are being loaded with and/or discharging material. During operation, do not climb onto, over or under moving conveyor belts and rollers. Always use ladders, steps and walkways when mounting and dismounting.
Hole alignment on mechanical supports must be checked and secured with pins provided and in accordance with safety signs.
Follow safe operating practices. Operate the machine controls smoothly. Avoid sudden stops, starts or changes in direction. Only use emergency stop buttons or emergency stop lines (if fitted) in emergency situations or during safety drills.
Never check the tension of 'V' belts, drive chains and conveyors when machine is running.
DO check frequently the stability of the machine. The chassis SHOULD NOT have undue vibration during operation.
After each day's operation, always run the machine dry; never leave material in the infeed. Starting a machine with a full load will cause strain problems in your machine.
Only authorized personnel are allowed to operate the machine.
Do not allow anyone who is fatigued or has diminished or impaired capabilities to operate the machine.
Before operating, make sure that no one is within 100 feet (31 meters) of the machine.
Do not stand next to, on, or under the machine when operating.

Always make sure the machine is in proper working order and that all functions are operating correctly.
Do not feed the machine materials other than those it is designed for.
Do not force more material into the machine than it can normally handle.
Do not fill the fuel tank when the machine is operating. Make sure the fuel cap is always secure.
Avoid moving parts of the machine; stay away from infeed and discharge areas.
Keep flammable materials away from hot areas of the machine.
Stop the machine if it is leaking fluids or produces unusual noises.
Do not remove the engine radiator cap when coolant is hot.
After machine cleaning, inspect electrical components for damage or leakage.
Dispose of oil, lubricants, or other fluids that impact the environment in the proper manner.
Use only authorized parts or accessories on the machine and make sure they are fastened securely.
The machine must be properly turned off after use; remove the key, close the latch, and lock the battery disconnect.
Follow all safety procedures and ensure that any personnel in area also comply accordingly.
The machine cannot be operated in adverse weather conditions (ie. thunder and lightning, excessive precipitation, damaging wind or hail storms, during any localized moderate or severe weather alerts, or any other severe conditions that could make the machine unsafe for operation).
The end user is responsible for providing sufficient localized lighting (ie. flood lights) when required.

(2) Authorized Work Stations

MD4 control unit
Manual control valves
Remote control

2.8 Maintenance Safety

(1) General Guidelines

Understand the service procedures before doing work. Keep working area clean and dry. Never lubricate, clean, service or adjust machinery while it is moving. Keep hands, feet and clothing clear of power driven parts and in running nip-points. Disengage all power and operate controls to relieve pressure.
Stop the engine, implement the lockout and tag out procedure and allow the machinery to cool before carrying out any maintenance.
Whenever maintenance or service is being carried out a minimum of two (2) persons should be present at all times. NEVER WORK ALONE.
Keep all parts in good condition. Ensure that all parts are properly installed. Fix damage immediately.
Replace worn and broken parts. Remove any build up of grease, oil and debris.
Never attempt repairs or adjustments to the machine while it is running unless specified to do so.
Disconnect the battery ground cable before making adjustments on electrical systems or welding on machinery. For the execution of maintenance work, tools and workshop equipment adapted to the task on hand are absolutely indispensable.
Remove only guards or covers that provide access. Wipe away any excess grease and oil. Never leave guards off or access doors open when unattended. Keep bystanders away if access doors are open.
When working beneath raised equipment, always use blocks, jack-stands or other rigid and stable supports. Make sure that any part of the machine raised for any reason is prevented from falling by securing in a safe reliable manner. Never work under unsupported equipment.
For carrying out overhead assembly work always use specially designed or otherwise safety, such as ladders and working platforms. Always use any walkway/platforms provided or a safe and secure platform approved by the regional safety enforcing authority.
When working at height make sure you take all necessary precautions in line with local regulations and use approved PPE, safety harnesses and work platforms. If you are not aware of working at height requirements speak to your manager before beginning any work. Do not use any unauthorized or unsafe structures or platforms.
Wear proper Personal Protection Equipment (PPE) during machine maintenance.
The machine must come to a complete stop before proceeding.
Never perform maintenance or repairs when the machine is running.
Make sure that the machine is locked and tagged out. Test the machine; it should not start.
Make sure that power source to the machine is also locked and tagged out.
Replace damaged parts immediately. Use only Terex authorized parts.
Inspect the wires and replace if necessary. Do not operate until doing so.
Take necessary precautions against fire hazards when welding on the machine.
Make sure that all fasteners have been properly secured.
Replace all removed guarding and make sure they are secure.
Make sure that any tools or parts have been removed from the machine before starting up.
Maintenance work on the machine cannot be completed in adverse weather conditions (ie. thunder and lightning, excessive precipitation, damaging wind or hail storms, during any localized moderate or severe weather alerts, or any other severe conditions that could make the machine unsafe for maintenance).

(2) Maintenance and Repairs During Operation

(a) Disposal of Parts and Consumables

Observe the adjusting, maintenance and intervals set out in these operating instructions, except where:
- Warning, horn, light, gauge or indicator calls for immediate action.
- Adverse conditions necessitate more frequent servicing.
Observe information on the replacement of parts and equipment. These activities may be executed by skilled personnel only.
Carry out maintenance and repair work only if the machine is positioned on stable and level ground and has been secured against inadvertent movement and buckling.
Never allow unqualified or untrained personnel to attempt to remove or replace any part of the machine, or anyone to remove large or heavy components without adequate lifting equipment.
To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting tackle and secured. Use only suitable and technically adequate lifting gear. Never work or stand under suspended loads.
Falling from and/or onto Terex machines can cause injury or even death. Do not climb on the machine while it is in operation. Never use machine parts as a climbing aid.
Beware of moving haulage and loading equipment in the vicinity of the machine.
The fastening of loads and instructing of crane operators should be entrusted to experienced persons only. The marshaller giving the instructions must be within sight or sound of the operator.
Any safety devices removed for setup, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work to ensure full working order.
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with Terex equipment includes such items as oil, fuel, coolant, filters and batteries, etc. Use leak-proof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain or into any water source. Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact.
Diesel fuel is highly flammable. Never remove the filler cap, or refuel, with the engine running. Never add gasoline or any other fuels mixed to diesel because of increased fire or explosion risks. Do not carry out maintenance on the fuel system near naked lights or sources of sparks, such as welding equipment or while smoking.
All hazardous materials must be disposed of and/or recycled in accordance with the end user's national regulations. This includes disposal of batteries, grease, electrical components, etc.
All electrical conductors must be severed to ensure that the equipment is inoperable prior to disposal.
Always ensure that any safety equipment, such as locking wedges, securing chains, bars or struts are utilized as indicated in these operating instructions.
After maintenance, tighten all bolts, fittings and connections. Install all guards, covers and shields. Replace or repair any damaged ones.
Refill and recharge pressure systems with recommended fluids. Start the engine and check for leaks.
Operate all controls and make sure the machine is functioning properly. After testing, shut down, check the work you performed.

(b) Gas, Dust, Steam, Smoke

Death, serious injury or delayed lung disease may result from breathing dusts that are generated when certain hazardous materials are crushed, screened or conveyed with this equipment.
Always operate internal combustion engines and fuel operated heating systems only out of doors or in a well-ventilated area. Before starting the machine in enclosed areas, make sure that there is sufficient ventilation.
Observe the regulations in force at the respective site.
Dust found on the machine or produced during work on the machine should be removed by extraction, not blowing. Dust waste should be dampened, placed in a sealed container and marked, to ensure safe disposal.
When dusts are generated by the operation of this equipment, use approved respiratory protection, as required by Federal, State and Local safety and health regulations.
Carry out welding, flame cutting and grinding work on the machine only if this has been expressly authorized, as there may be a risk of explosion and fire.
Before carrying out welding, flame cutting and grinding operations, clean the machine and its surroundings from dust and other flammable substances and make sure the premises are adequately ventilated as there may be a risk of explosion.
Ensure operators wear a suitable face mask where exposed to possible harmful effects of air pollution of any kind.

(c) Hazardous Substances

Ensure that correct procedures are formulated to safely handle hazardous materials by correct identification, labeling, storage, use and disposal.
All hazardous materials must be handled strictly in accordance with the manufacturers instructions and all applicable regulations observed at all times. Store hazardous materials in restricted access areas and mark them clearly.

(d) Disposal and Decommissioning

All hazardous materials must be disposed of and/or recycled in accordance with the end user's national regulations. This includes the disposal of batteries, grease, electronic components, etc.
All electrical conductors must be severed to ensure that the equipment is inoperable prior to disposal.

(e) Noise Levels

The highest continuous noise levels recorded for this equipment were measured at 123 db (A) and 108 db (C), with a guranteed power noise level of 105 db. Subsequently, hearing protection must be worn when operating this machine or in the vicinity thereof.
High noise levels may cause loss or degradation of hearing over a period of time.
Always ensure that operators are provided with approved ear protection and that these are worn at all times when the machine is operating.

(f) Operating Temperature Range

The normal operating temperature range of the machine is from +14 °F to +104 °F (-10 °C to +40 °C). For use in temperatures outside this range, contact your local dealer or Terex for details. If high or low ambient temperature conditions apply, specific details can be advised at the time of order as special equipment could be necessary. Appropriate oil and coolant to suit the local conditions must be used as specified elsewhere in this manual. For more information, see Lubrication.

(g) Humidity

Operating the machine in high humidity may effect engine and/or machine performance. In order to help ensure the maximum expected performance and life, appropriate fluids should be used. For more information, refer to Lubrication, or the provided CAT engine manual.

(3) Fire Safety

Always have a fire extinguisher(s) and/or water available when operating the machine.
Make sure all personnel working with the machine are properly instructed on use of a fire extinguisher.
Routinely inspect the fire extinguisher to maintain its proper operation.
Inspect the hydraulic hoses for leaks or damage and replace as necessary.
Inspect the electrical wiring for wear or damage and replace or reroute wiring as necessary.
Check battery cables to ensure proper connection and examine for frayed or damaged insulation.
Do not allow moving components to contact metal surfaces; this can rapidly create friction heat.
Make sure the bearings are functioning properly and are lubricated according to the Lubrication Schedule. Bearings that fail can reach critical temperatures and may cause a fire.
Do not feed metal objects into the machine. Metals can reach temperatures high enough to ignite fires.
Flammable liquids, chemicals, or other combustible objects must be properly stored or disposed of.
Do not allow debris to collect near dangerously hot areas, such as the engine.
Clean the machine daily with pressurized air and water after shutdown.
Establish proper maintenance programs to prevent fires and to keep the machine running properly.

(a) Fire Extinguisher

It is extremely important that a fire extinguisher is on hand and in proper working order. Terex is not responsible for its maintenance. It is the owner's responsibility to ensure proper training of all personnel on its use, and that the extinguisher is maintained in accordance with OSHA 29 CFR 1910.157.

(b) Espar Engine Heater

Your machine may be equipped with an optional Espar Engine Heater. If equipped, please see the warning below.

⚠ WARNING

There is a potential fire hazard with Espar heaters. It is the responsibility of the customer to ensure the area around the heater is clear of built-up debris. Terex cannot be responsible for any fires that occur.

(4) Questions

If there are any questions regarding fire prevention, please contact Terex.

2.9 Emergency Stop Locations

Emergency stops are located at both the left hand side and right hand side of the machine. Refer to the graphic below for an their approximate locations.

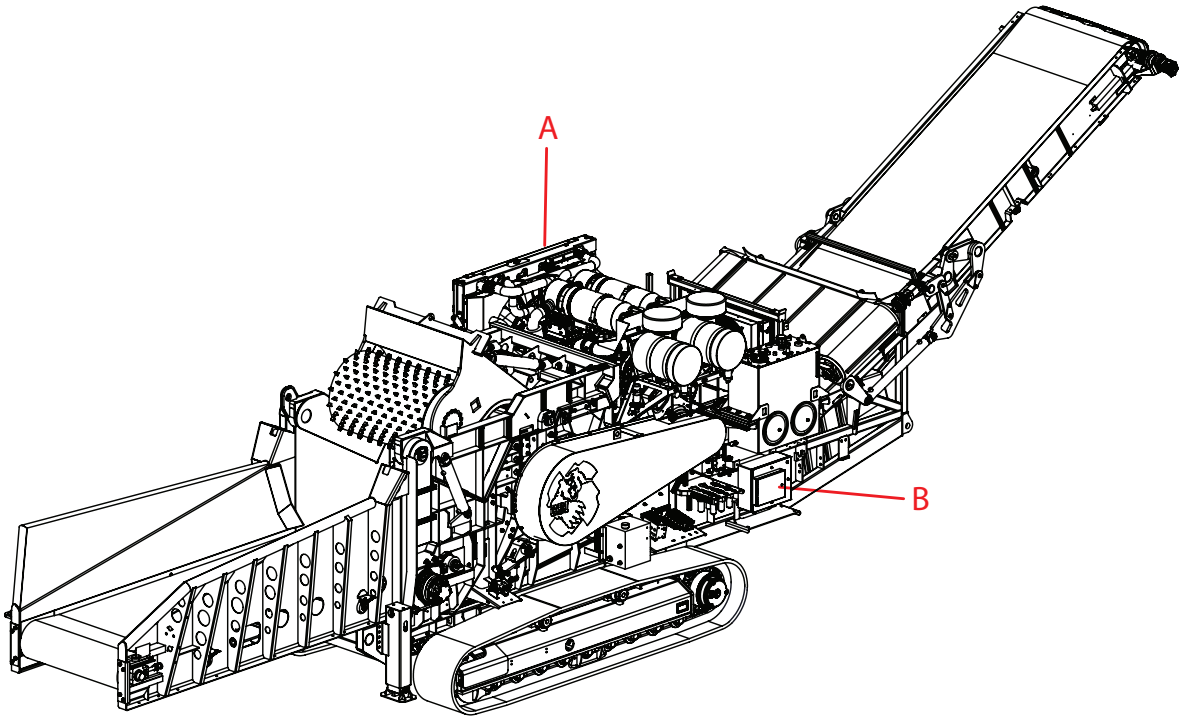


Figure 2.4 - Emergency Stop Locations

Emergency Stop	Location
A	Not shown; e-stop is to the right of the ladder underneath the radiator
B	E-stop is on the control panel

2.10 Danger Zones

(1) Operating Zone

Your machine is a complex piece of equipment that can pose hazards to anyone within range of it during operation. The range at which the machine poses a general hazard is referred to as the operating zone. The purpose of this section is to familiarize operators with the operating zone of the machine.

- The operating zone is the area surrounding the machine a distance of 100 feet (31 meters).
- Do not enter the operating zone at any time while the machine is in operation.
- Do not allow any personnel to enter the operating zone any time the machine is in operation.
- The operating zone may only be entered after machine has been returned to a safe state.

(2) Hazard Areas

There are several areas of your machine that pose specific hazards and need special attention. These hazard areas are illustrated in Figure 2.5 with a brief description of the nature of the hazards below. Failure to use adequate caution when dealing with hazard locations may result in severe injury or death.

Component	Hazard	Reference
Feed Conveyor	Never operate the machine with personnel in range of the feed conveyor. Wood chips or residual debris may eject out the infeed at high velocities any time the rotor is spinning, even if material is not being fed into the machine. Stay back 100 feet (31 meters) from the feed conveyor.	Figure 2.5 / A
Infeed/Top Feed Roll	Never operate the machine with personnel in range of the infeed. Wood chips or residual debris may eject out the infeed at high velocities any time the rotor is spinning, even if material is not being fed into the machine.	Figure 2.5 / B
Discharge Conveyor	Never operate the machine with personnel in range of the discharge conveyor. Wood chips or residual debris may be ejected out of the discharge any time the discharge is operating. Stay back 100 feet (31 meters) from the discharge conveyor.	Figure 2.5 / C

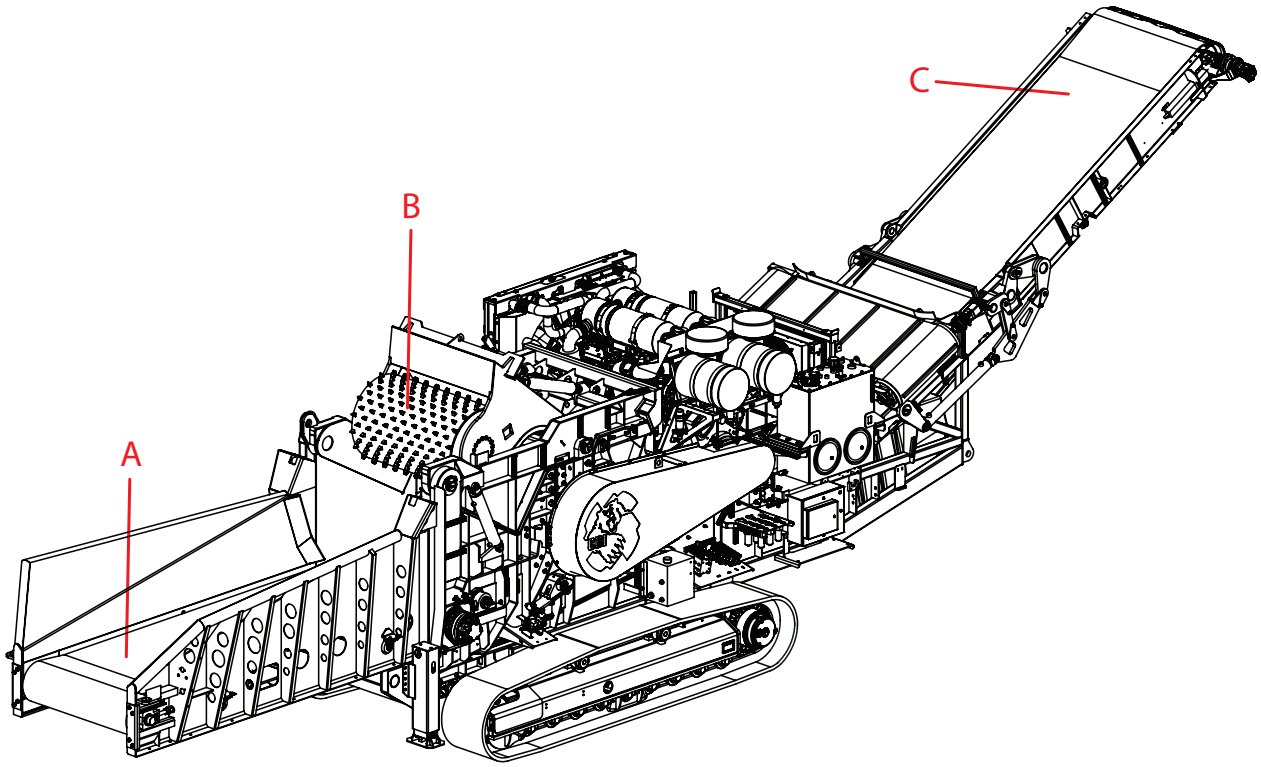


Figure 2.5 - Machine Hazard Areas

2.11 Lockout / Tagout

(1) Lockout/Tagout Basics

Lockout/Tagout (LOTO) refers to specific practices and procedures to safeguard employees from the unexpected release of energy or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities. The following is a procedure for deactivating and then reactivating equipment before and after service.

(2) Deactivating Equipment and LOTO Procedure

When servicing or maintenance is required, the machine must be deactivated. Use the following procedure to deactivate and perform a lockout/tagout on the machine.

PROCEDURE

Step	Action
1	If the machine or equipment is operating, shut it down using the normal stopping procedure. Wait for rotor to stop turning and verify that rotor is not moving before proceeding.
2	Notify affected personnel that servicing or maintenance is being performed and that the machine must be deactivated.
3	Depressurize all stored power. Stored or residual energy (such as that in capacitors, springs, cylinders, elevated machine members, rotating flywheels, moving parts, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc. Be familiar with your equipment to know where stored energy may be present. Install all mechanical chocking devices after depressurization.
4	Use a piece of wood to wedge the rotor to prevent it from spinning during maintenance.
5	Move engine battery disconnect switch key to Off (Figure 2.6 / B) and remove the key. Close the door (Figure 2.6 / A) and place a padlock (Figure 2.7 / C) through the hasp (Figure 2.7 / B) and lock the door (Figure 2.7 / A) securely.
6	Ensure that the equipment is disconnected from the energy source. First, check that no personnel are exposed, and then verify the isolation of the equipment by activating the normal operating controls. Check for engine operation; equipment should not operate.
7	Always test to make certain the equipment will not operate. The machine or equipment is now locked out.

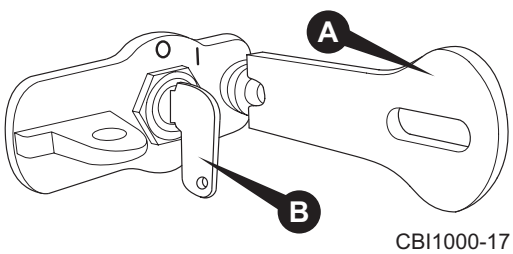


Figure 2.6 - Engine Battery Disconnect Switch Door and Key

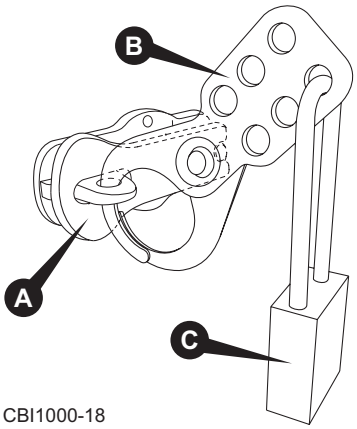


Figure 2.7 - Install Lockout/Tagout Hasp

(3) Depressurizing

Before removing any hydraulic lines from components, perform the following steps to manually relieve any residual pressure. Slowly loosen swivel fittings on all hose ends and allow a slow leak before fully removing hose from fitting.

(a) Depressurizing a Counterbalance Valve

Step	Action
1	Move function to stow position and chock if applicable.
2	Measure the distance from the top of th set screw (Figure 2.8 / B) to the jam nut (Figure 2.8 / A).
3	Slowly loosen jam nut on counterbalance valve cartridge (Figure 2.8 / C).
4	Slowly turn in set screw on counterbalance valve cartridge.
5	Once bottomed out, wiggle set screw up and down for 5 seconds.
6	If the valve has more than one cartridge (as shown in Figure 2.8), complete steps 2 through 5 on second cartridge before removing first cartridge.
7	With a cloth over the hex, slowly remove cartridge(s).

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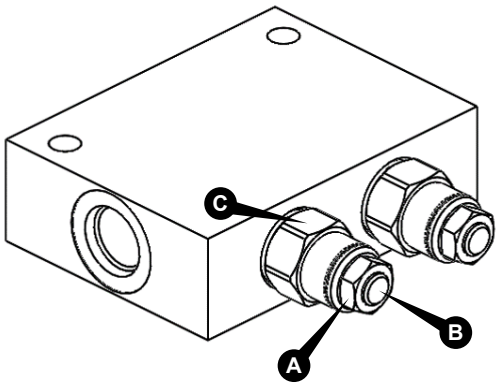

Figure 2.8 - Counterbalance Valve

(b) Depressurizing Cylinder and Motor Circuits

Step	Action
1	Move function to stow position and chock if applicable.
2	If a counterbalance valve is present in the circuit, follow the counter balance valve depressurization procedure before continuing.
3	Manually override the stackable valve to depressurize belt engage function by pressing in the button on the end of the valve (Figure 2.9 / A).
4	Manually override the service roll check valve to depressurize the top feed roll cylinders by pressing in the button on the end of the valve (Figure 2.10 / A).
5	Manually operate the levers up and down on the manual control valves (Figure 2.11) to other functions.

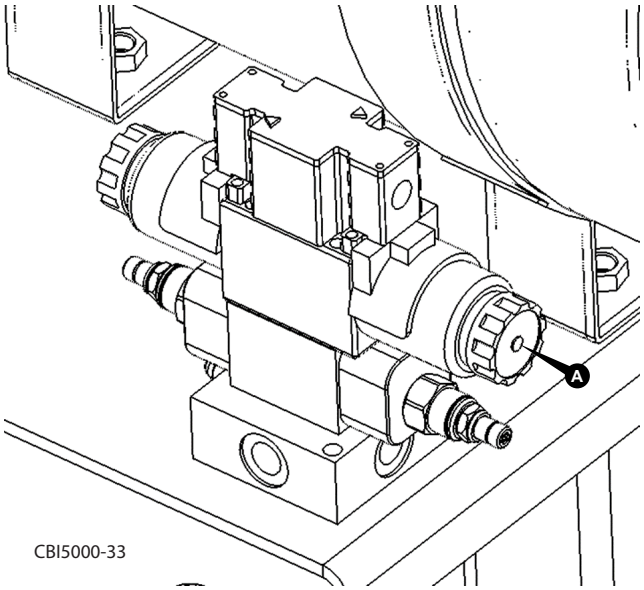

Figure 2.9 - Belt Engage Valve Manual Override

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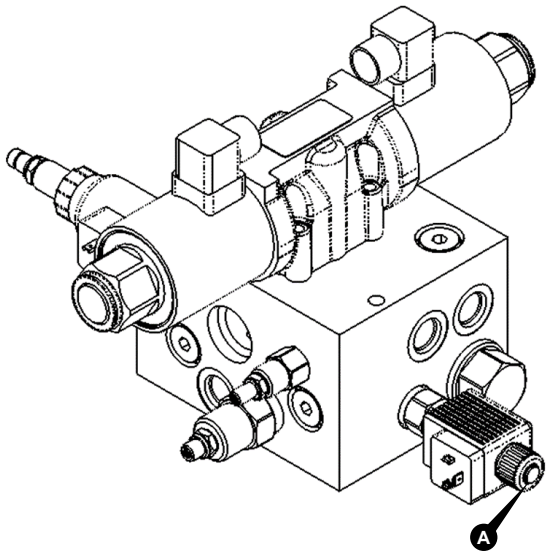

Figure 2.10 - Service Roll Check Valve Manual Override

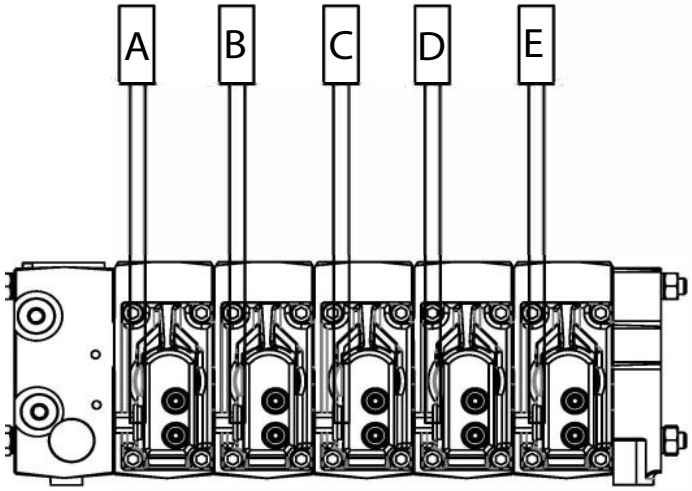

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Figure 2.11 - Manual Control Valves

(4) Power Restoration and Returning Equipment to Service

(a) Reassemble Counterbalance Valve

Step	Action
1	Insert cartridge(s). Torque to 35 ft-lbs (Figure 2.8 / C).
2	Return the set screw (Figure 2.8 / B) to the distance measured to the top of the jam nut (Figure 2.8 / A).
3	Tighten the jam nut and confirm the measurement from the top fo the set screw to the top of the jam nut.
4	Repeat steps 2 through 3 if there is more than one cartridge.

(b) Restarting the Engine

When the servicing or maintenance is completed and the machine is ready to return to normal operating condition, use the following procedure.

PROCEDURE

Step	Action
1	Check the machine and the immediate area around the machine to ensure that non-essential items have been removed and that the machine or equipment components are operationally intact.
2	Check the operational area to ensure that all personnel have been safely positioned or removed from the area.
3	Verify that the controls are in neutral.
4	Remove the lockout tag, hasp, and padlock from the main power switch. The removal of some forms of blocking may require re-energizing the machine before safe removal.
5	If raised, lower the upper hog box and top feed roll. For more information, see Opening and Closing the Hog Box.
6	Once the upper hog box and top feed roll have fully lowered, the machine is ready for operation.
7	Notify affected personnel that the servicing or maintenance is completed and the machine is ready for use.
8	Open the engine battery disconnect switch door and insert the battery switch key. Turn the switch to the On position. At the control panel, turn the control panel key one click. Press the Reset button. Don’t start the engine.

⚠ WARNING

Exercise caution when restarting the engine, as the rotor will engage. Ensure all personnel are clear from the rotor.

Step	Action
9	Turn the key to the Start position to start the engine.

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3 Technical Description

3.1 General Information

Every effort is made to supply equipment as specified, but we reserve the right, where necessary, to amend specifications without prior notice as we operate a policy of continued product development.

It cannot be guaranteed that the plant meets any specific requirements in respect to noise or vibration levels, dust emissions, or any other factors relevant to health and safety measure or environmental protection needs.

The technical data given in this chapter are given as approximations for reference only.

3.2 Machine Component Specifications

(1) Machine Type/Model

Machine	Horizontal Grinder/Chipper
Type	CBI 6400CT

(2) Powerpack

Engine	CAT C-27; 1050 HP (787 kW), diesel
Gearbox	PT Tech HPTO15
Fuel Capacity	500 gallons (1,892.7 liters)
Control System	Parker IQAN, variable speed, remote control operated

(3) Discharge Conveyor

Length	60” wide discharge belt with mechanical splice, non-magnetic head pulley
Height	15’-9” (4.80 meters)

(4) Infeed

Opening	34” high x 60” wide (.86 meters x 1.52 meters)
Conveyor	15’-6” long with heavy-duty belting (4.72 meters)

(5) Drive Components

Fan	Reversing pitch radiator fan that reverses airflow automatically
Drive	8-V section Arimid belt with guarding
Feed Wheel	40” diameter x 60” wide (1.02 meters x 1.52 meters)

(6) Tracks

Tracks	500 mm triple grouzer

(7) Rotor

Rotor	40” diameter x 60” wide segmented grinding rotor (solid steel) (1.02m x 1.52m)
Shaft	8” shaft (20cm) (major diameter)

(8) Hydraulics

Type	Hydrostatic
Hydraulic Tank Capacity	110 gallons (416.4 liters)

(9) Transport Dimensions

Length	43’-9” (13.34 meters)
Width	9’-10” to 10’-9” (2.98 meters - 3.28 meters) Depending on options
Height	12’-0” (3.65 meters)
Weight	90,000 - 104,000 lbs (approximately) Additional options selected below may increase weight.

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4 Machine Description

4.1 Component Identification

This section identifies the main components of the machine and the term with which they are referred to in this manual.

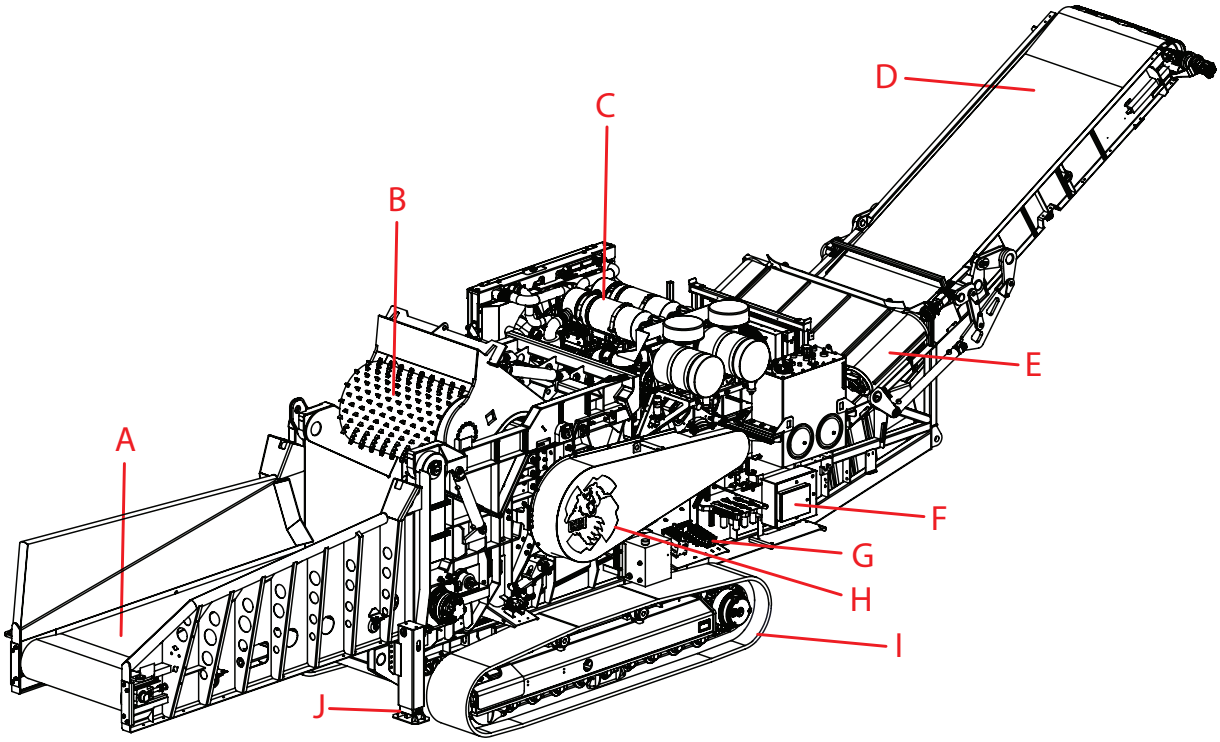

Figure 4.1 - Machine Components

Item	Component	Description
A	Feed Conveyor	The purpose of the feed conveyor is to feed material into the infeed. Metals should be avoided.
B	Infeed/Top Feed Roll	The infeed/top feed roll assists the fed material into the rotor.
C	Engine	The CAT engine powers the machine. Engine components can be accessed from climbing the ladder between the radiator and discharge conveyor.
D	Discharge Conveyor	The discharge conveyor ejects material from the machine.
E	Magnet	The overband magnet is an optional feature that helps to eliminate any metal contaminants that have passed through the infeed.
F	Control Panel	The Parker IQAN MD4 control panel interface enables users to interact with the machine. A separate remote control is also provided as an alternative way to interact with the machine.
G	Manual Control Valves	The manual control valves can be used to control the hog box and discharge conveyor.
H	Belt Guard	The belt guard protects the drive belts, which are a vital component of the drive system. The belt guard can be removed to perform maintenance on the drive belts.
I	Tracks	The tracks enable the portable machine to be moved/ transported.
J	Outriggers	

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5 Operation

5.1 Introduction

The following section is arranged to guide the operator through the steps taken to operate the machine. Read this section through and understand it from beginning to end. Procedures given in this section are basic and are expanded upon as the operator becomes more knowledgeable about the machine and its capabilities. The purpose of this section is to act as a starting point of which to base your operators training program and it does not constitute a complete operators training program in itself. Never operate a machine until you fully understand its capabilities and limitations.

⚠ WARNING

Always wear eye, head, hand, foot and hearing personal protective equipment (PPE) when operating the machine. Additional PPE may be required such as respiratory equipment and/or reflective vest.

Prior to machine start-up, the operator must walk around the machine to ensure there are no personnel and/or unwanted objects in any of the dangerous locations on the machine. For more information, see Section 2.10 Danger Zones.

5.2 Operating Procedures

(1) Normal Machine Startup

PROCEDURE

1. To start up the machine, perform a visual inspection of the machine and look for any worn or damaged parts.
2. Perform all pre-start-up inspections and required start-up maintenance.
3. Ensure that all personnel are clear from the machine.
4. Turn on the battery disconnect switch to the ON (or 45 °) position.
5. Go to the control panel and turn the start key to the RUN (or vertical) position.
6. Wait for about 5 seconds for the controller to boot up, then the STARTUP MENU will be visible.
7. Press the RESET pushbutton; it should illuminate blue.

1 If the lamp does not stay illuminated when released then the machine is not ready to start. One common cause of this is an emergency stop pushbutton being pressed. Check all emergency stop pushbuttons by pulling them out.

2 If the lamp does not stay illuminated when released and no emergency stop pushbuttons are pressed, then the machine may have a critical fault.

3 If the lamp does not illuminate while being pressed at all then the lamp may need to be replaced.

8. Turn and hold the key switch in the START (or right) position until the CAT engine starts. A warning alarm will sound for 5 seconds, then the engine will crank. Cranking can take an addtional 5 seconds.

» If the engine cranks but does not start, check:

- All emergency stops.
- Look for any fault messages on the MD4 display.
- If the CAT engine has an active fault there are two lights (located within the BASIC RUN MENU) to indicate the fault codes.
- A yellow light will flash the active code number. Count the number of flashes and refer to the CAT engine manual for definitions.
- A red light will flash if there are fault codes active. If fault codes are active refer the CAT manual for further information.

9. Non-clutch-equipped machines will remove the tension from the drive belts by sliding the engine carriage forward. Once the tension is removed, the engine will start and you may release the key. The engine will then slide back, re-tension the drive belts, and engage the rotor.

⚠ WARNING

On non-clutched machines the rotor automatically engages after the engine is started. Always ensure it is safe to engage the rotor before starting the engine.

NOTICE

On all machines allow the engine to warm up for 15 minutes or until the engine temperature is over 145°F (62°C) before loading.

10. When the engine is started, go to the BASIC RUN MENU. This screen is not password protected and is used to get the machine ready for operation.

(2) Normal Machine Transportation

NOTICE

Remote image on screens may vary depending on machine.

1. Start up the machine by using the Normal Machine Startup procedure.
2. Once the MD4 boots up and the STARTUP MENU appears, navigate to the TRANSPORT MENU (Figure 5.1).

Figure 5.1 - Navigate to the Transport Menu

3. Once in the TRANSPORT MENU, press the FOLD DISCHARGE CONVEYOR button (Figure 5.2). Once the discharge is folded, the TRACK MODE button will be highlighted in green. Ensure the Discharge Conveyor is fully in the folded postion before enabling TRACK MODE.

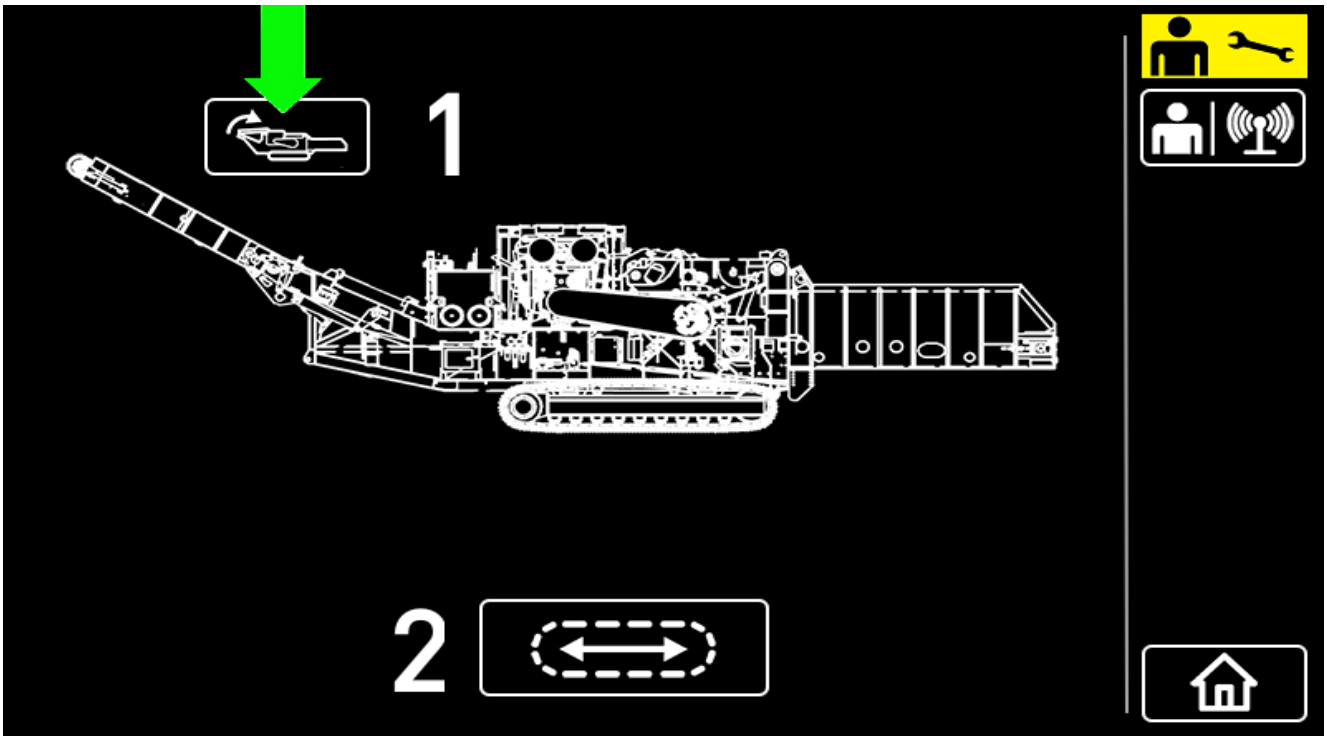


Figure 5.2 - Fold Discharge Conveyor

4. Still in the TRANSPORT MENU, press the TRACK MODE button (Figure 5.3) to enable TRACK MODE.

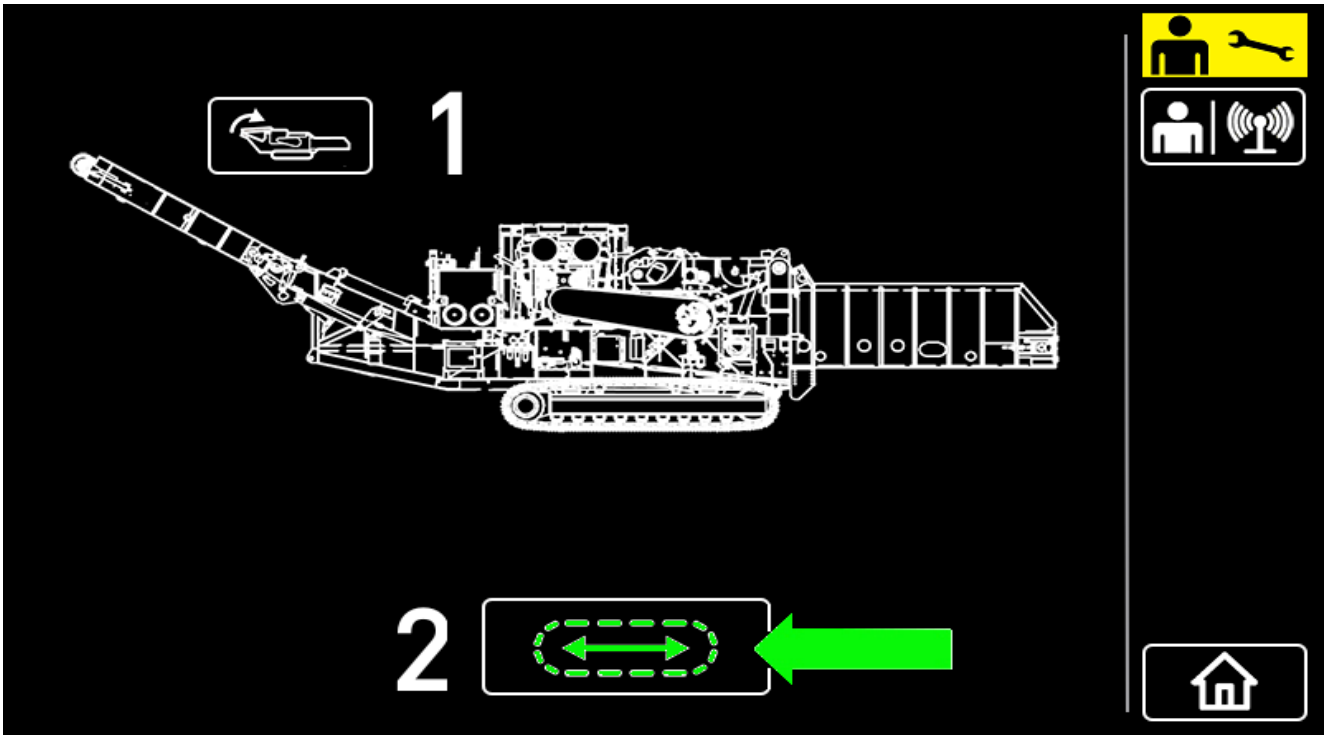


Figure 5.3 - Enable Track Mode

5. Perform a safety check. Walk around the entire machine to ensure no personnel are in range of the machine (Figure 5.4). Press the check-mark in the bottom right corner to proceed once the safety check has been done.

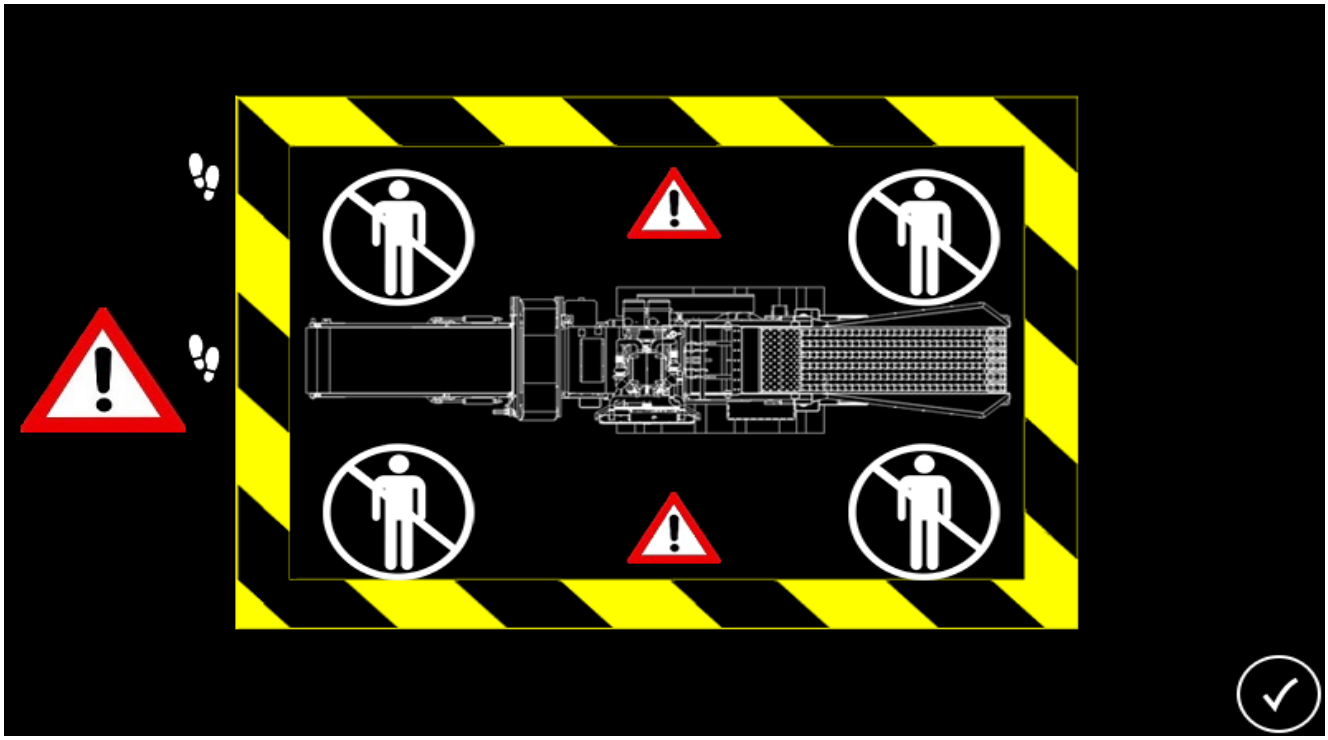


Figure 5.4 - Perform a Safety Check by Walking Around the Machine

6. Grab the remote from the control panel enclosure and power it on by ensuring the emergency stop is not pulled and momentarily pressing the ON-OFF button. (Figure 5.5).

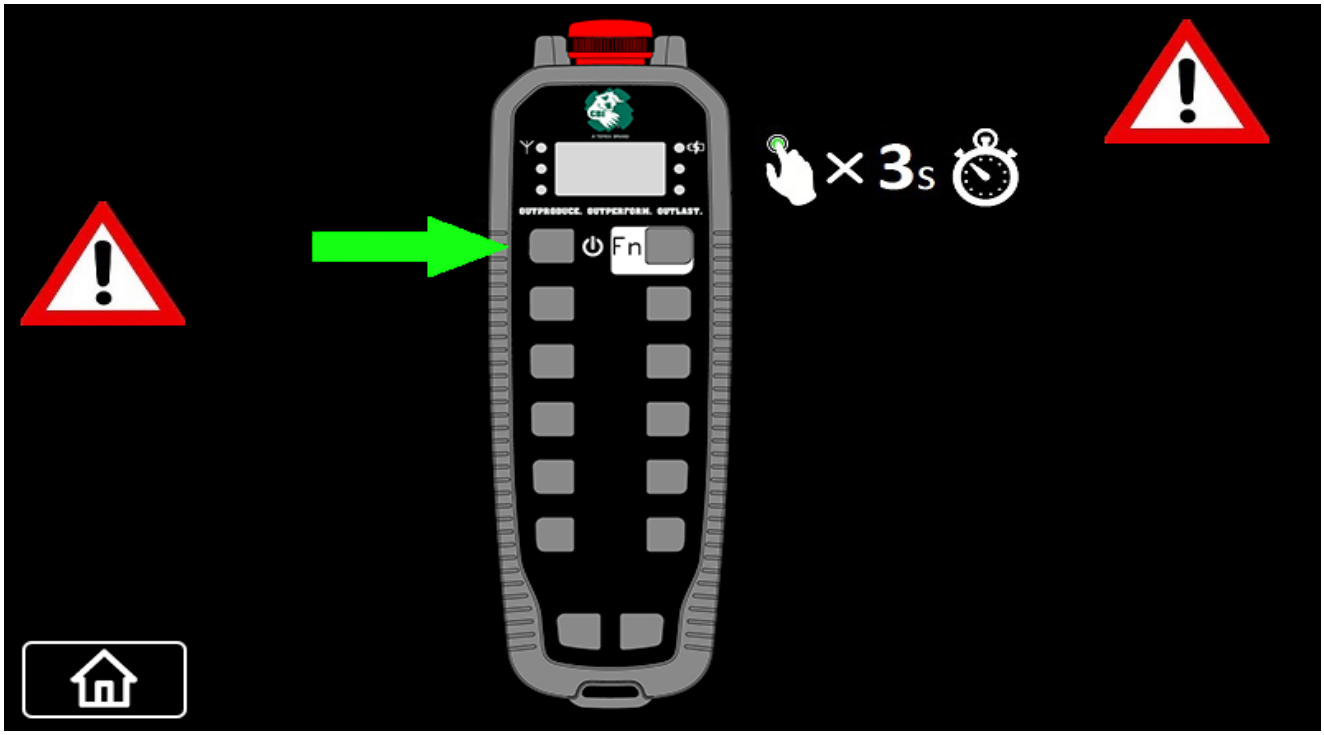


Figure 5.5 - Turn On Remote Control

7. If the machine is not in radio mode, it must be put into radio mode. Turn the Local/Radio Mode switch to the right. (Figure 5.6).

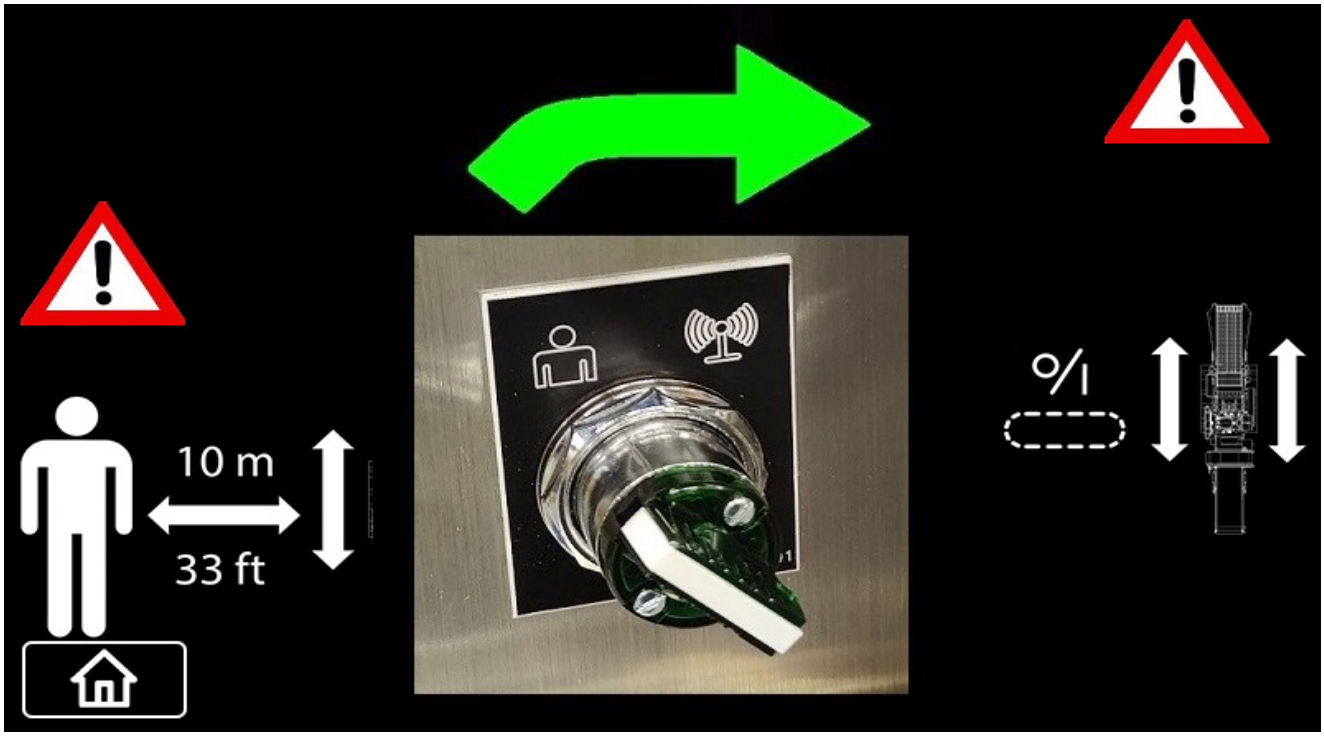


Figure 5.6 - Enter Radio Mode

8. Enable TRACK MODE on the remote by pressing and holding the FUNCTION and RUN MODE SCROLL buttons for three seconds (Figure 5.7). The track mode alarm will sound.

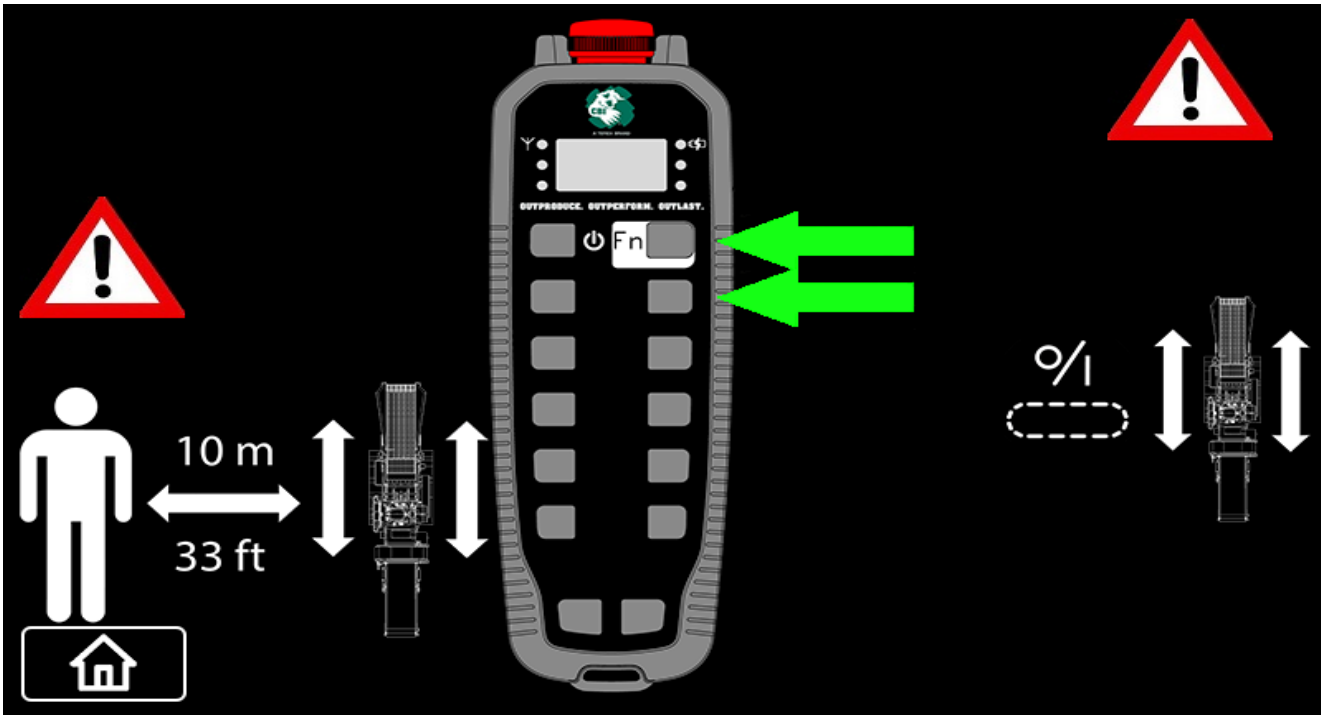


Figure 5.7 - Enable Track Mode on the Remote

9. Once the remote is in TRACK MODE, use the bottom four buttons to move the machine. (Figure 5.8).
   - a) Holding ROLL UP will move the left track forward and holding ROLL DOWN will move the right track forward. Holding both buttons at the same time will move the machine forwards.
   - b) Holding the bottom left button will move the left track in reverse and holding the bottom right button will move the right track in reverse. Holding both buttons at the same time will move the machine backwards.

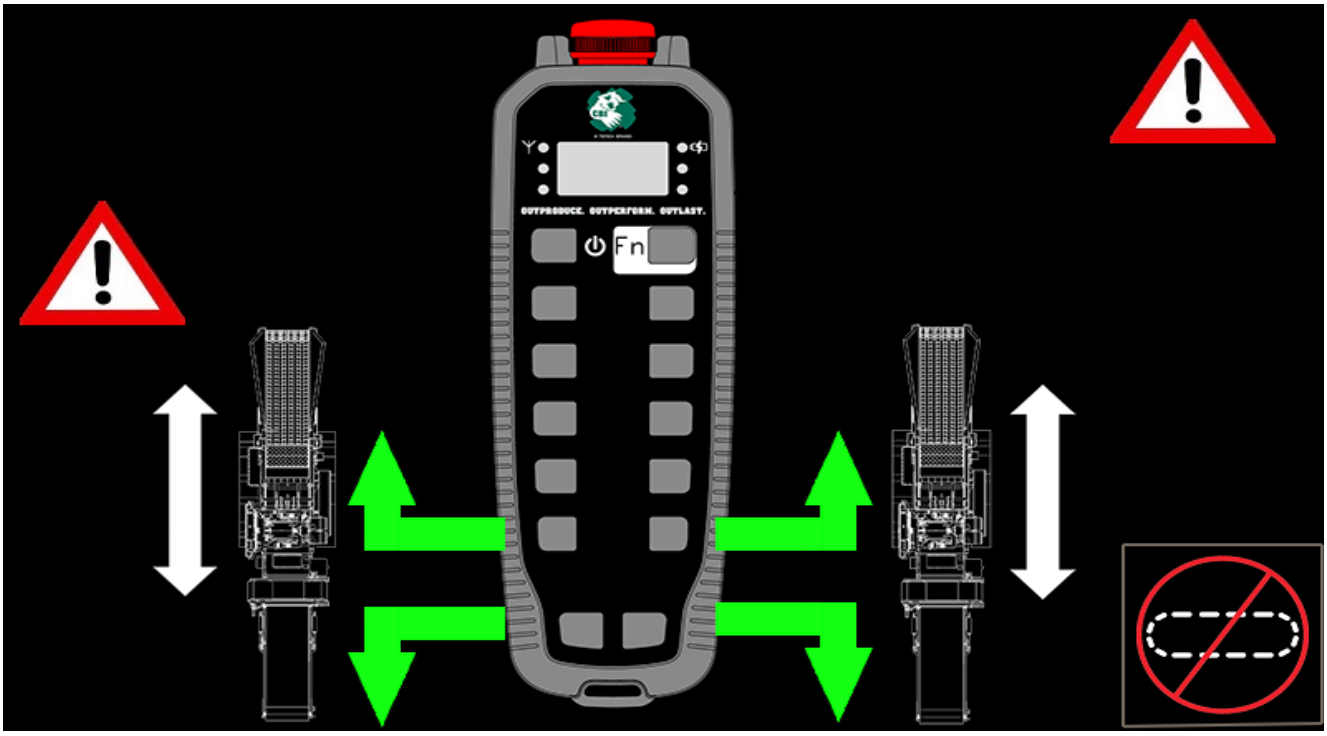


Figure 5.8 - Move Tracks

10. Once the machine is in the desired position, press the DISABLE TRACK MODE button in the bottom right corner of the screen (Figure 5.8).

11. Press and hold the FUNCTION and RUN MODE SCROLL buttons for one second to disable TRACK MODE (Figure 5.9).

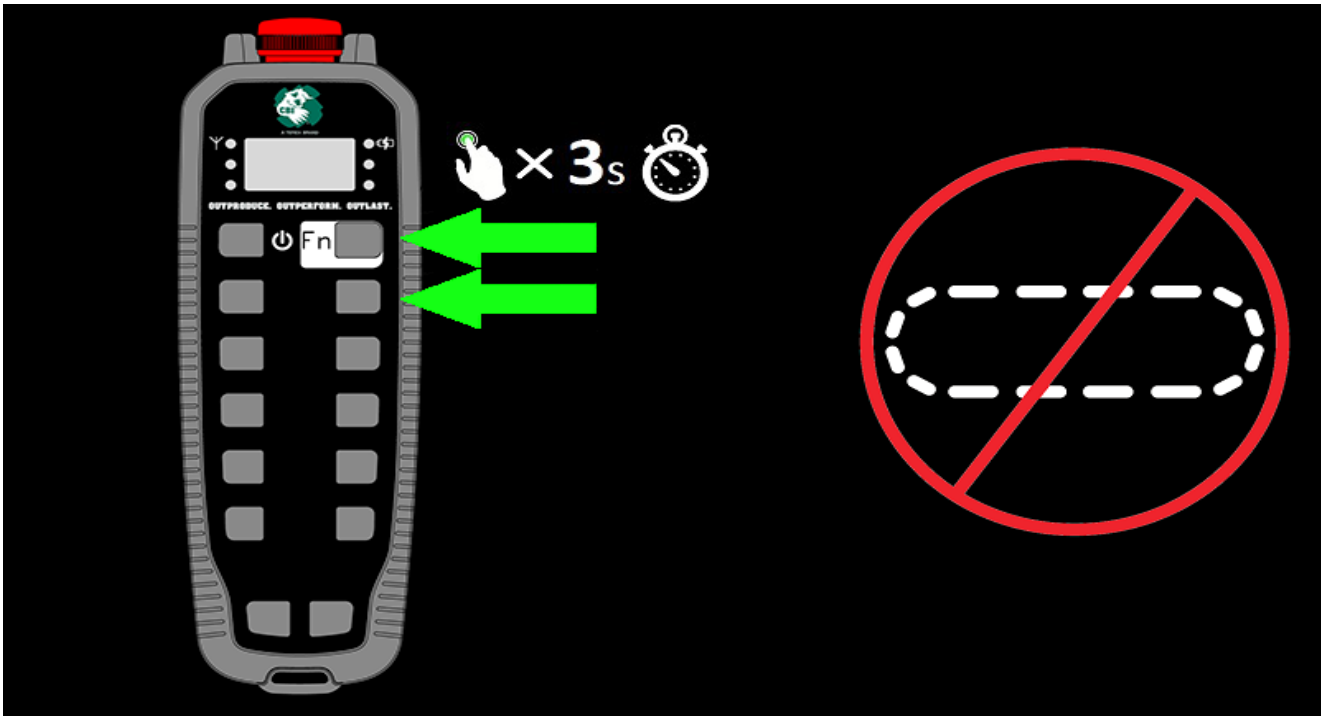


Figure 5.9 - Disable Track Mode on the Remote

12. Momentarily press the ON/OFF button to turn off the remote. (Figure 5.10).

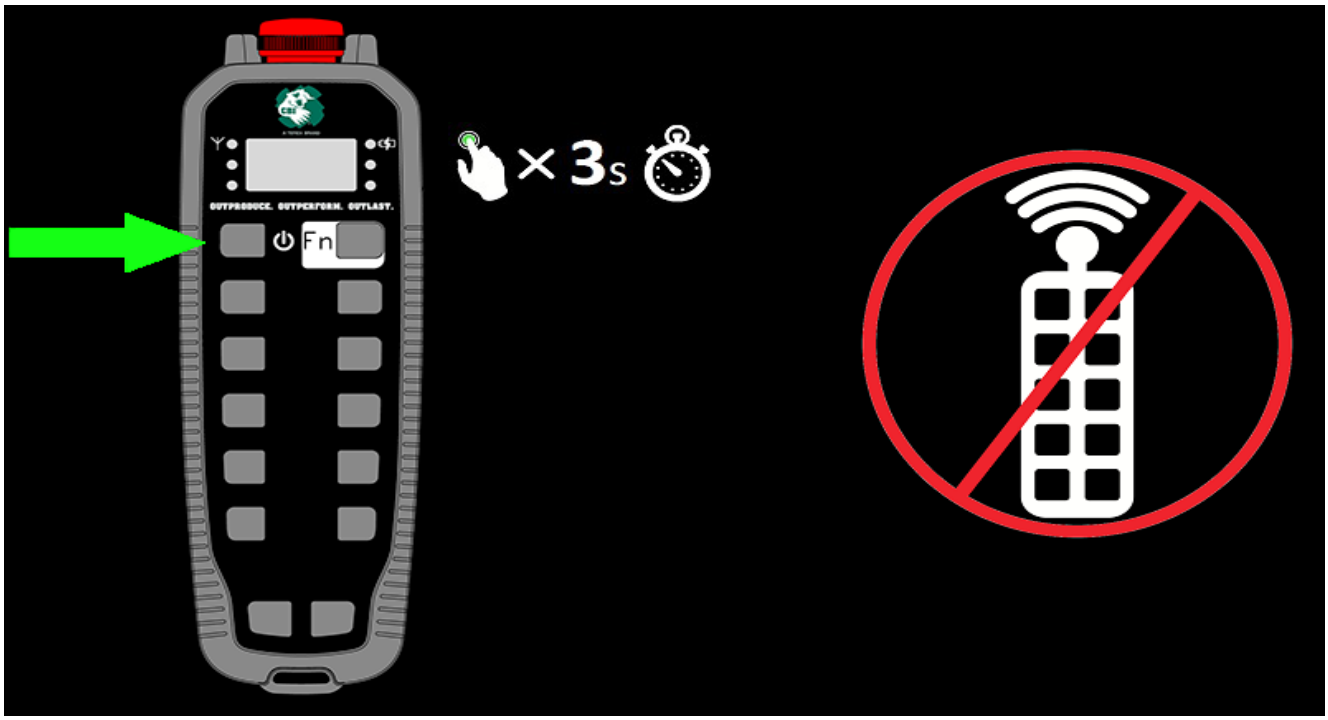


Figure 5.10 - Power Off Remote Control

13. When the remote is powered down, plug it into the provided charging cable in the control panel enclosure (Figure 5.11). Store the remote in the enclosure when not in use.

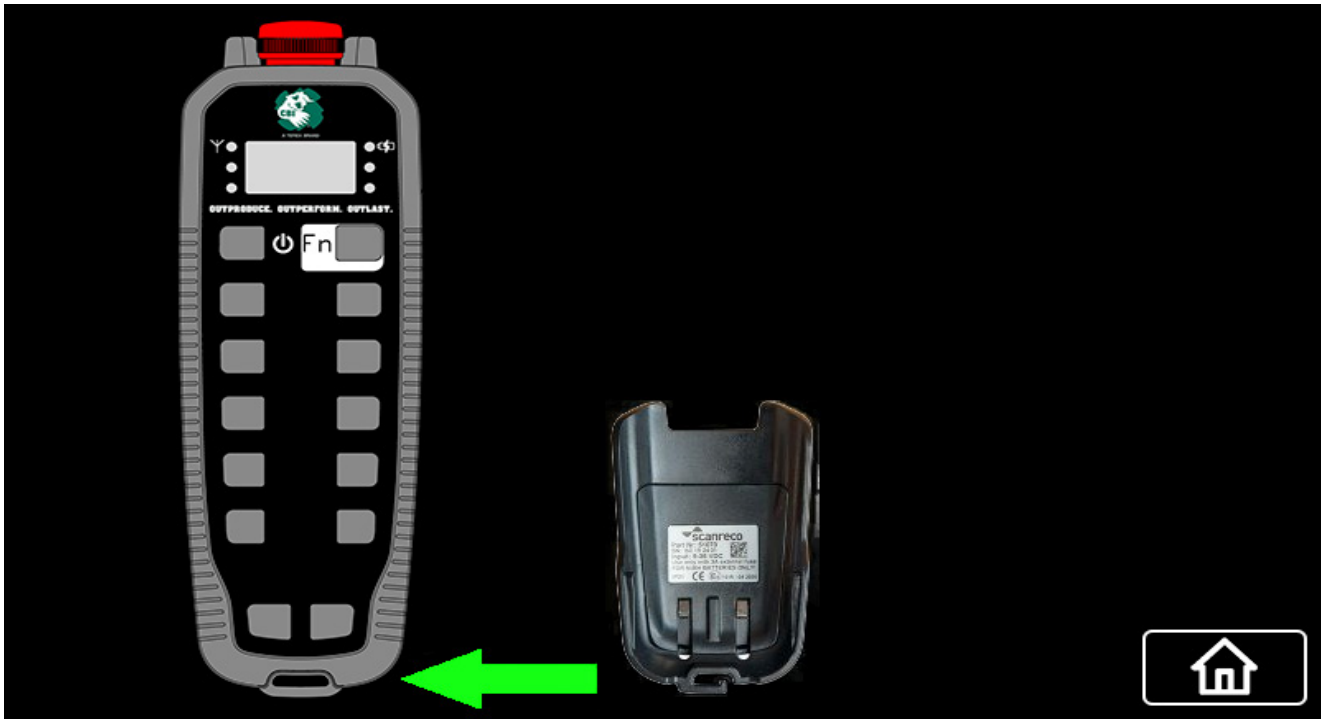


Figure 5.11 - Plug in Remote Control

14. Power down the MD4 by turning the key on the control panel to the OFF position.
15. Turn the battery disconnect switch to the OFF (or vertical) position.

(3) Normal Machine Operation

PROCEDURE

1. Once the machine has been warmed up it will then be ready for operation.
2. The machine is normally run in RADIO MODE, but it can be run locally from the MD4 as well.
   - In RADIO MODE, all of the machine functions run from the remote control.
   - In LOCAL MODE, all of the machine functions are run from the MD4. The remote radio is disabled.
   - It is recommended to run the machine in RADIO MODE to help keep all personnel clear of the machine when operating. Running the machine in LOCAL MODE should only be done as a backup and should only be performed by trained personnel.
3. Turn on the remote control by pressing the ON / OFF button on the remote and holding for three seconds. Please refer to Section 5.10 Remote Control for visual reference and more in depth information.
4. To put the machine into RADIO MODE, navigate to the BASIC RUN MENU and press the LOCAL / RADIO TOGGLE. This toggle will switch the machine between LOCAL MODE and RADIO MODE. This function is also available on some of the other screens.
5. If a clutch is equipped, Start the Discharge Conveyor by pressing the FUNCTION and ENG SLOW buttons on the remote or by pressing DISCHARGE TOGGLE on the BASIC RUN MENU.
6. If a clutch is not equipped, Start the Discharge Conveyor by pressing the FUNCTION and FEEDS REV buttons on the remote.
7. If a clutch is equipped, engage the clutch by pressing and holding the FUNCTION and E-STOP buttons for three seconds on the remote or by pressing CLUTCH TOGGLE on the BASIC RUN MENU.
8. Increase the engine speed by pressing and holding the ENG FAST button on the remote or by pressing ENGINE FAST on the BASIC RUN MENU until RPM is at the maximum.
9. Start the Feed Conveyor, Top Feed Roll, and Bottom Roll (if equipped) by pressing the FEED FWD button on the remote or by pressing the FEEDS FORWARD button on the BASIC RUN MENU.
10. You can now start feeding material in to the machine.
11. The following manual controls are available during grinding operations:
    - FEED REV reverses the Feed Conveyor and the Top Feed Roll for as long as it is pressed. The Bottom Roll (if equipped) will also stop at this time.

    » *Following FEED REV, it is necessary to press FEED FWD again to restart the Feed Conveyor, Top Feed Roll, and Bottom Feed Roll.*

    - ROLL REV reverses only the Top and Bottom Rolls (if equipped) for as long as it is pressed. The Feed Conveyor will also stop at this time.

    » *Following ROLL REV, it is necessary to press FEED FWD again to restart the Feed Conveyor, Top Feed Roll, and Bottom Feed Roll.*

    - ROLL UP raises the Top Feed Roll for as long as it is pressed. This is used when the Top Feed Roll is having trouble climbing over the material being fed into it.
    - ROLL DWN applies downward pressure to the Top Feed Roll. This is used to increase the grip of the Top Feed Roll if material is not feeding properly.

- Feed rates can be changed from the remote while the machine is running. Check Section 5.10 Remote Control to verify how to scroll through the four run modes.

(4) Normal Machine Shutdown

PROCEDURE

1. Stop loading material onto the Feed Conveyor, and allow for the material in the machine to be processed. Wait until the Discharge Conveyor is empty. Use the remote control for the following steps.
2. Press the FEED REV button to stop the Feed Conveyor, Top Feed Roll, and Bottom Feed Roll (if equipped) and wait for them to come to a stop.
3. Press the ENG SLOW button to bring the CAT engine to a low idle.
4. If a clutch is equipped, press and hold the FUNCTION and E-STOP buttons for three seconds to disengage the clutch. Then wait for it to come to a stop. The rotor will continue to turn for several minutes due to its inertia.
5. If a clutch is equipped, stop the Discharge Conveyor by pressing the FUNCTION and ENG SLOW buttons.
6. If a clutch is not equipped, stop the Discharge Conveyor by pressing the FUNCTION and FEEDS REV buttons.
7. If the machine is going to be moved:
   - If a clutch is equipped, enter TRACK MODE by pressing FUNCTION and ROLL REV for three seconds. Then fold the Discharge Conveyor by pressing FUNCTION and ENG SLOW.
   - If a clutch is not equipped, fold the Discharge Conveyor by pressing FUNCTION and ROLL UP
   - In both cases, do so until the conveyor is fully seated.
8. Go to the control panel and turn the key back to the OFF (or left) position.
9. Turn the battery disconnect switch to the OFF (or vertical) position.
10. Perform a lockout/tagout on the machine. For more information, see Section 2.11 Lockout/Tagout.
11. Perform the end of day cleaning and maintenance tasks. For more information, see 5.2.6 Cleaning the Machine and Section 5.2.7 Final Inspection.

(5) Clutch Brake Release

NOTICE

This section only applies if the machine is a 6400C Series.

1. Once the machine is free of all material, disengage the rotor.
2. Open the Hog Box. This process is detailed in Section 5.12a Opening the Hog Box.
3. Ensure that all safety stops are in place and turn the engine off.
4. With the engine off and the clutch brake release switch (Figure 5.12) turned on, a small electric pump will start. The switch will illuminate red to indicate the pump is on.

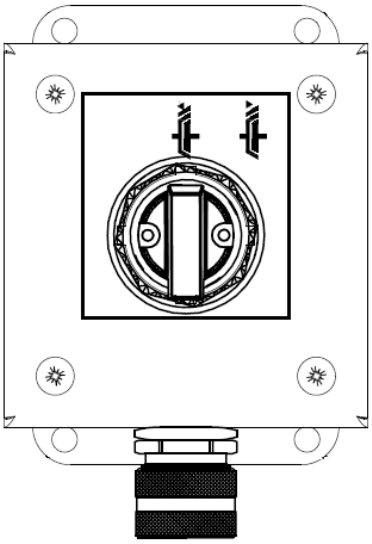


Figure 5.12 - Clutch Brake Release Switch

5. When the pump is running the clutch brake will be released and you should be able to turn the rotor by hand.
6. To reengage the clutch brake, simply turn the clutch brake release switch back the left.

⚠ WARNING

Extended use of the electric hydraulic pump can result in damage due to overheating. The electric pump should only be used during the intervals that it is needed, and no longer.

(6) Cleaning the Machine

It is important to keep your machine clean in order to maintain optimal performance and reduce the risk of a fire. The following is basic instruction for cleaning the machine and should not be considered complete; it is a minimum on which to build your own cleaning procedures. The machine should be cleaned on a daily basis following its operation.

NOTICE

Never aim a water hose at electrical components. If the lubrication is washed off any of the components, re-lubricate them according to the Lubrication Schedule.

PROCEDURE

1. Shovel Heavy Debris - Shovel all heavy debris off of the machine to remove the bulk of the material.
2. Blow Off Machine - Adhering to all pertinent safety precautions, use compressed air to blow residual debris off of the machine.
3. Wash Machine - Using water with a mild detergent, wash off all debris that remains after you blew the machine off. Washing can create additional mess; by washing the machine last you minimize the mud generated.

⚠ WARNING

Always use extreme caution when using pressurized water around sensitive electronic or mechanical components. Failure to comply may result in severe machine damage.

4. Scrape Machine - Persistent dirt can be scraped off using a putty knife. Excess grease can be removed using a clean rag.

(7) Final Inspection

At the end of the day a final inspection should be performed on the machine. The purpose of this inspection is to ensure the safety of the machine.

Check that the entire machine is switched off and secured against unintentional activation.
Store the remote control in the control unit and connect it to the charger.
Turn off the battery switch and remove the key. Store this key in the control enclosure.
Close the bracket of the battery switch and lock it using a padlock. Store this key somewhere safe.
Lock the large and small hatches of the control enclosure.

5.3 Maximum Angles of Operation

NOTICE

Fluids in hydraulic oil tank, fuel tank, and engine oil reservoir are all sensitive to machine angle positions. To maintain functionality and prevent machine damage, maximum angle positions shown below must not be exceeded.

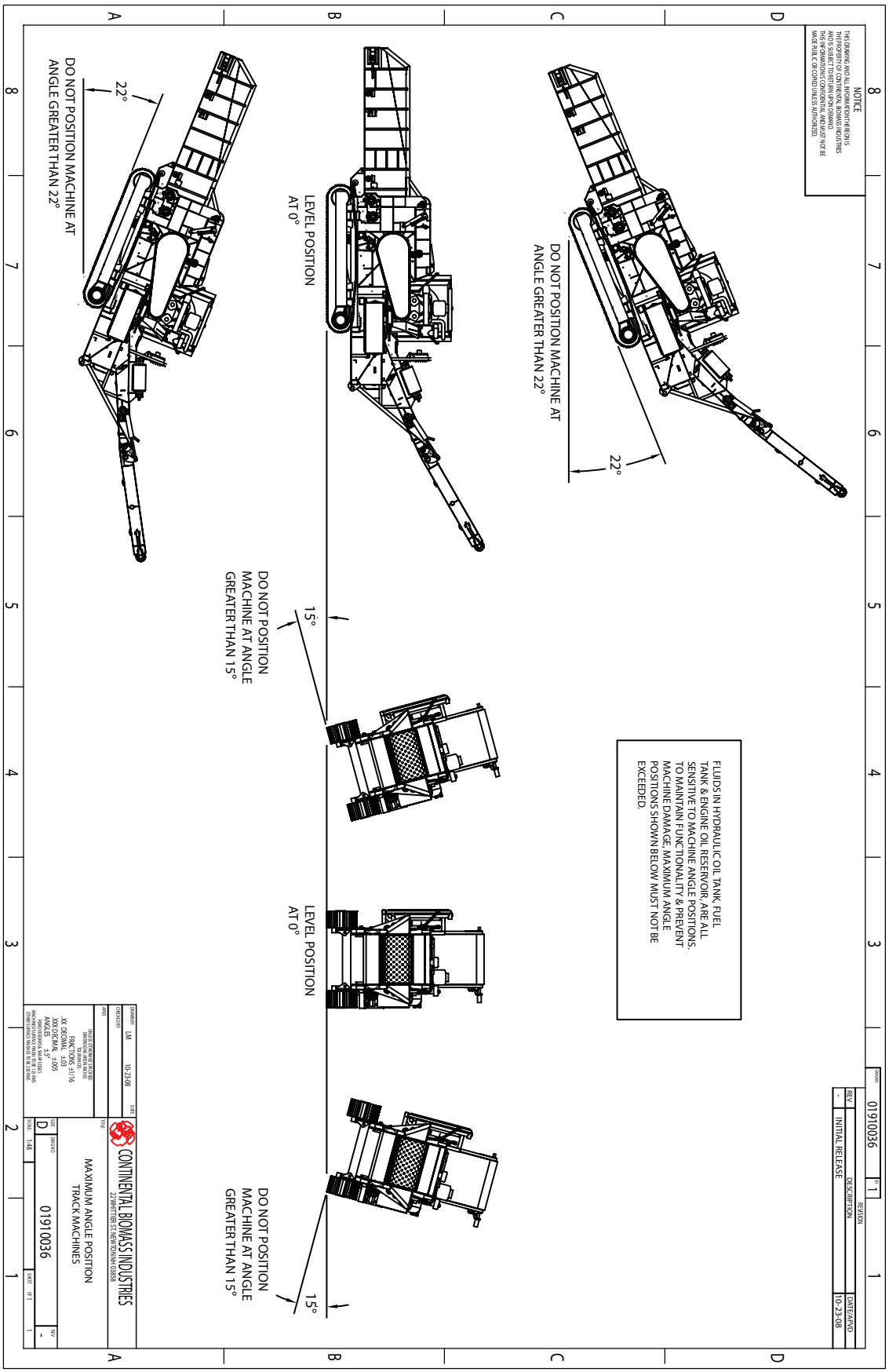


Figure 5.13 - Maximum Angles of Operation

5.4 Control Modes

Control modes allow certain features to be enabled or disabled depending on your specific needs. The following section details what the various control modes on your machine are, and under what conditions they should be used.

(1) Local Mode

Local mode is used when all the machine functions are going to be controlled from the control panel. When the machine is first turned on it will be in local mode by default. This mode is useful for controlling the machine while adjusting settings or running diagnostics.

(2) Radio Mode

Radio mode is used when all the machine functions are going to be controlled from the remote controller. To enter radio mode you must enable it from the control panel using the local/radio toggle. This mode is useful for regular operation of the machine or performing service when the operator is away from the control panel. For more information, see Section 5.10 Remote Control.

(3) Auto Mode

Auto mode enables all of the automated safety functions of the machine. When the machine is first turned on it will be in auto mode by default. This mode is used for all regular operation of the machine.

(4) Service Mode

Service mode disables all of the automated features on the machine and allows components to be controlled independently of one another. To enter service mode you must enable it from the control panel using the service/auto toggle. This mode should only be used for performing service on the machine that requires automated features be disabled.

Which control mode is currently enabled is changed in the control panel and displayed in the upper right corner of its display. This indicator has four states corresponding to Local Auto Mode, Local Service Mode, Radio Auto Mode, and Radio Service Mode.

			
Local Auto	Local Service	Radio Auto	Radio Service

⚠ WARNING

Never operate the machine in service mode as automated safety features will be disabled. Ensure conditions are safe prior to controlling any machine function. Failure to comply may result in severe machine damage or injury to personnel.

5.5 Automated Throughput-Performance Features

Built into the machine's electronic control system are a number of Automated Throughput-Performance Features. Their primary purpose is to increase the amount and quality of material throughput through the machine while minimizing operator input. The purpose of the following section is to familiarize operators with what automated features are on their machine, their function, and how to optimize them.

(1) Dynamic Feed Control

Dynamic Feed Control is a set of features that control when and how the feed system operates to maximize throughput by utilizing peak engine and rotor performance.

It is made up of four adjustable values:

Load Sense Recover		Symbols as shown on the MD4
Load Sense Trip		
Feed Reverse		
IntelliGrind™		

A significant engine RPM drop can indicate that the engine is being bogged down by the material being fed into the rotor. If the engine bogs down too much the engine will stall, dramatically decreasing throughput.

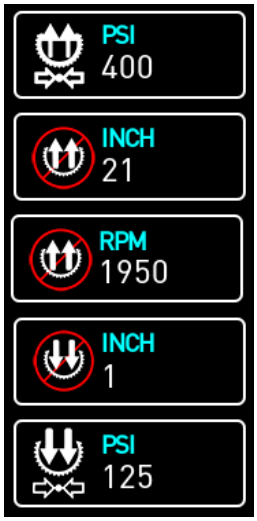
- Load Sense is one of the most important features for throughput performance. This feature works by stopping the feed system automatically when the engine speed falls below a certain RPM. That certain RPM is the Load Sense Trip setpoint. This stops adding additional load to the rotor and allows the rotor to process the current material and recover. This feature is necessary for ensuring the engine does not stall during extreme loading conditions. It can only be disabled by entering service mode.
- Load Sense Recover setpoint is an engine RPM setpoint that will re-enable the feed system after being paused by the Load Sense Trip Setpoint. Once the Load Sense Recover Setpoint is reached the feed system automatically resumes feeding.
- Feed Reverse setpoint is an additional measure that, when enabled, steps in when Load Sense is not enough. If the engine RPM drops to the Feed Reverse Setpoint then the feed system will reverse for a user-configurable amount of time. This is done in an attempt to get the material that is bogging down the engine out of the rotor and prevent that material from catching fire. Once the engine has recovered to the Load Sense Recover Setpoint the feeds will stop reversing and resume.

- IntelliGrind™ is an additional user-selectable feature designed to increase throughput with automated feed system speed adjustments. It is targeted at minimizing the number of times Load Sense and Feed Reverse have to be utilized, and thus reducing the number of times the feeds stop. The less time the feeds are stopped the higher the throughput of the machine. IntelliGrind™ works by slowing down the feed system based on engine RPM. The aggression setting of IntelliGrind™ changes how fast and intense the slowing of the feed system speed is in relation to commanded engine speed to actual. Typically the IntelliGrind™ Setpoint is above the Load Sense Trip Setpoint. Choosing the ideal IntelliGrind™ settings requires trial and error for each different material. IntelliGrind™ can be enabled, disabled, and configured in the Run Menu.

(2) Dynamic Top Roll Force

Dynamic Top Roll Force is a feature that controls when and how much up/down force is applied to the Top Feed Roll. This feature improves overall throughput of the machine by using the Top Feed Roll to help feed and maintain feeding material into the rotor.

It is made up of four adjustable values:

Top Roll Up Pressure **Top Roll Up Cancel** **Top Roll Up Cancel RPM** **Top Roll Down Cancel** **Top Roll Down Pressure**		Symbols as shown on the MD4

Top Roll Up Pressure and Top Roll Down Pressure are user-adjustable pressures applied to the Top Feed Roll. Only one or the other is activated at once and this behavior is dictated by Top Roll Up Cancel, Top Roll Up Cancel RPM, and Top Roll Down Cancel. Up and Down Cancel are Top Feed Roll height values (inches/mm) that dictate when Top Roll Up Pressure switches to Top Roll Down Pressure and vice-versa. Up Cancel RPM is an adjustable engine RPM. If the engine falls down to this RPM it will switch to Down Pressure, as likely this is due to material having made it to the rotor.

An uninterrupted motion of the Top Feed Roll would be as follows:

1. The machine is in Auto mode, the feeds are forward, the Top Feed Roll is below the Top Roll Up Cancel Setpoint
2. The up solenoid is turned on: Top Roll Up Pressure is applied via a regulator
   - The Feed Conveyor feeds material to the Top Feed Roll
   - The Top Feed Roll climbs on top of the material with ease due to an appropriate Top Roll Up Pressure value

3. The Top Feed Roll reaches the Top Roll Up Cancel Setpoint
   - The up solenoid is turned off
   - The down solenoid is turned on: Top Roll Down Pressure is applied
   - The Top Feed Roll's downward force aids in gripping the material and feeding it into the rotor
   - Once material is no longer under the Top Feed Roll, it quickly lowers in order to be prepared for the next material. This also prevents any material blow-back from the rotor.
4. The Top Feed Roll reaches the Top Roll Down Cancel Setpoint
   - The down solenoid is turned off
   - The up solenoid is turned on: Top Roll Up Pressure is applied; the cycle starts again

(3) Static Top Roll Control

Static Top Roll Control is a user-selectable feature that adds additional control to the movement of the Top Feed Roll. When used correctly this feature can improve throughput through the machine.

It is made up of two adjustable values:

Top Roll Lock		Symbols as shown on the MD4
Top Roll Hold		

A significant RPM drop can indicate that the engine is being bogged down by the material being fed into the rotor. If the engine bogs down too much the engine will stall.

- Top Roll Lock is an engine RPM setpoint. If the engine RPM falls below this level, the Top Feed Roll will lock its current height and stop applying pressure to the material. This feature is useful as stopping the Top Feed Roll from pushing material into the rotor can allow it to finish grinding the material in it already. Once the engine RPM has recovered to above the Top Roll Lock Setpoint the Top Feed Roll resumes normal operation and automated features are allowed to affect the Top Feed Roll again.
- Top Roll Hold is an adjustable setting that raises the 'zero' height position (inches/mm) of the Top Feed Roll. This 'zero' position refers to the lowest point the Top Feed Roll is allowed to go (without user intervention) in reference to the deck. This feature can be helpful depending on material as it can prevent the Top Feed Roll from wasting time going all the way down to the deck when it is not necessary. An example would be if the material is a consistent feed of 18" trees. By setting Top Roll Hold Setpoint at 16" the Top Feed Roll will only travel between the 18" trees and the 16" Top Roll Hold value. This minimizes unnecessary travel to the deck and increases throughput.

⚠ DANGER

Caution should be taken when exposing the rotor as material can be forcefully thrown out of it.

5.6 Automated Reliability Features

Built into the machine's electronic control system are a number of Automated Reliability Features. Their primary purpose is to minimize damage to the machine during unsafe conditions and increase reliability over the life of the machine while minimizing operator input. The purpose of the following section is to familiarize operators with what these automated features are on their machine, their function, and how to use them.

(1) M.D.S.

Metal Detection System (M.D.S.) is a feature that is used to protect the machine from tramp metal damage. This feature is adjustable and able to be disabled.

Metal Detection System (M.D.S.)		Symbols as shown on the MD4

This feature uses an electronic sensor located on the bearing housing to detect when tramp metal first contacts the rotor. When the adjustable sensitivity limit is reached, the M.D.S. automatically raises the Top Feed Roll, reverses the feed system, initiates a shutdown, and displays a warning message on the control panel.

When the machine detects metal, the engine will begin to return to idle, the Top Feed Roll will begin to lift, and the feed system will reverse for a preset time. When the engine reaches idle speed the machine will shut down. If the machine is not equipped with a clutch, the engine will remain in position to use the engine as a brake for the rotor stopping motion as soon as possible.

Depending on the material you are running, you may want to change the M.D.S. Trip Setpoint value making the machine more or less sensitive. If you are not sure where to set this value, you can refer to the M.D.S. peak reading. This peak reading is the highest detected value the sensor has picked up since the last reset. To give an example, if you run the machine for an hour and the peak reading is only 2.4, then you could set the M.D.S. Trip Setpoint to 3.0. This prevents an M.D.S. trip unless the material is detected as more metallic than your typical material. If the M.D.S. Trip Setpoint value set at 3.0 and you start to see trips with no metal, then look to see what the peak reading is and re-adjust the M.D.S. Trip Setpoint to be even higher.

When metal is detected and the machine has finished shutting down, you must inspect the infeed and rotor areas for any metal or metal damage.

⚠ DANGER

Lockout and tagout all machine power sources. Refer to Section 2.11 Lockout/Tagout for proper procedure. Before climbing into the infeed and mill (which the rotor is contained in) to inspect for metal, you must ensure that you install the Top Feed Roll safety pin.

When metal is detected a warning is given on the MD4. This will remind you to put the Top Feed Roll safety pin in place before inspecting the infeed and rotor. To reset the machine turn the key to the off position and restart as normal. When resetting the machine, if the Top Feed Roll safety pin is not installed, the top roll will fall to its down position. Please be sure no one is in the infeed area when restarting the machine.

(2) System Jam Detection and Reversing

System Jam Detection and Reversing is an automated feature that prevents damage to the machine that could be caused by material jams. It works by detecting high pressure conditions in the hydraulic motors and will respond automatically.

If a jam is detected in the feed, discharge, or regrind (if equipped) system, the feed system is reversed for a user-configurable amount of time. In the case of a Regrind Conveyor jam, the Regrind Conveyor is reversed along with the feed system. If the Regrind Conveyor has reversed six times within two minutes the machine will go through a critical fault shutdown sequence. Assuming there was not a Regrind Conveyor jam critical fault, after the preset amount of time is over the machine resumes normal operation.

(3) Hydraulic Warm Up

Hydraulic Warm Up is a feature used to help warm up the machine's hydraulic system to prevent damage and reduce wear. When this feature is activated, select hydraulic circuits on the machine will run at reduced flow rates to circulate the hydraulic fluid through the system and warm up gradually. This feature is good as it accomplishes its goal without putting heavy loads on the system.

NOTICE

The machine will not operate normally unless the hydraulic fluid is above 32°F (0°C).

Hydraulic Warm Up		Symbols as shown on the MD4

The following things occur during this process:

- Top Feed Roll Down Pressure is applied
- The feed system is reversed
- The discharge conveyor is turned on

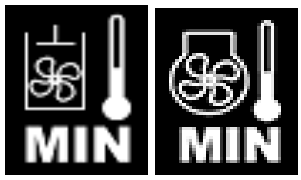
This process, unless interrupted, goes until a certain condition is met. This condition depends on the Hydraulic Warm Up mode: either Temperature or Time.

- In Temperature mode, Hydraulic Warm Up will run until the set temperature is reached.
- In Time mode, Hydraulic Warm Up will run until the timer has counted down.

(4) Cycle System Cooling

Cycle System Cooling is a user-adjustable automated feature that manages the two cooling systems of the machine in order to extend life and maintain peak performance. The two cooling systems are the hydraulic cooling system and the engine cooling system, and they are controlled in the same manner.

It is made up of three basic components, one for each cooling system:

Cooling Temperature Threshold		Symbols as shown on the MD4
Cooling Cycle Time		
Purging		

- Cooling Temperature Threshold is an adjustable minimum temperature in which the fans will pull air through the radiators. Cooling Cycle Time is an adjustable amount of time in which the fans pull. Increasing this value will increase the amount of cooling done over time. Purging is the action of reversing the direction of airflow through the radiator (from pulling to pushing) in order to flush built up debris from the radiator. Given the nature of the industry, debris build up is inevitable.
- Purging is done at regular intervals (right after the cooling cycle) for an adjustable amount of time. When the airflow reverses, any material that is trapped in the cooler is blown out. Purging is also used in two situations. The first is when the Engine Fast command is given via either the remote control or the MD4. The second is when the manual purge button is pressed from the Cooling System Menu. This feature is utilized in order to increase the efficiency of the cooling system and the reliability of the machine.

5.7 Panel Controls & Settings

(1) Introduction

Your machine comes standard with a touch screen MD4 control unit (Figure 5.14 / D). The MD4 provides a simple user interface for operators to interact with the machine. Machine settings, controls, and information can all be accessed through the MD4. The MD4 features increased I/O capacity that can be utilized for the addition of customized machine functions. The purpose of this section is to familiarize the operator with the proper techniques for navigation, machine control, and setting modification in the MD4 controller.

(2) Control Enclosure Layout

The control enclosure (Figure 5.14) is situated on the side of the machine.

Behind the smaller enclosure door (Figure 5.14 / A) is the ignition switch (Figure 5.14 / G), a system reset button (Figure 5.14 / C), a local / radio mode switch (Figure 5.14 / F) and a MD4 controller (Figure 5.14 / B) for machine controls, settings, and data.

There is an emergency stop button (Figure 5.14 / D) located on the face of the larger enclosure (Figure 5.14 / E). The remote control and its charger are stored inside the larger enclosure.

The larger enclosure (Figure 5.14 / E) should remain closed during operation. Both enclosures (Figure 5.14 / A and E) may be locked for security.

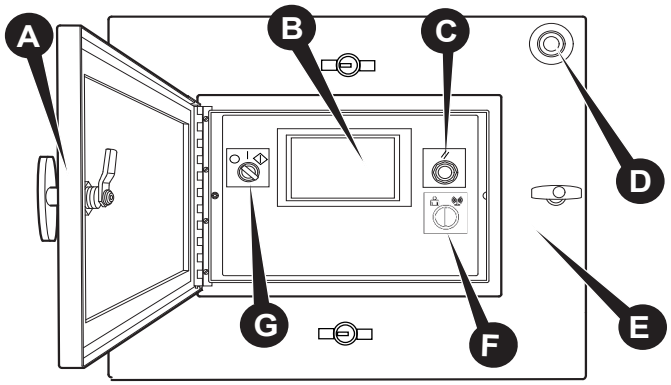


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Figure 5.14 - Control Enclosure Layout

5.8 Controller Menus

(1) Startup Menu

The Startup Menu (Figure 5.15) is used for navigating between the various sub-menus. This is the first menu displayed when the machine is powered up. The purpose of this section is to familiarize operators with navigation of the Startup Menu.

Figure 5.15 - Startup Menu

Pictograph	Function
	Basic Run Menu Momentarily press this button to navigate to the Basic Run Menu.
	Advanced Menu Momentarily press this button to navigate to the Advanced Menu.
	Transport Menu Momentarily press this button to navigate to the Transport Menu.
	Contact Information Menu Momentarily press this button to navigate to the Contact Information Menu.

(2) Basic Run Menu (Clutch-Equipped Machine)

NOTICE

There are two variants of this menu, this one applies to machines with a clutch equipped.

The Basic Run Menu (Figure 5.16) is used for basic operation of the machine. It is a simplified interface that is sufficient for the day to day activities of the majority of users. This menu can be accessed by pressing the Basic Run Menu button from the Startup Menu.

The Basic Run Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the buttons and parameters on this menu along with a brief explanation of what they are.

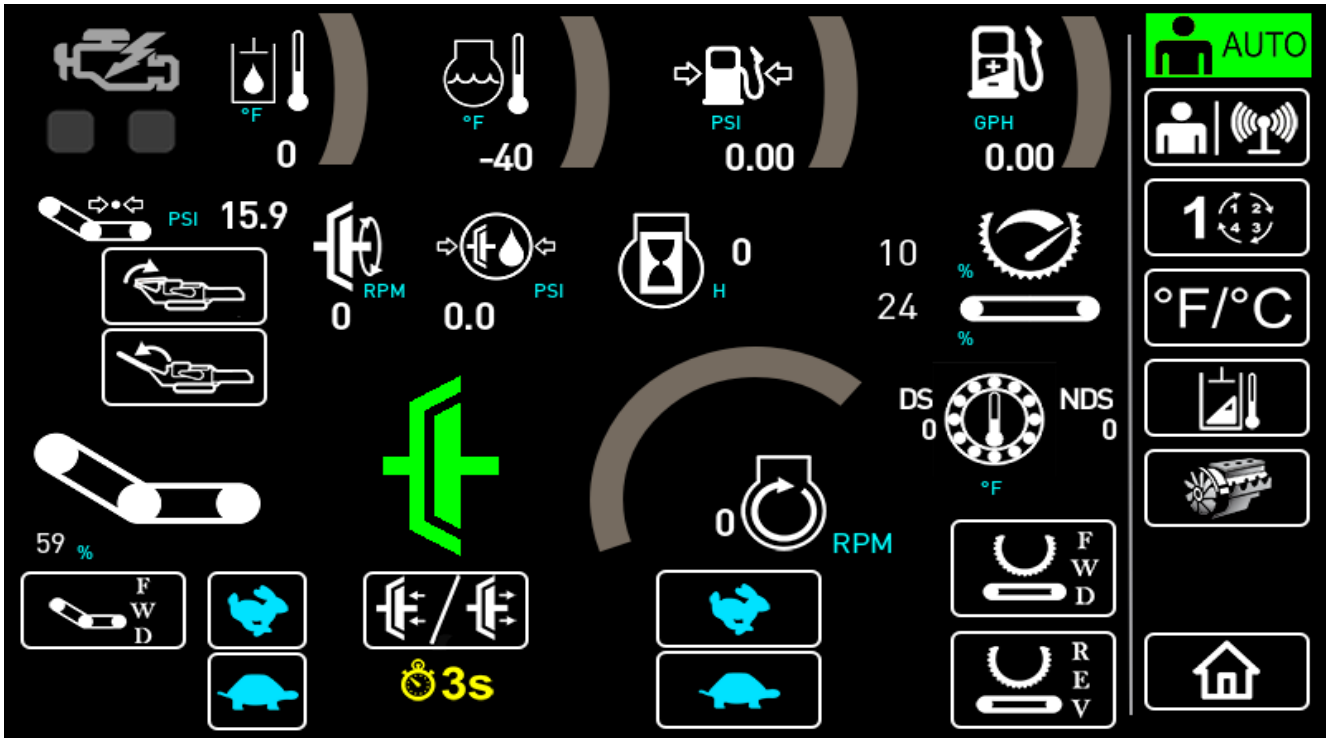
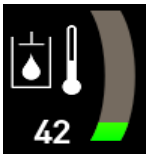


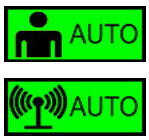
Figure 5.16 - Basic Run Menu (Clutch-Equipped Machine)

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Discharge Toggle Momentarily press this button to the toggle the discharge on and off. Green indicates the Discharge Conveyor is running, white indicates it is not.
	Discharge Status The % below this symbol refers to the current discharge speed.

	Discharge Fast Press and hold this button (right of the discharge toggle) to increase the speed of the Discharge Conveyor.
	Discharge Slow Press and hold this button (right of the discharge toggle) to decrease the speed of the Discharge Conveyor.
	Clutch Toggle Press and hold this button for three seconds to engage or disengage the clutch.
	Clutch Engage/Disengage Status This displays if the clutch is engaged or disengaged. If this symbol is green then the clutch is engaged. If this symbol is flashing green then the clutch is being engaged. If this symbol is white then the clutch is disengaged.
	Engine Speed This displays the engine's speed with a visual gauge and in RPM.
	Engine Fast Press and hold this button (below Engine Speed) to throttle the engine up.
	Engine Slow Press and hold this button (below Engine Speed) to idle the engine down.
	Bearing Temperatures This display is only present if the machine is equipped with bearing temperature sensors. This displays the current temperature being reported by the bearing temperature sensors. Left of this symbol (if equipped) will show the Drive Side temperature, and to the right will show the Non-Drive Side temperature. Below the symbol will indicate the unit of measure.
	Feeds Forward Momentarily press this button to move the feed system forward. Green indicates the feeds are active forward, white indicates they are not.
	Feeds Reverse Press and hold this button to move the feed system backward. Green indicates the feeds are active backward, white indicates they are not.
	Discharge Fold Press and hold this button to fold the Discharge Conveyor. Green indicates the fold command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Discharge Unfold Press and hold this button to unfold the Discharge Conveyor. Green indicates the unfold command is being sent, white indicates it is not. This button is the lower of the two similar buttons.

	Discharge Pressure This displays the pressure of the Discharge Conveyor to the right of the symbol.
	Clutch RPM This displays the RPM of the clutch.
	Clutch Oil Pressure This displays the oil pressure of the clutch.
	Engine Hours To the right of this symbol displays the total cumulative hours in which the engine has run.
	Top Feed Roll Speed To the left of this symbol displays the speed of the Top Feed Roll in percentage.
	Feed Conveyor Speed To the left of this symbol displays the speed of the Feed Conveyor in percentage.
	Engine Diagnostics Lamp The upper symbol may turn red to indicate a CAT engine fault code has been detected. The two lamps below it would then indicate in either red or amber the CAT fault code. Refer to the CAT engine manual for a breakdown of the fault codes.
	Hydraulic Oil Temperature This displays the hydraulic oil temperature.
	Engine Coolant Temperature This displays the engine coolant temperature.
	Fuel Pressure This displays the fuel pressure.
	Fuel Consumption This displays the current fuel consumption.

 	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Run Mode Toggle Momentarily press this button to toggle between the four run modes. It displays the currently selected run mode.
	Display Units Momentarily press this button to toggle system units of measurement.
	Hydraulic Warm Up Menu Momentarily press this button to navigate to the Hydraulic Warm Up Menu.
	Engine Data Menu Momentarily press this button to navigate to the Engine Data Menu.
	Startup Menu Momentarily press this button to return to the Startup Menu.
	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.

(3) Basic Run Menu (Non-Clutch-Equipped Machine)

NOTICE

There are two variants of this menu, this one applies to machines without a clutch equipped.

The Basic Run Menu (Figure 5.17) is used for basic operation of the machine. It is a simplified interface that is sufficient for the day to day activities of the majority of users. This menu can be accessed by pressing the Basic Run Menu button from the Startup Menu.

The Basic Run Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the buttons and parameters on this menu along with a brief explanation of what they are.

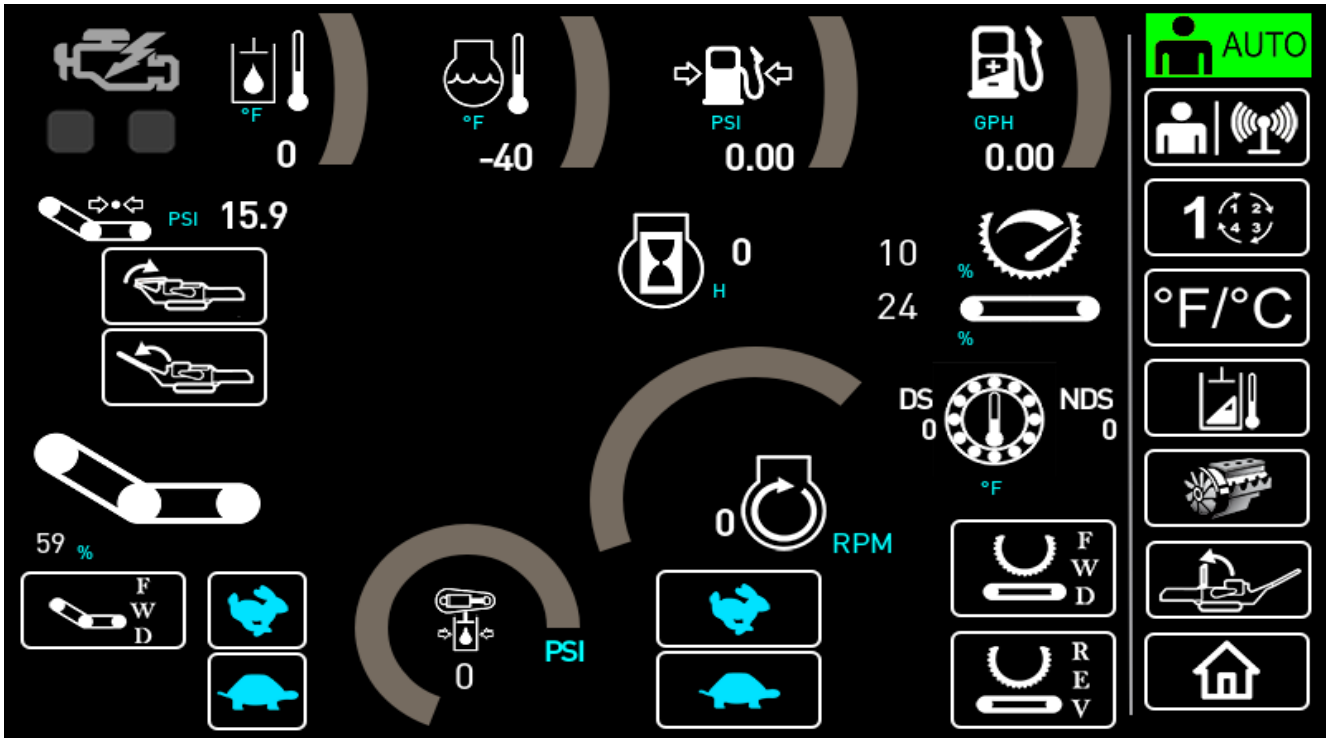
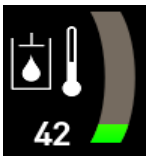


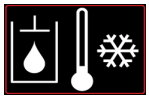
Figure 5.17 - Basic Run Menu (Non-Clutch-Equipped Machine)

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Discharge Toggle Momentarily press this button to the toggle the discharge on and off. Green indicates the Discharge Conveyor is running, white indicates it is not.
	Discharge Status The % below this symbol refers to the current discharge speed.

	Discharge Fast Press and hold this button (right of the discharge toggle) to increase the speed of the Discharge Conveyor.
	Discharge Slow Press and hold this button (right of the discharge toggle) to decrease the speed of the Discharge Conveyor.
	Belt Cylinder Hydraulic Pressure This displays the hydraulic pressure in the drive belt tensioning cylinders.
	Engine Speed This displays the engine's speed with a visual gauge and in RPM.
	Engine Fast Press and hold this button (below Engine Speed) to throttle the engine up.
	Engine Slow Press and hold this button (below Engine Speed) to idle the engine down.
	Bearing Temperatures This display is only present if the machine is equipped with bearing temperature sensors. This displays the current temperature being reported by the bearing temperature sensors. Left of this symbol (if equipped) will show the Drive Side, and to the right will show the Non-Drive Side temperatures. Below the symbol will indicate the unit of measure.
	Feeds Forward Momentarily press this button to move the feed system forward. Green indicates the feeds are active forward, red indicates they are not.
	Feeds Reverse Press and hold this button to move the feed system backward. Green indicates the feeds are active backward, red indicates they are not.
	Discharge Fold Press and hold this button to fold the Discharge Conveyor. Green indicates the fold command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Discharge Unfold Press and hold this button to unfold the Discharge Conveyor. Green indicates the unfold command is being sent, white indicates it is not. This button is the lower of the two similar buttons.
	Discharge Pressure This displays the pressure of the Discharge Conveyor to the right of the symbol.

	Engine Hours To the right of this symbol displays the total cumulative hours in which the engine has run.
	Top Feed Roll Speed To the left of this symbol displays the speed of the Top Feed Roll in percentage.
	Feed Conveyor Speed To the left of this symbol displays the speed of the Feed Conveyor in percentage.
	Engine Diagnostics Lamp The upper symbol may turn red to indicate a CAT engine fault code has been detected. The two lamps below it would then indicate in either red or amber the CAT fault code. Refer to the CAT engine manual for a breakdown of the fault codes.
	Hydraulic Oil Temperature This displays the hydraulic oil temperature.
	Engine Coolant Temperature This displays the engine coolant temperature.
	Fuel Pressure This displays the fuel pressure.
	Fuel Consumption This displays the current fuel consumption.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.

	Run Mode Toggle Momentarily press this button to toggle between the four run modes. It displays the currently selected run mode.
	Display Units Momentarily press this button to toggle system units of measurement.
	Hydraulic Warm Up Menu Momentarily press this button to navigate to the Hydraulic Warm Up Menu.
	Engine Data Menu Momentarily press this button to navigate to the Engine Data Menu.
	Basic Service Menu Momentarily press this button to navigate to the Basic Service Menu.
	Startup Menu Momentarily press this button to return to the Startup Menu.
	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.

(4) Hydraulic Warm Up Menu

The Hydraulic Warm Up Menu (Figure 5.18) is used for controlling, adjusting, and displaying settings of the hydraulic warm up feature. This menu can be accessed by pressing the Hydraulic Warm Up Menu button from the Basic Run Menu. See Section 5.6c Hydraulic Warm Up for more information on this feature in general.

The Hydraulic Warm Up Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

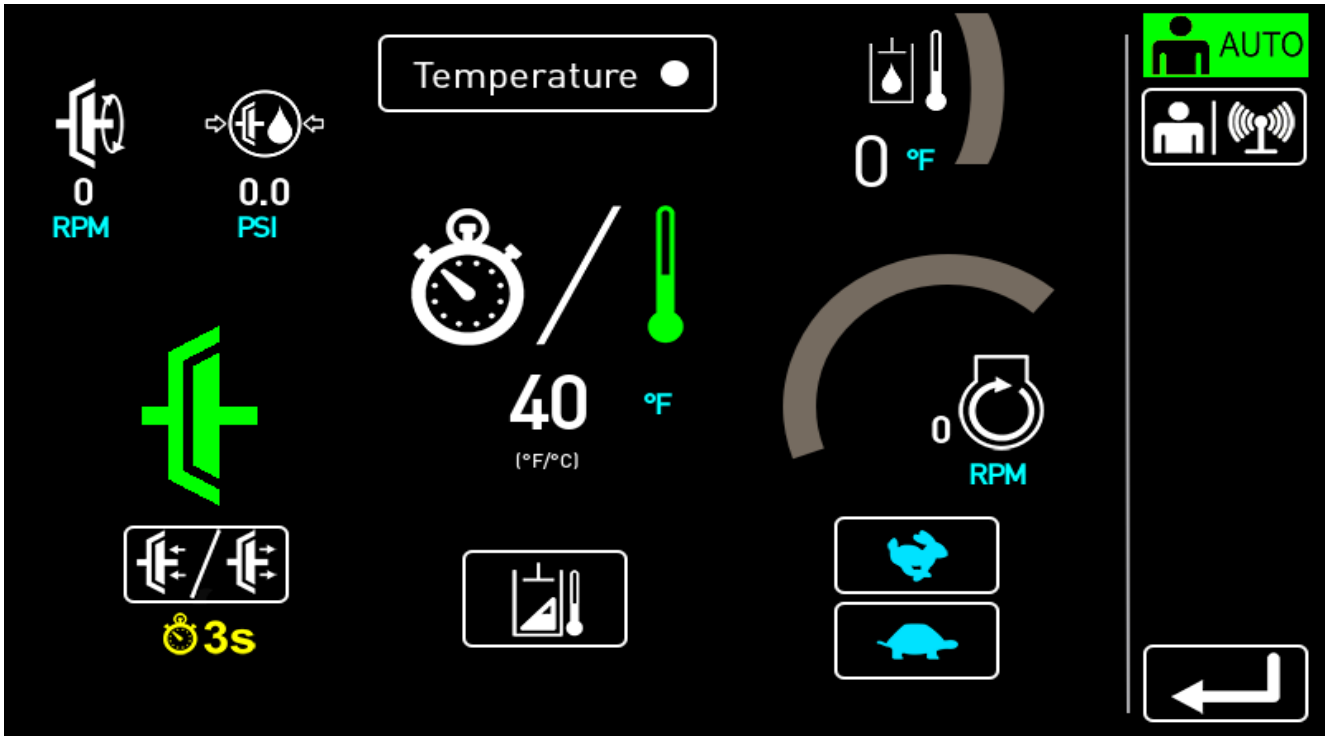
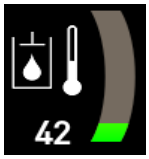


Figure 5.18 - Hydraulic Warm Up Menu

Pictograph	Function
	Start Hydraulic Warm Up Function Momentarily press this button to start the Hydraulic Warm Up feature. Green indicates the feature is active. White indicates it is not.
	Engine Fast Press and hold this button to throttle the engine up.
	Engine Slow Press and hold this button to idle the engine down.
	Clutch Toggle This button is only present if the machine is equipped with a clutch. Press and hold this button for three seconds to engage or disengage the clutch.

	Clutch Status This display is only present if the machine is equipped with a clutch. This displays the clutch status. Green indicates it is on (engaged), white indicates it is off (disengaged).
 or 	Time/Temperature Toggle Momentarily press this button and select the desired mode. This changes the Hydraulic Warm Up feature between time and temperature controlled mode.
	Time/Temperature Status This displays the currently selected mode of the Hydraulic Warm Up feature. If the stopwatch is green, it is in time mode. If the thermometer is green it is in temperature mode.
	Clutch RPM This display is only present if the machine is equipped with a clutch. This displays the RPM of the clutch.
	Clutch Oil Pressure This display is only present if the machine is equipped with a clutch. This displays the oil pressure of the clutch.
	Hydraulic Oil Temperature This displays the hydraulic oil temperature.
	Engine RPM This displays the engine's speed in RPM.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Return Momentarily press this button to return to the Basic Run Menu.

	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.

(5) Engine Data Menu

The Engine Data Menu (Figure 5.19) is used for advanced monitoring of the engine. This menu can be accessed by pressing the Engine Data Menu button from the Basic Run Menu or from the Advanced Menu.

The Engine Data Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

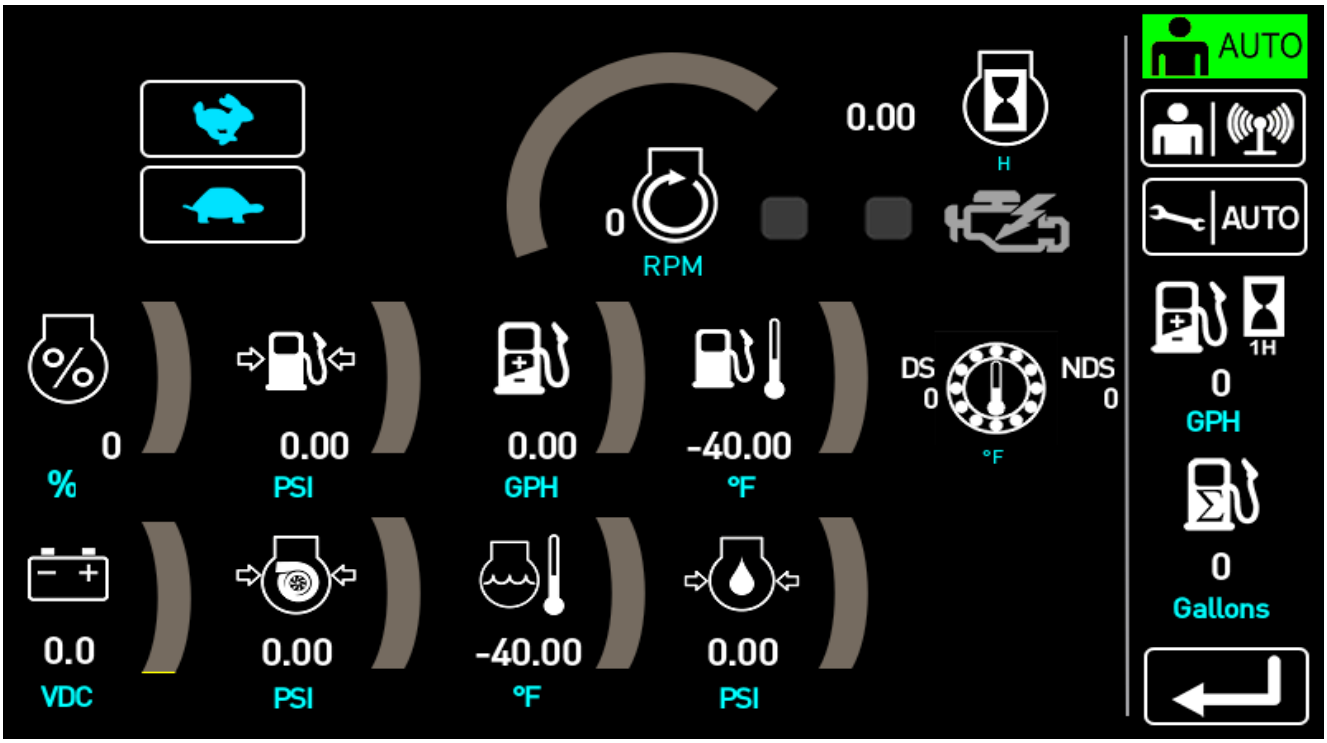
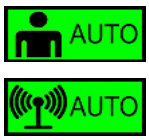


Figure 5.19 - Engine Data Menu

Pictograph	Function
	Engine Fast Press and hold this button to throttle the engine up.
	Engine Slow Press and hold this button to idle the engine down.
	Engine RPM This displays the engine's speed in RPM.
	Engine Hours This displays the total cumulative hours in which the engine has run.

	Engine Diagnostics Lamp The right symbol may turn red to indicate a CAT engine fault code has been detected. The two lamps to the left of it would then indicate in either red or amber the CAT fault code. Refer to the CAT engine manual for a breakdown of the fault codes.
	Engine Percent Load This displays percent of load.
	Fuel Pressure This displays the fuel pressure.
	Fuel Consumption This displays the current fuel consumption.
	Fuel Temperature This displays the fuel temperature.
	Battery Voltage This displays the battery voltage.
	Engine Boost Pressure This displays the engine boost pressure.
	Engine Coolant Temperature This displays the engine coolant temperature.
	Engine Oil Pressure This displays the engine oil pressure.
	Bearing Temperatures This display is only present if the machine is equipped with bearing temperature sensors. This displays the current temperature being reported by the bearing temperature sensors. Left of this symbol (if equipped) will show the Drive Side, and to the right will show the Non-Drive Side temperatures. Below the symbol will indicate the unit of measure.

 	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Fuel Consumption (1 Hour Average) This displays the current hourly average fuel consumption of the engine.
	Total Fuel Used This displays the gallons (or liters) total used, as indicated by the engine.
	Return Momentarily press this button to return to the Basic Run Menu.
	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.

(6) Basic Service Menu (Non-Clutch-Equipped Machine)

NOTICE

This menu only applies to machines without a clutch equipped.

The Basic Service Menu (Figure 5.20) is used for controlling the belt engage system of a non-clutch-equipped machine. It features controls associated with using the belt engage system effectively. This menu can be accessed by pressing the Basic Service Menu button from the Basic Run Menu.

The Basic Service Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

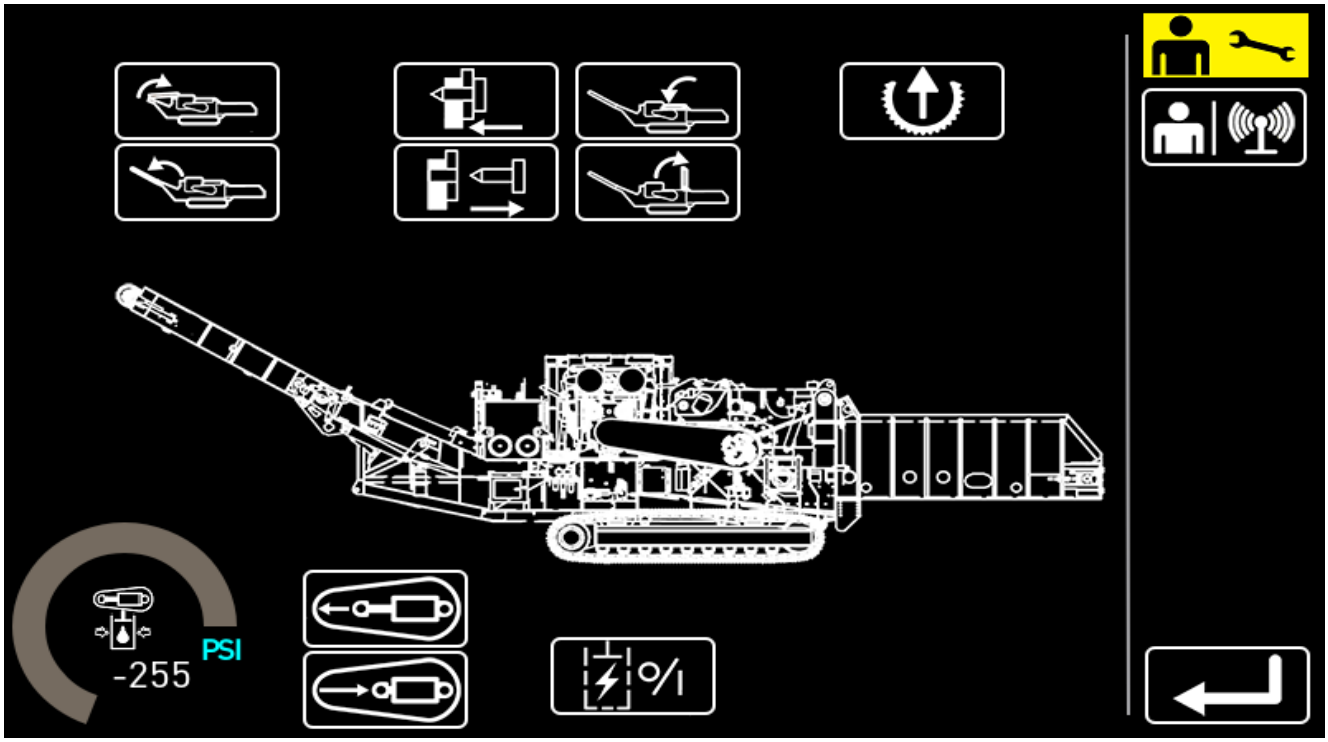
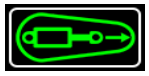


Figure 5.20 - Basic Service Menu

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Fold Discharge Conveyor Press and hold this button to fold the Discharge Conveyor. Green indicates the fold command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Unfold Discharge Conveyor Press and hold this button to unfold the Discharge Conveyor. Green indicates the unfold command is being sent, white indicates it is not. This button is the lower of the two similar buttons.

	Extend Hog Box Lock Pin This button is not present on a 5400 Series. Press and hold this button to extend the Hog Box lock pin. Green indicates the extend command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Retract Hog Box Lock Pin This button is not present on a 5400 Series. Press and hold this button to retract the Hog Box lock pin. Green indicates the retract command is being sent, white indicates it is not. This button is the lower of the two similar buttons.
	Close Hog Box This button is not present on a 5400 Series. Press and hold this button to close the Hog Box. Green indicates the close command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Open Hog Box This button is not present on a 5400 Series. Press and hold this button to open the Hog Box. Green indicates the open command is being sent, white indicates it is not. This button is the lower of the two similar buttons.
	Raise Top Feed Roll Momentarily press this button to raise the Top Feed Roll. Press the button again to stop raising it.
	Belt Cylinder Hydraulic Pressure This displays the hydraulic pressure in the drive belt tensioning cylinders
	Belt Cylinder Extend This button only works when the engine is off. Momentarily press this button to extend the belt tensioning cylinder and engage the drive belt. Green indicates the extend command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Belt Cylinder Retract This button only works when the engine is off. Momentarily press this button to retract the belt tensioning cylinder and disengage the drive belt. Green indicates the retract command is being sent, white indicates it is not. This button is the lower of the two similar buttons.
	Auxiliary Hydraulic Pump Toggle This button only works when the engine is off. Momentarily press this button to toggle the auxillary hydraulic pump on or off. Green indicates the pump run command is being sent, white indicates it is not.

	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Return Momentarily press this button to return to the Basic Run Menu.

(7) Transport Menu

The Transport Menu (Figure 5.21) is used for preparing the machine for transportation. The Discharge Conveyor must be completely folded during transportation. This menu can be accessed by pressing the Transport Menu button from the Startup Menu.

The Transport Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

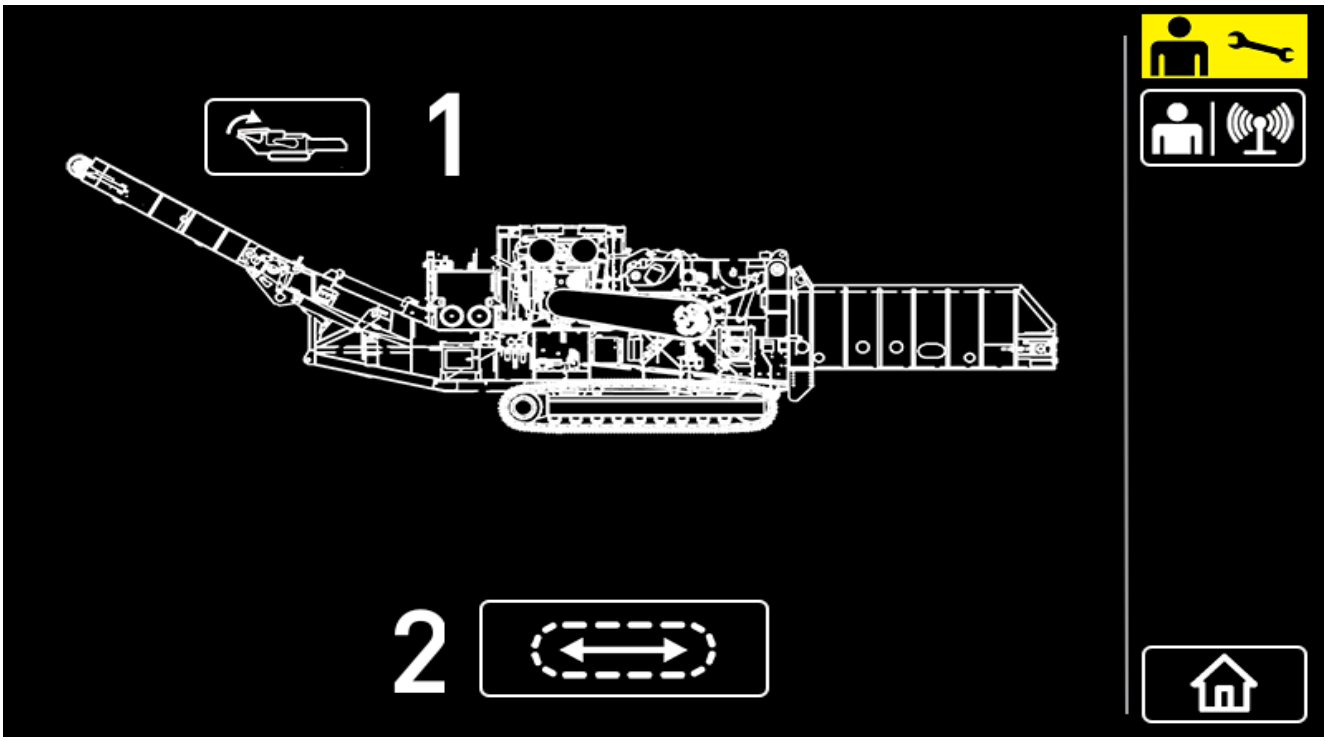
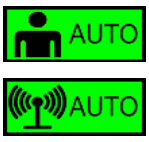


Figure 5.21 - Transport Menu

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Fold Discharge Conveyor Press and hold this button to fold the Discharge Conveyor. Green indicates the fold command is being sent, white indicates it is not.
	Enable Track Mode After the Discharge Conveyor is folded this button will turn green to signify that Track Mode can be enabled. Momentarily press this button to enable Track Mode. Follow the steps in Section 5.2b Normal Machine Transportation for how to navigate through the screens that follow after pressing this button.

	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Startup Menu Momentarily press this button to return to the Startup Menu.

(8) Contact Information Menu

The Contact Information Menu (Figure 5.22) is used for displaying machine specific information such as the build date, and serial number, as well as contact information for CBI/Terex. This menu can be accessed by pressing the Contact Information Menu button from the Startup Menu. The purpose of this section is to familiarize operators with navigation of this menu.

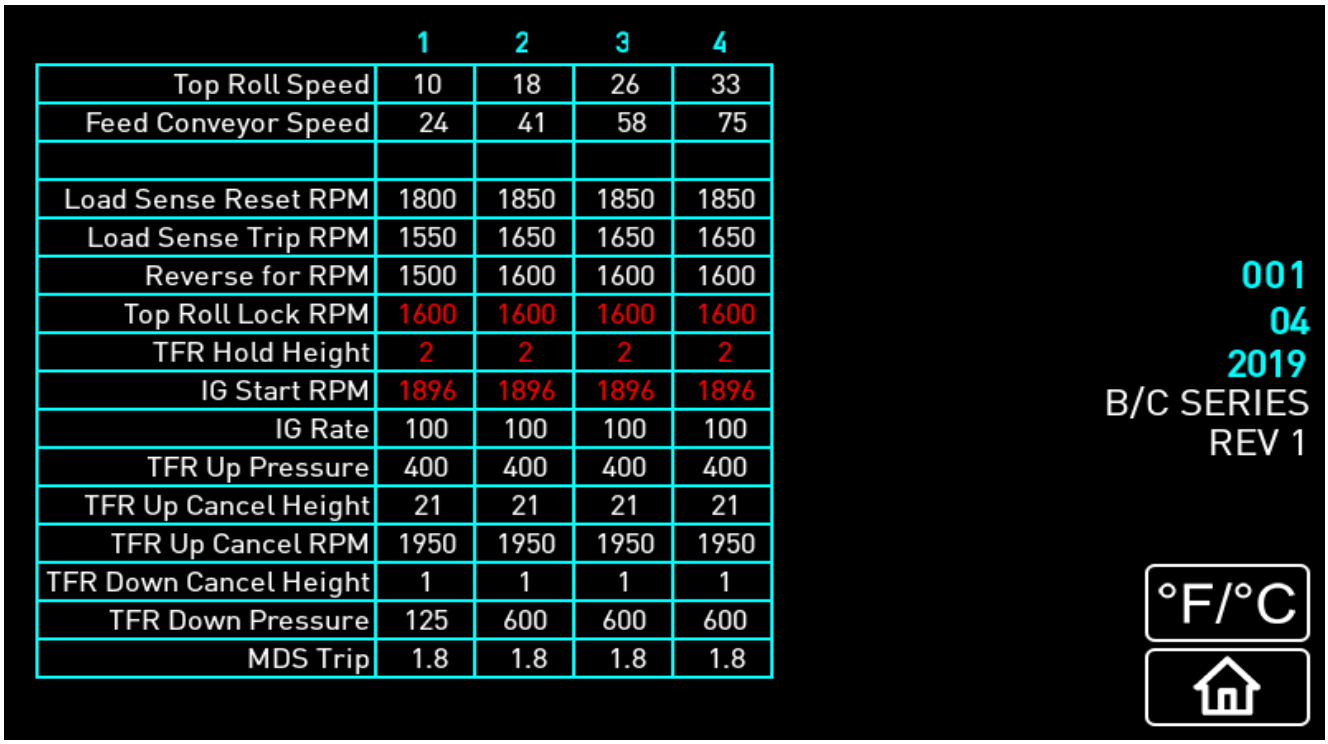
Figure 5.22 - Contact Information Menu

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	System Defaults Menu Momentarily press this button to navigate to the System Defaults Menu.
	Startup Menu Momentarily press this button to return to the Startup Menu.

(9) System Defaults Menu

The System Defaults Menu (Figure 5.23) has various machine defaults displayed on it. These settings cannot be changed from this screen, it is for informational purposes only. This menu can be accessed by pressing the System Defaults Menu button from the Contact Information Menu. The purpose of this section is to familiarize operators with navigation of this menu.



	1	2	3	4
Top Roll Speed	10	18	26	33
Feed Conveyor Speed	24	41	58	75
Load Sense Reset RPM	1800	1850	1850	1850
Load Sense Trip RPM	1550	1650	1650	1650
Reverse for RPM	1500	1600	1600	1600
Top Roll Lock RPM	1600	1600	1600	1600
TFR Hold Height	2	2	2	2
IG Start RPM	1896	1896	1896	1896
IG Rate	100	100	100	100
TFR Up Pressure	400	400	400	400
TFR Up Cancel Height	21	21	21	21
TFR Up Cancel RPM	1950	1950	1950	1950
TFR Down Cancel Height	1	1	1	1
TFR Down Pressure	125	600	600	600
MDS Trip	1.8	1.8	1.8	1.8

Figure 5.23 - System Defaults Menu

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
°F/°C	Display Units Momentarily press this button and select the desired display units to toggle system units of measurement.
	Startup Menu Momentarily press this button to return to the Startup Menu.

(10) Advanced Menu

The Advanced Menu (Figure 5.24) is used for accessing advanced features intended only for qualified personnel. It is PIN protected to deter unauthorized use. This menu can be accessed by pressing the Advanced Menu button from the Startup Menu.

The Advanced Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

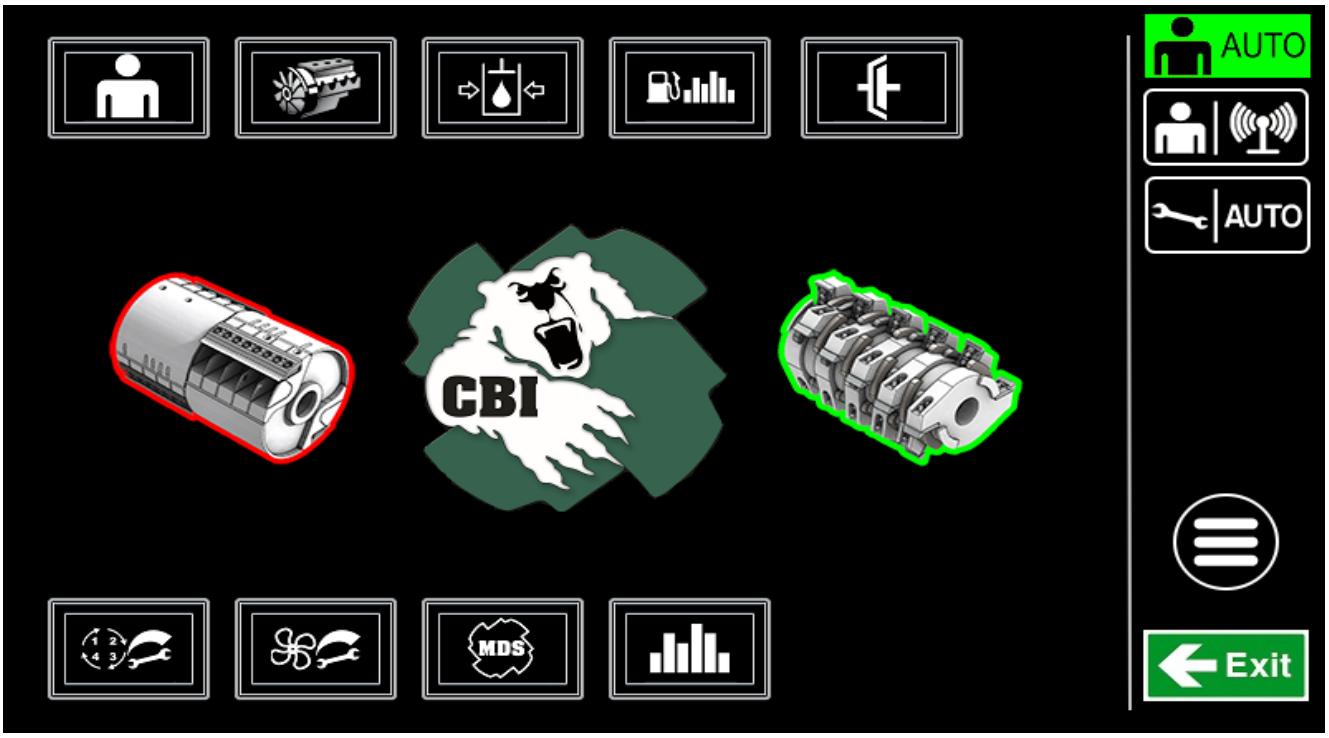
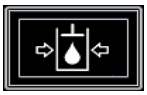


Figure 5.24 - Advanced Menu

Pictograph	Function
	Run Menu Momentarily press this button to navigate to the Run Menu.
	Cooling System Menu Momentarily press this button to navigate to the Cooling System Menu.
	Metal Detection System (M.D.S.™) Menu Momentarily press this button to navigate to the Metal Detection System (M.D.S.™) Menu.
	Measure Groups Menu Momentarily press this button to navigate to the Measure Groups Menu.
	Manual Control Menu Momentarily press this button to navigate to the Manual Control Menu.

	Engine Data Menu Momentarily press this button to navigate to the Engine Data Menu.
	Pressure Menu Momentarily press this button to navigate to the Pressure Menu.
	Fuel Consumption Menu Momentarily press this button to navigate to the Fuel Consumption Menu.
	Clutch Diagnostics Menu This button is only present if the machine is equipped with a clutch. Momentarily press this button to navigate to the Clutch Diagnostics Menu.
	Chipper Rotor Button This button is only present in a 6400C Series. Momentarily press this button to change the machine between chipper and grinder modes. Red around this symbol indicates the machine is in grinder mode. Green indicates the machine is in chipper mode.
	Grinder Rotor Button This button is only present in a 6400C Series. Momentarily press this button to change the machine between chipper and grinder modes. Green around this symbol indicates the machine is in grinder mode. Red indicates the machine is in chipper mode.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Advanced System Menu Momentarily press this button to navigate to the Advanced System Menu.
	Exit Momentarily press this button to return to the Startup Menu.

(11) Run Menu

The Run Menu (Figure 5.25) is used for adjusting the parameters of each of the four run modes. This menu can be accessed by pressing the Run Menu button from the Advanced Menu.

The Run Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

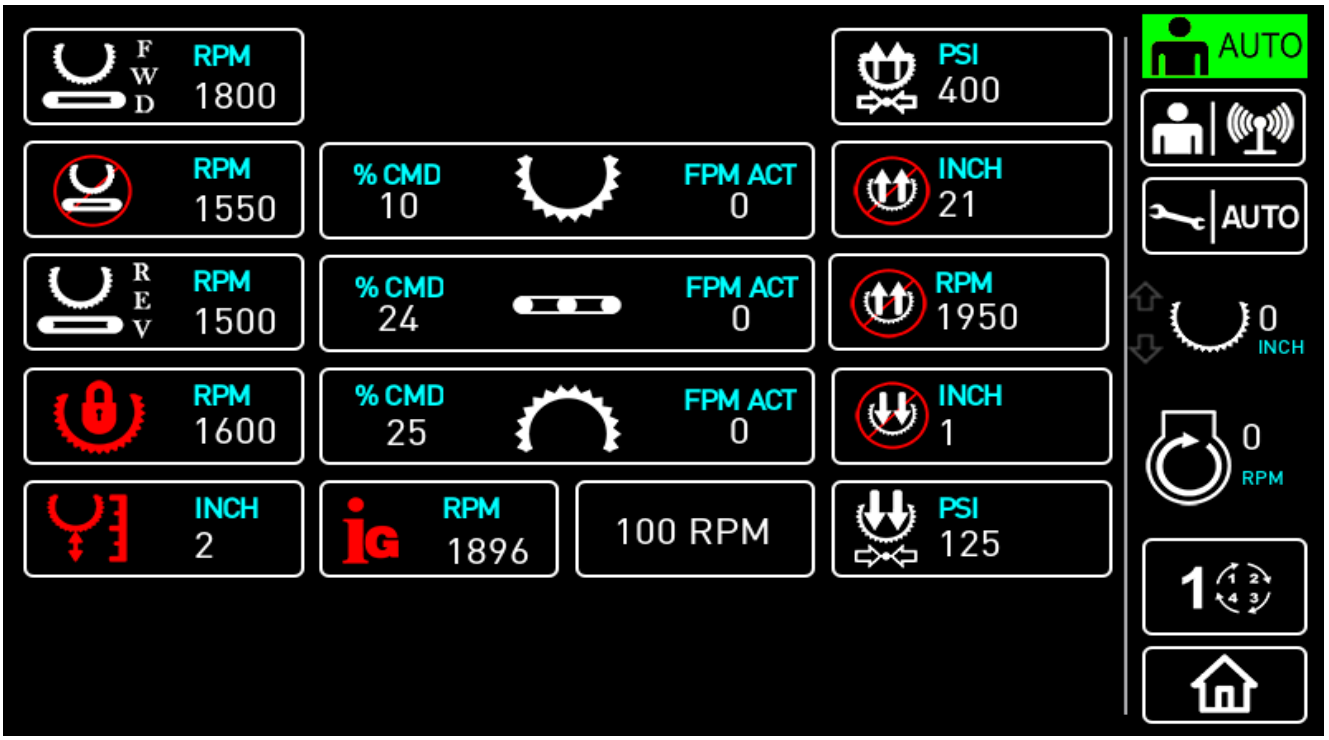
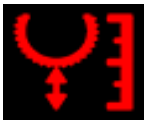
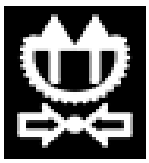
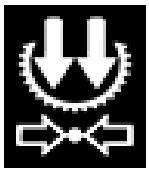


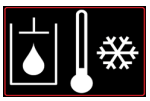
Figure 5.25 - Run Menu

*Selection of any box with values on this Menu will bring up an additional adjustment slider on the bottom of the screen. *This allows the desired values to be dialed in.

Pictograph	Function
	Load Sense Recover Setpoint Momentarily press this button and use the adjustment slider to adjust the engine speed setpoint at which the Load Sense recovers. Green indicates the feed system is active forward, white indicates it is not. See Section 5.5a Dynamic Feed Control for more information.
	Load Sense Trip Setpoint Momentarily press this button and use the adjustment slider to adjust the engine speed setpoint at which Load Sense Trip activates. See Section 5.5a Dynamic Feed Control for more information.

	Feed Reverse Setpoint Momentarily press this button and use the adjustment slider to adjust the engine speed setpoint at which the feeds will automatically reverse. Once selected, a toggle button also appears that allows enabling and disabling of this feature. White indicates this feature is enabled, red indicates it is not. Green indicates the feed system is currently reversing due to having reached the Feed Reverse Setpoint. See Section 5.5a Dynamic Feed Control for more information.
	Top Roll Lock Setpoint Momentarily press this button and use the adjustment slider to adjust the engine speed setpoint at which the Top Feed Roll will stop applying downward force until engine speeds recover. Once selected, a toggle button also appears that allows enabling and disabling of the feature. White indicates this feature is enabled, red indicates it is not. Green indicates the Top Feed Roll is currently locked from having reached the Top Roll Lock Setpoint. See Section 5.5c Static Top Roll Control for more information.
	Top Roll Hold Setpoint Momentarily press this button and use the adjustment slider to adjust the ‘zero’ point of the Top Feed Roll. A toggle button also appears that allowing enabling and disabling of the feature. White indicates this feature is enabled, red indicates it is not. Green indicates the Top Feed Roll is currently being held. See Section 5.5c Static Top Roll Control for more information.
	Top Roll Speed Momentarily press this button and use the adjustment slider to adjust the speed of the Top Feed Roll.
	Feed Conveyor Speed Momentarily press this button and use the adjustment slider to adjust the speed of the Feed Conveyor.
	Bottom Roll Speed This button is only present if the machine has a Bottom Feed Roll. Momentarily press this button and use the adjustment slider to adjust the speed of the Bottom Feed Roll.
	IntelliGrind™ Setpoint Momentarily press this button and use the adjustment slider to adjust the engine speed setpoint in which IntelliGrind™ starts. Once selected, a toggle button appears that allowing enabling and disabling of the feature. Green indicates this feature is enabled, white indicates it is not. Momentarily pressing the button to the right allows changing of the aggressiveness of the feature. See Section 5.5a Dynamic Feed Control for more information.
	Chipper Settings Menu This button is only present on a 6400C Series machine when it is in Chipper Mode. In Chipper Mode the two IntelliGrind buttons disappear and this replaces them. Momentarily press this button to enter the Chipper Settings Menu.

	Top Roll Up Pressure Momentarily press this button and use the adjustment slider to adjust the Up Pressure of the Top Feed Roll. More Up Pressure means a 'lighter' Top Feed Roll while Up Pressure is active. Green indicates the Top Feed Roll has this upward pressure active, white indicates it does not. See Section 5.5b Dynamic Top Roll Force for more information.
	Top Roll Up Cancel Setpoint Momentarily press this button and use the adjustment slider to adjust the Top Feed Roll height at which Up Pressure turns off and Down Pressure is enabled. See Section 5.5b Dynamic Top Roll Force for more information.
	Top Roll Up Cancel RPM Setpoint Momentarily press this button and use the adjustment slider to adjust the engine RPM at which Up Pressure turns off and Down Pressure is enabled. See Section 5.5b Dynamic Top Roll Force for more information.
	Top Roll Down Cancel Setpoint Momentarily press this button and use the adjustment slider to adjust the Top Feed Roll height at which Down Pressure turns off and Up Pressure is enabled. See Section 5.5b Dynamic Top Roll Force for more information.
	Top Roll Down Pressure Momentarily press this button and use the adjustment slider to adjust the Down Pressure of the Top Feed Roll. More Down Pressure means a 'heavier' Top Feed Roll while Down Pressure is active. Green indicates the Top Feed Roll has this downward pressure active, white indicates it does not. See Section 5.5b Dynamic Top Roll Force for more information.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Top Roll Height This displays the current height of the Top Feed Roll. The arrows to the left represent the up/down solenoids. Green indicates which is active.

	Engine RPM This displays the engine's speed in RPM.
	Run Mode Scroll Momentarily press this button to scroll between the four available run modes. The currently selected run mode is shown within the button.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.
	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.
No image	Run Mode Naming There is a semi-hidden feature on this screen. By momentarily pressing the top center of the screen, a prompt comes up. This prompt allows entry of customised names for the four Run Modes.

(12) Chipper Settings Menu

NOTICE

This menu is only present on 6400C Series Machines while they are in Chipper Mode.

The Chipper Settings Menu (Figure 5.26) provides adjustment for Chipper Mode. This menu can be accessed by pressing the Chipper Settings Menu button from the Run Menu.

The Chipper Settings Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

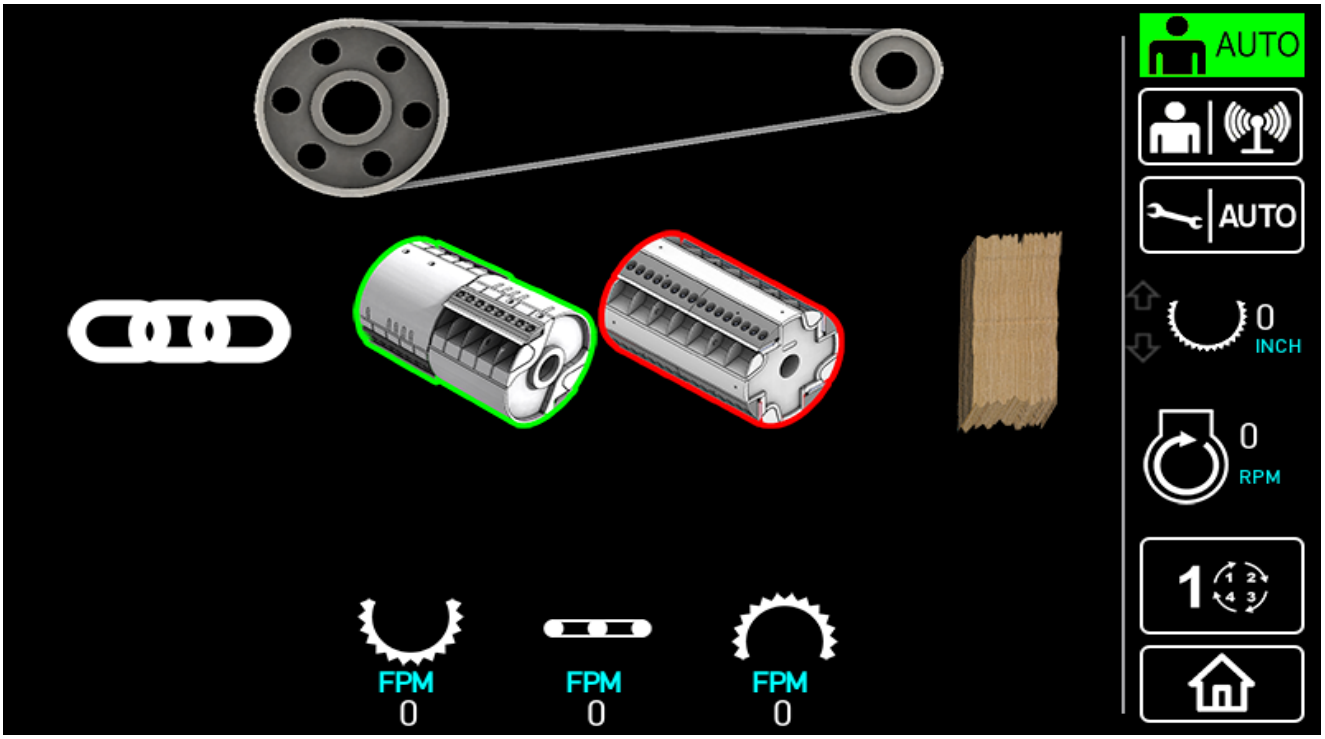
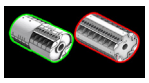


Figure 5.26 - Chipper Settings Menu

*Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Engine and Rotor Sheave Sizes This symbol shows the belt and both main sheaves. By momentarily pressing on either, a drop-down is brought up in the center of the screen. Momentarily press the sheave that change is desired, then select an option in the drop-down to configure those options. This adjusts the chipping logic to account for these differences.
 or 	Infeed Type Selection This icon shows the currently selected infeed type, with the two options being a belt or chains. Momentarily press this icon to change between the two, leaving the desired option on the screen. This adjusts the chipping logic to account for differences in infeed depth.
	Chip Size Momentarily press icon to bring up a slider. Using this slider, adjust the desired wood chip size. This adjusts the chipping speed logic to produce the desired chip.
	Chipper Rotor Type Selection This button allows the selection of either a two pocket or a four pocket rotor. Momentarily pressing this button will switch between the two types. The left symbol is a two pocket rotor. The right is a four pocket rotor. The one with green around it is the currently selected rotor. The one with red around it is not.
	Top Roll Speed The number indicated below this symbol is the current speed of the Top Feed Roll.
	Feed Conveyor Speed The number indicated below this symbol is the current speed of the Feed Conveyor.
	Bottom Roll Speed The number indicated below this symbol is the current speed of the Bottom Feed Roll.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.

	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Top Roll Height This displays the current height of the Top Feed Roll. The arrows to the left represent the up/down solenoids. Green indicates which is active.
	Engine RPM This displays the engine's speed in RPM.
	Run Mode Scroll Momentarily press this button to scroll between the four available run modes. The currently selected run mode is shown within the button.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(13) Cooling System Menu

The Cooling System Menu (Figure 5.27) is used for adjusting and monitoring the status of cooling system functions. This menu can be accessed by pressing the Cooling System Menu button from the Advanced Menu. See Section 5.6d Cycle System Cooling for more information on this feature in general.

The Cooling System Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

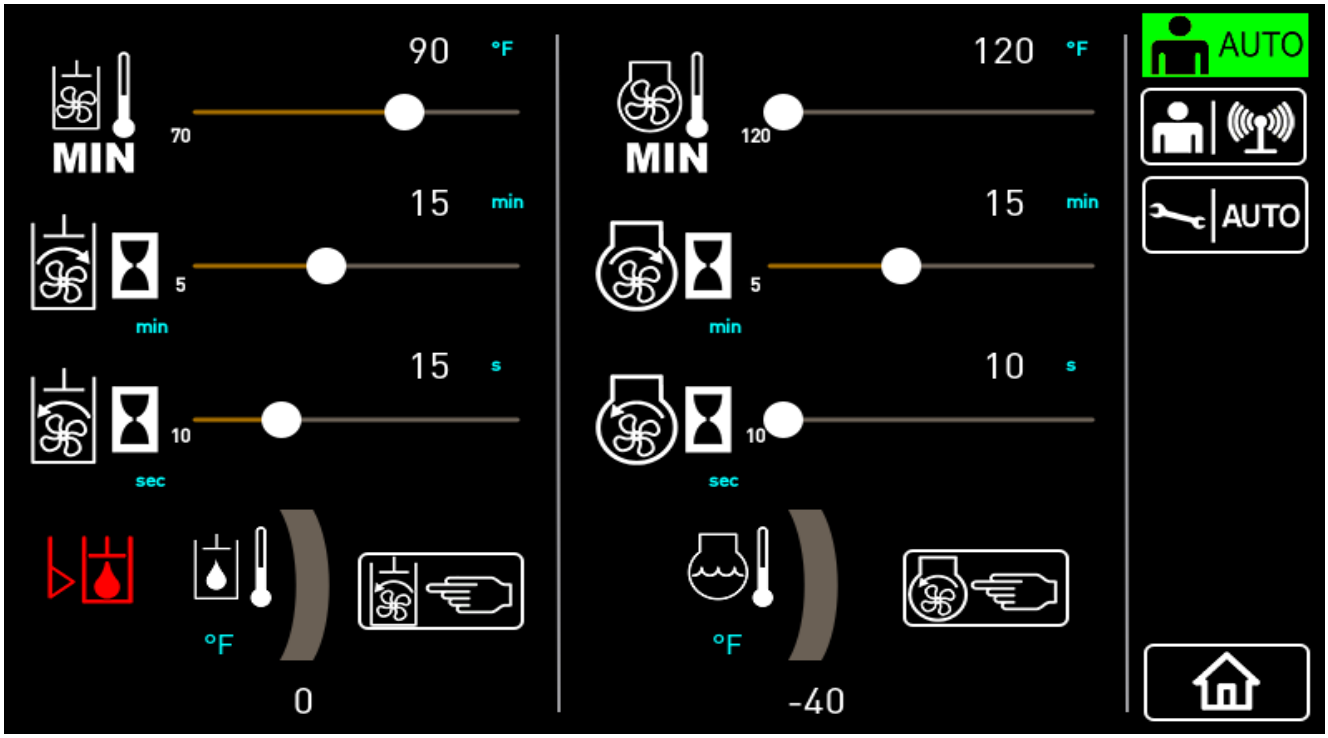
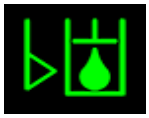
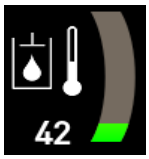
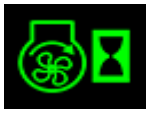
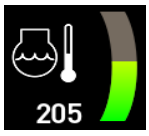
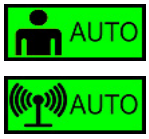


Figure 5.27 - Cooling System Menu

Pictograph	Function
	Hydraulic Cooling Enable Temperature Use the slider to adjust the temperature in which the hydraulic cooling system will activate. Green indicates that the hydraulic oil temperature is over the enable temperature, white indicates it is not.
	Hydraulic Cooling Cycle Time Use the slider to adjust the length of the hydraulic cooling cycles. Green indicates the hydraulic cooling fan is pulling air, white indicates it is not. The number below this symbol indicates the amount of time (in minutes) remaining in the cooling cycle.

	Hydraulic Purge Time Use the slider to adjust the length of purge time of the hydraulic cooling system. Green indicates the hydraulic cooling fan is purging air, white indicates it is not. The number below this symbol indicates the amount of time (in minutes) remaining in the purging cycle.
	Hydraulic Oil Level This displays whether the hydraulic oil level is acceptable. Green indicates it is, red indicates it is not.
	Hydraulic Oil Temperature This displays the hydraulic oil temperature.
	Manual Hydraulic Purge Momentarily press this button to manually purge the hydraulic cooling system. See Section 5.6d Cycle Cooling System for more information.
	Engine Cooling Enable Temperature Use the slider to adjust the temperature in which the engine cooling system will activate. Green indicates that the engine oil temperature is over the enable temperature, white indicates it is not.
	Flexxaire Fan Cooling Cycle Time Use the slider to adjust the length of the Flexxaire fan cooling cycles. Green indicates the Flexxaire cooling fan is pulling air, white indicates it is not. The number below this symbol indicates the amount of time (in minutes) remaining in the cooling cycle.
	Flexxaire Fan Purge Cycle Time Use the slider to adjust the length of purge time of the Flexxaire fan. Green indicates the Flexxaire cooling fan is purging air, white indicates it is not. The number below this symbol indicates the amount of time (in minutes) remaining in the purging cycle.
	Engine Coolant Temperature This displays the engine coolant temperature.
	Manual Engine Purge Momentarily press this button to manually purge the engine cooling system. See Section 5.6d Cycle Cooling System for more information.
	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	

	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(14) Metal Detection System (M.D.S.™) Menu

The Metal Detection System (M.D.S.™) Menu (Figure 5.28) provides adjustment for the Metal Detection System (M.D.S.™). This menu can be accessed by pressing the Metal Detection System (M.D.S.™) Menu button from the Advanced Menu. See Section 5.6a M.D.S. to see more information.

The Metal Detection System (M.D.S.™) Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

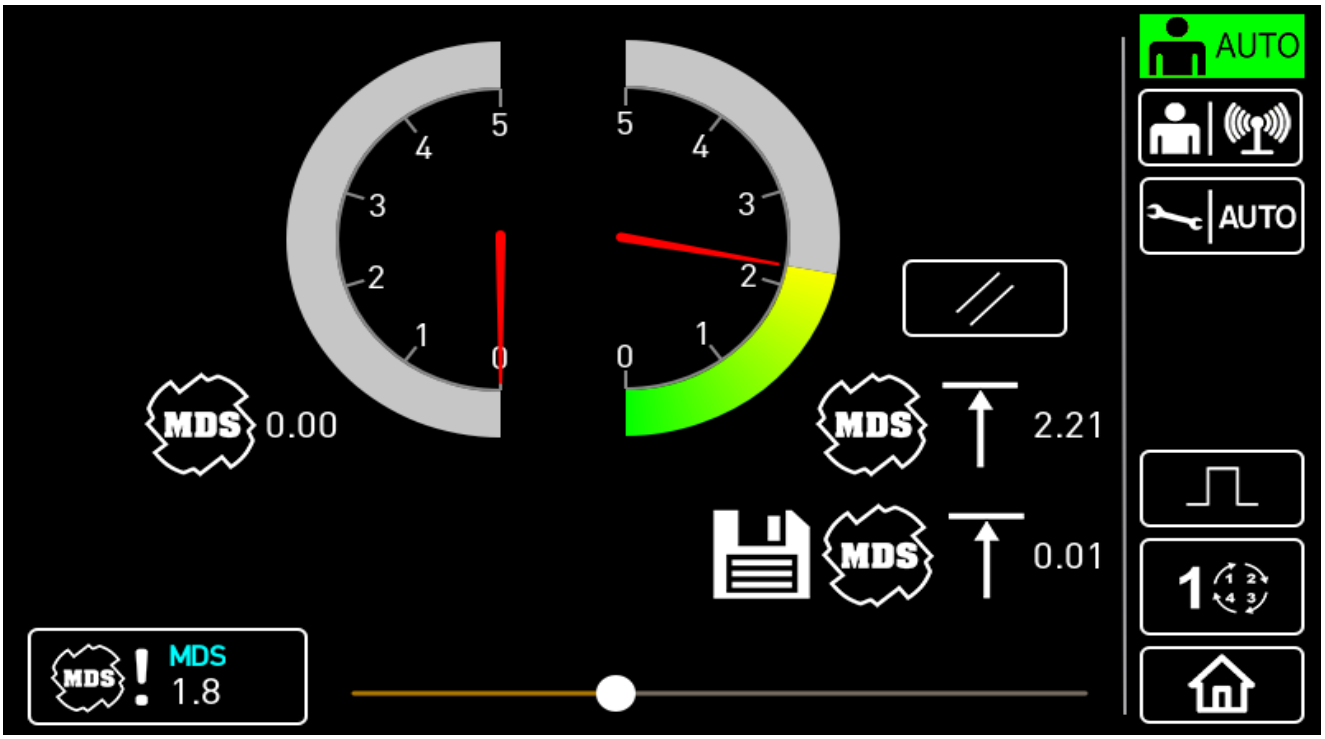
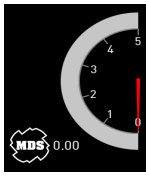


Figure 5.28 - Metal Detection System (M.D.S.™) Menu

Pictograph	Function
	M.D.S. Input The current reading of the M.D.S sensor is displayed on this gauge and next to the MDS symbol.
	M.D.S. Peak This gauge shows the highest M.D.S measurement since last reset.

	M.D.S. Peak Reset Momentarily press this button to reset the M.D.S peak signal measurement.
	M.D.S. Peak This displays the highest M.D.S measurement since last reset.
	M.D.S. Trip Setpoint This displays the highest M.D.S measurement since last power cycle.
	M.D.S. Trip Setpoint This displays the current M.D.S Trip Setpoint. Adjust this value with the slider to the right of the button. Momentarily press this button to toggle the M.D.S on and off. White indicates MDS is enabled, red indicates it is disabled.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	M.D.S. Test Momentarily press this button to test the M.D.S.
	Run Mode Scroll Momentarily press this button to scroll between the four available run modes. The currently selected run mode is shown within the button.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.
	M.D.S. Metal Detection Warning This is a warning that may appear in the center of the screen if metal is detected. Before proceeding, please install the Top Feed Roll safety pin and inspect the infeed for metal and the rotor for possible damage. Press the "X" button to clear the alarm.

	M.D.S. Warning This is a warning that may appear in the center of the screen after disabling M.D.S. after metal has been detected. This warns the user to ensure the Top Feed Roll safety pin is installed. Before proceeding, ensure that it is installed and that all personnel are clear from the infeed area. Press the “X” button to clear the alarm.

(15) Measure Groups Menu

The Measure Groups Menu (Figure 5.29) is used for viewing various measure groups. This menu can be accessed by pressing the Measure Groups Menu button from the Advanced Menu. The purpose of this section is to familiarize operators with navigation of the Measure Groups Menu..

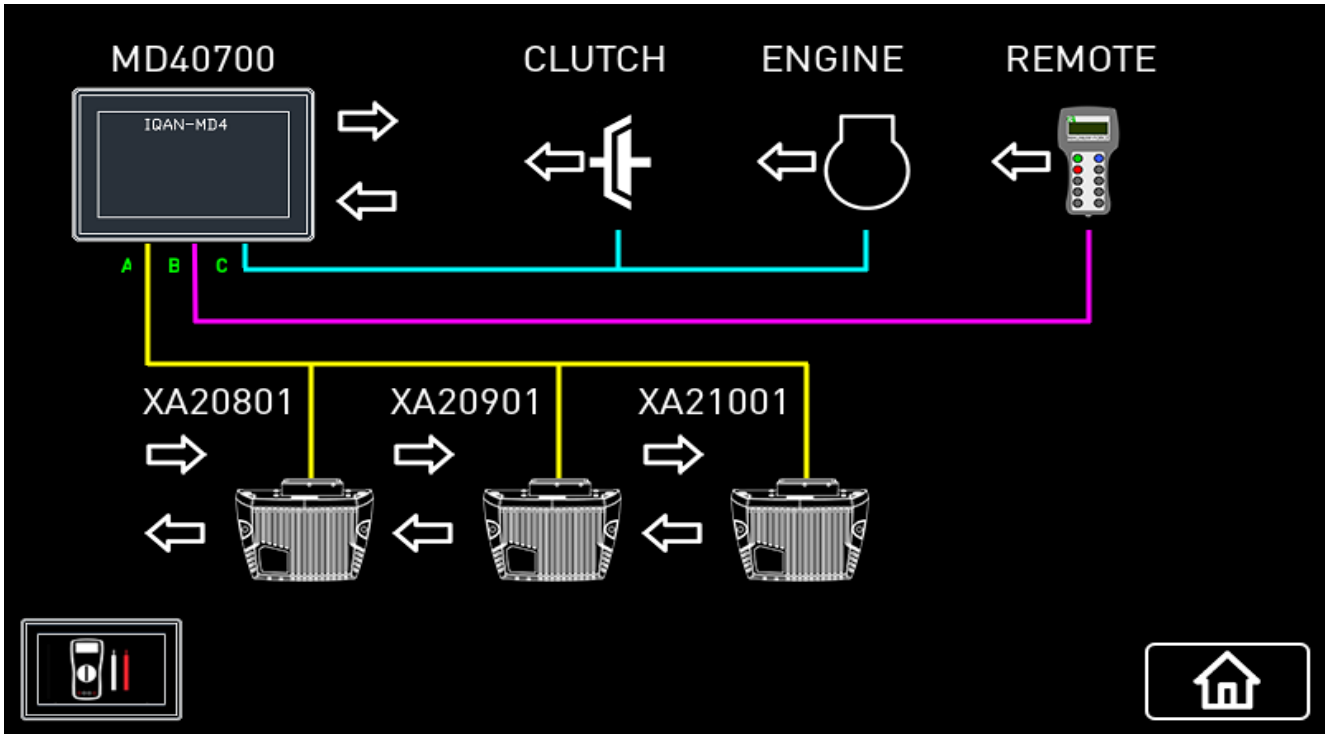
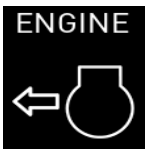
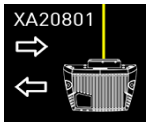
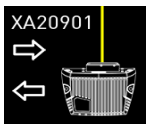
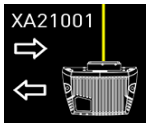


Figure 5.29 - Measure Groups Menu

Pictograph	Function
	MD40701 Inputs/Outputs Momentarily press the arrows next to this symbol to view the MD40701 inputs and outputs. The right arrow is for outputs and the left arrow is for inputs.
	Clutch Outputs This button is only present if the machine is equipped with a clutch. Momentarily press this button to view the clutch outputs.
	Engine Outputs Momentarily press this button to view the engine outputs.
	Radio Remote Outputs Momentarily press this button to view the radio remote outputs.

	XA20801 Inputs/Outputs Momentarily press this button to view the XA20801 inputs.
	XA20901 Inputs/Outputs Momentarily press this button to view the XA20901 inputs.
	XA21001 Inputs/Outputs Momentarily press this button to view the XA21001 inputs.
	Advanced I/O Testing Menu This menu is highly technical and should be avoided by those not technically inclined. It's main purpose is for verification of machine wiring. The button is only present if the engine is off, and the engine needs to remain off during use of this menu. This prevents the digital outputs from causing unintended behavior. This menu allows quick testing of digital outputs without regards to the normal run logic of the machine. This menu also allows viewing of all inputs to the machine. Momentarily press this button to enter the Advanced I/O Testing Menu.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(16) Manual Control Menu

The Manual Control Menu (Figure 5.30) is used for manually controlling various functions on the machine. This menu can be accessed by pressing the Manual Control Menu button from the Advanced Menu.

The Manual Control Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

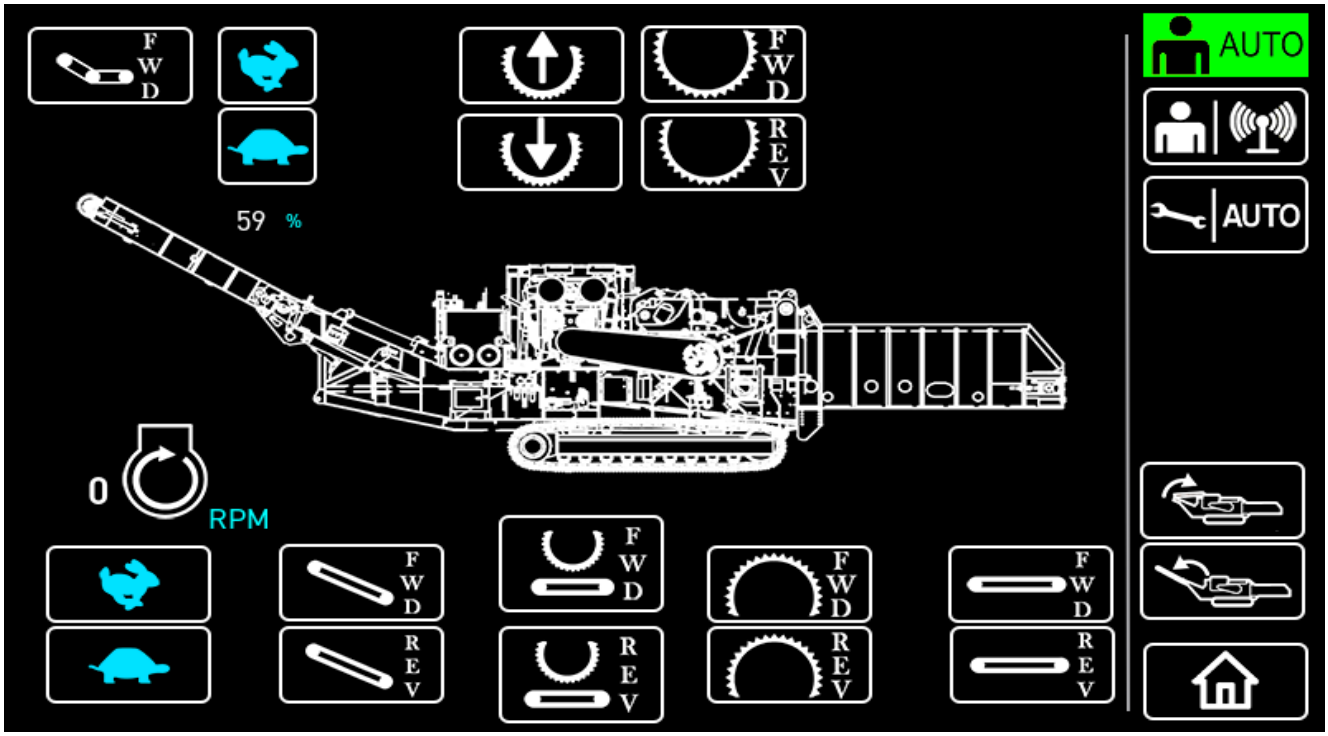
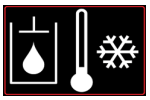


Figure 5.30 - Manual Control Menu

*NOTE: Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Engine RPM This displays the engine's speed in RPM.
	Engine Fast Press and hold this button (beneath Engine RPM) to throttle the engine up.
	Engine Slow Press and hold this button (beneath Engine RPM) to idle the engine down.
	Regrind Conveyor Forward This button is only present if the machine has a Regrind Conveyor. Momentarily press this button to move the Regrind Conveyor forward.

	Regrind Conveyor Reverse This button is only present if the machine has a Regrind Conveyor. Press and hold this button to the Regrind Conveyor reverse.
	Feeds Forward Momentarily press this button to move the feed system forward. Green indicates the feeds are active forward, red indicates they are not.
	Feeds Reverse Press and hold this button to move the feed system backward. Green indicates the feeds are active backward, red indicates they are not.
	Bottom Feed Roll Forward This button is only present if the machine has a Bottom Feed Roll. Momentarily press it to move the Bottom Feed Roll forward.
	Bottom Feed Roll Reverse This button is only present if the machine has a Bottom Feed Roll. Press and hold it to move the Bottom Feed Roll reverse.
	Feed Conveyor Forward Momentarily press this button to move the Feed Conveyor forward.
	Feed Conveyor Reverse Press and hold this button to move the Feed Conveyor reverse.
	Discharge Toggle Momentarily press this button the toggle the discharge on and off.
	Discharge Fast Press and hold this button (left of Discharge Toggle) to increase the speed of the Feed Conveyor.
	Discharge Slow Press and hold this button (left of Discharge Toggle) to decrease the speed of the Feed Conveyor. The current setting in percentage is indicated below.
	Top Roll Up Momentarily press this button to raise the Top Feed Roll. This will bypass the automatic controls. Press the button again to stop raising it.
	Top Roll Down Press and hold this button to lower the Top Feed Roll. While held this will bypass the automatic controls.
	Top Roll Forward Momentarily press this button to move the Top Feed Roll forward. This will bypass the automatic controls. Press the button again to stop raising it.
	Top Roll Reverse Press and hold this button to make the Top Feed Roll move backward. While held this will bypass the automatic controls.

 	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Fold Discharge Conveyor Press and hold this button to fold the Discharge Conveyor. Green indicates the fold command is being sent, white indicates it is not. This button is the higher of the two similar buttons.
	Unfold Discharge Conveyor Press and hold this button to unfold the Discharge Conveyor. Green indicates the unfold command is being sent, white indicates it is not. This button is the lower of the two similar buttons.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.
	Hydraulic Temperature Warning This is a warning that may appear in the center of the screen. See Section 5.9b CBI Warnings for more information.

(17) Pressure Menu

The Pressure Menu (Figure 5.31) is used for monitoring various machine pressure settings. This menu can be accessed by pressing the Pressure Menu button from the Advanced Menu.

The Pressure Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

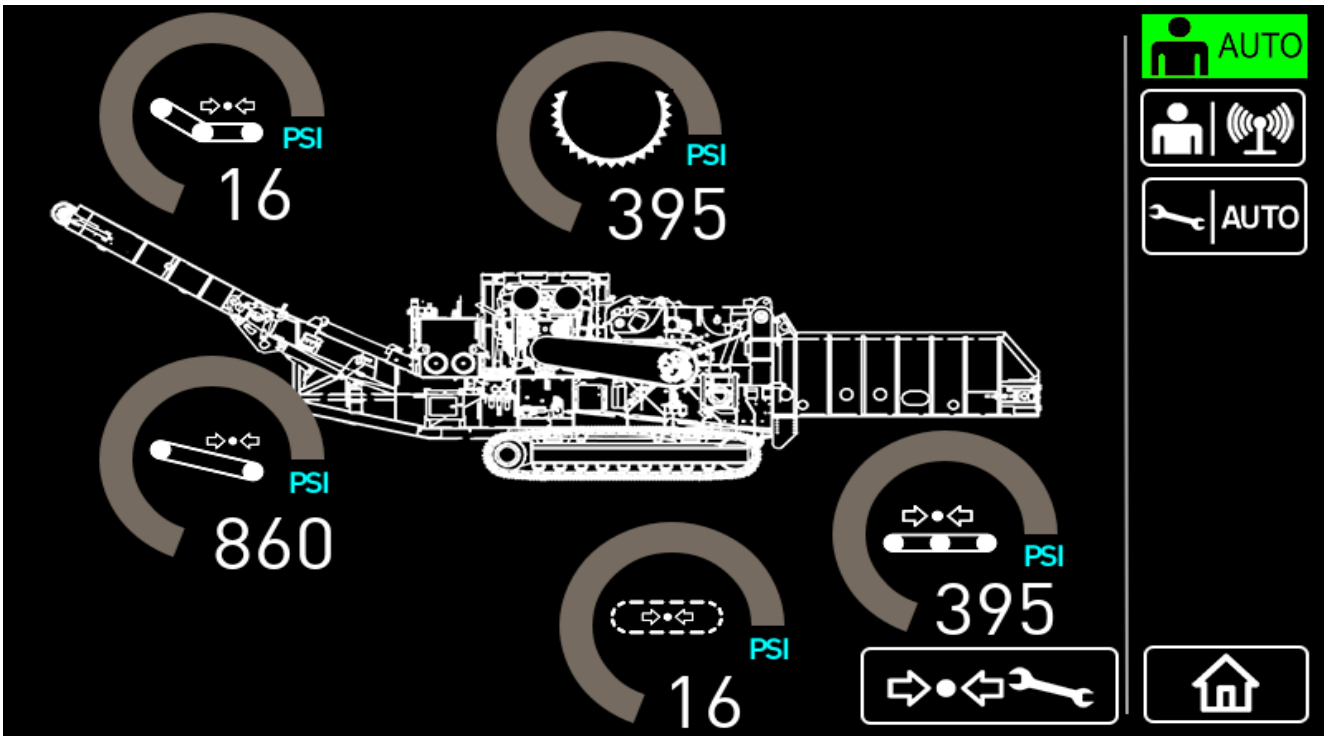
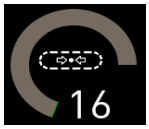
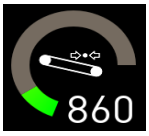


Figure 5.31 - Pressure Menu

*NOTE: Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Bottom Feed Roll Pressure This display is only present if the machine has a Bottom Feed Roll. This displays the pressure of the Bottom Feed Roll.
	Feed Conveyor Pressure This display is only present if the machine does not have a Bottom Feed Roll. It displays the pressure of the Feed Conveyor.
	Track Brake Pressure This displays the pressure of the track brake.

	Regrind Conveyor Pressure This display is only present if the machine has a Regrind Conveyor. This displays the pressure of the Regrind Conveyor.
	Top Feed Roll Pressure This displays the pressure of the Top Feed Roll.
	Discharge Pressure This displays the pressure of the Discharge Conveyor.
	High Pressure Settings Menu Momentarily press this button to navigate to the High Pressure Settings Menu.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(18) High Pressure Settings Menu

The High Pressure Settings Menu (Figure 5.32) is used for adjusting high pressure settings. This menu can be accessed by pressing the High Pressure Settings Menu button from the Pressure Menu.

The High Pressure Settings Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

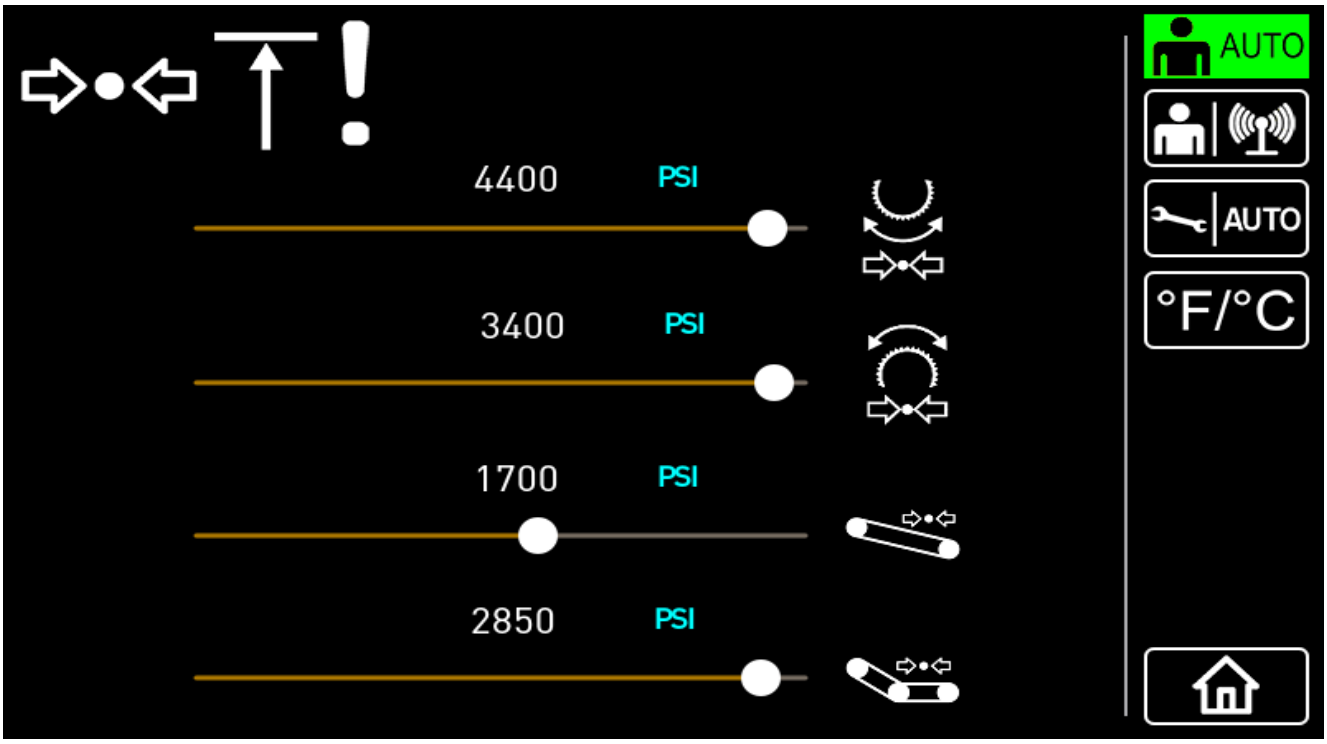


Figure 5.32 - High Pressure Settings Menu

*NOTE: Machine orientation may differ, affecting some pictograph directions.

Pictograph	Function
	Top Roll High Pressure Use the slider to the left of the image to adjust the high pressure setpoint of the Top Feed Roll.
	Feed Conveyor High Pressure This slider is only present if the machine does not have a Bottom Feed Roll. Use the slider to the left of the image to adjust the high pressure setpoint of the Feed Conveyor.
	Bottom Roll High Pressure This slider is only present if the machine has a Bottom Feed Roll. Use the slider to the left of the image to adjust the high pressure setpoint of the Bottom Feed Roll.

	Regrind Conveyor Pressure This slider is only present if the machine has a Regrind Conveyor. Use the slider to the left of the image to adjust the high pressure setpoint of the Regrind Conveyor.
	Discharge Conveyor High Pressure Use the slider to the left of the image to adjust the high pressure setpoint of the Discharge Conveyor.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Display Units Momentarily press this button to toggle system units of measurement.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(19) Fuel Consumption Menu

The Fuel Consumption Menu (Figure 5.33) is used for displaying information about the machine's fuel consumption. This menu can be accessed by pressing the Fuel Consumption Menu button from the Advanced Menu.

The Fuel Consumption Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

Figure 5.33 - Fuel Consumption Menu

Pictograph	Function
	Fuel Consumption (1 Hour Average) This displays the current hourly average fuel consumption of the engine.
	Fuel Consumption (12 Hour Average) This displays the current 12 hour average fuel consumption of the engine.
	Total Fuel Used This displays the gallons (or liters) total used, as indicated by the engine.
	Consumption Log Momentarily press this button to view the consumption log.

	Fuel History Reset Momentarily press this button to reset the fuel consumption history and averages.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Fuel Consumption This displays the current gallons (or liters) per hour used.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(20) Clutch Diagnostics Menu

NOTICE

This menu is only present and relevant if the machine is equipped with a clutch.

The Clutch Diagnostics Menu (Figure 5.34) is used for monitoring clutch settings. This menu can be accessed by pressing the Clutch Diagnostics Menu button from the Advanced Menu.

The Clutch Diagnostics Menu contains various buttons and display parameters. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to list all of the button and parameters on this menu along with a brief explanation of what they are.

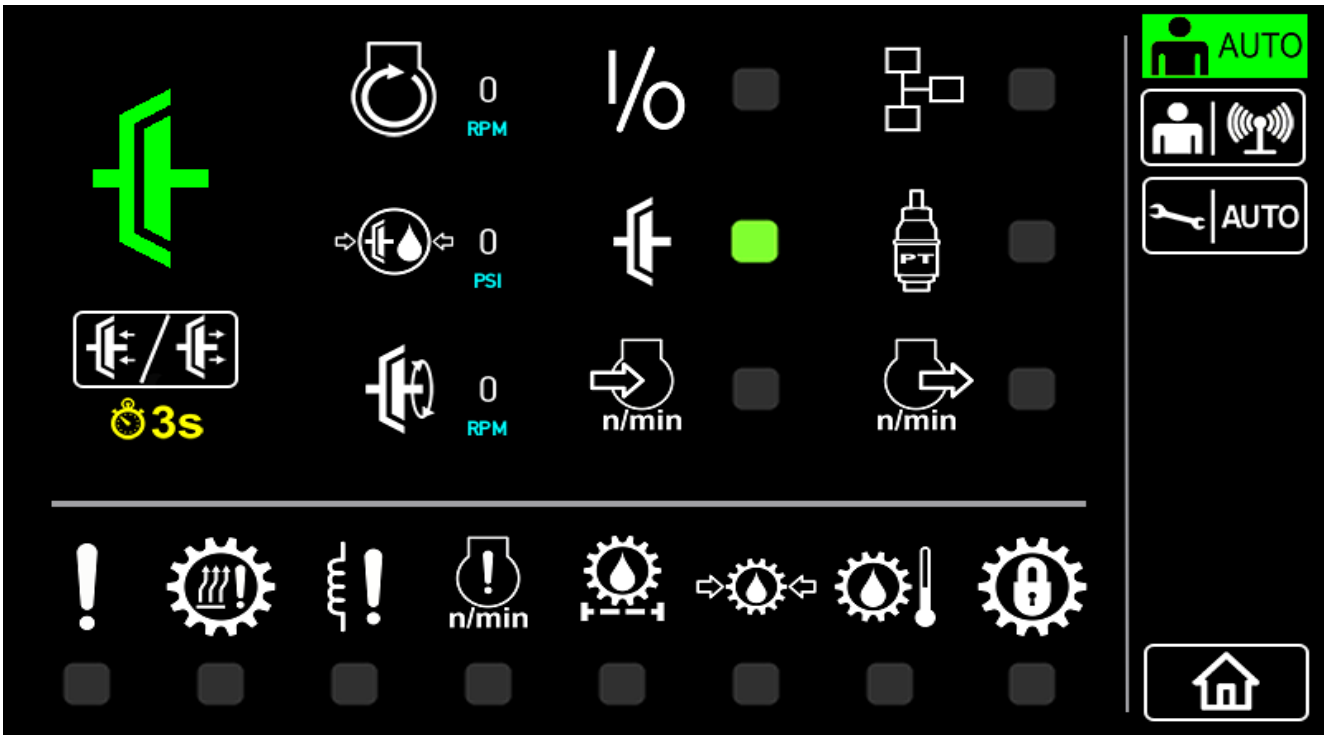
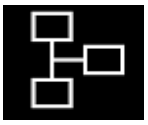
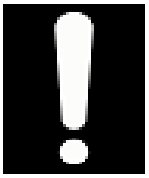


Figure 5.34 - Clutch Diagnostics Menu

Pictograph	Function
	Clutch Status This displays the clutch status. Green indicates it is on (engaged), white indicates it is off (disengaged).
	Clutch Toggle Press and hold this button for three seconds to engage or disengage the clutch.
	Engine RPM This displays the engine's speed in RPM.

	On/Off Toggle This displays if the clutch controller is on or off.
	CAN Bus Detected This displays if the CAN Bus is detected.
	Clutch Oil Pressure This displays the oil pressure of the clutch.
	Pressure Transducer Detected This displays if the pressure transducer is detected.
	Clutch RPM This displays the speed of the clutch in RPM.
	Clutch Input Detected This displays whether or not clutch input is detected.
	Clutch Output Detected This displays whether or not clutch output is detected.
	Failure or Malfunction This displays if there is a failure or malfunction with the clutch. If this is selected, please contact CBI/Terex.
	Clutch Overload This displays that the clutch is being overloaded.
	Coil Fault This displays that there is a fault with the coil.
	Engine Rotation Speed Fault This displays that there is a fault with the rotation speed of the engine.
	Clutch Oil Filter Indicator This indicates if the clutch oil filter is in need of replacement.

	Clutch Oil Pressure This displays that there is an issue with the oil pressure of the clutch.
	Clutch Oil Temperature This displays that there is an issue with the oil temperature of the clutch.
	Clutch Lock This displays that the clutch is locked.
   	Control Mode One of these will be displayed in the top right. This displays the machine's current Control Mode. See Section 5.4 Control Modes for more information.
	Local / Radio Toggle Momentarily press this button to toggle the machine between radio and local mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Service / Auto Toggle Momentarily press this button to toggle between service and auto mode. NOTICE: Confirmation of mode selection is highlighted in the top right corner of the screen.
	Advanced Menu Momentarily press this button to return to the Advanced Menu.

(21) Advanced System Menu

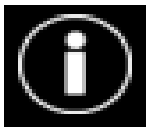
NOTICE

Caution should be used when making any changes within this menu.

The Advanced System Menu (Figure 5.35) is a powerful menu intended only for configuration details and advanced machine debugging. Things visible within this menu are system configuration information, data logs, raw inputs/output values, and other parameters. It is also possible to change machine operation set points. This menu can be accessed by pressing the Advanced System Menu button from the Advanced Menu.

The Advanced System Menu contains various buttons, sub menus, and functionality. In order to successfully use this menu it is critical that you fully understand the button functions and parameters displayed. The purpose of this section is to describe the purpose of each sub menu as well as to list and describe the buttons that will appear within them.

Figure 5.35 - Advanced System Menu

Pictograph	Function
	Information Sub-Menu Press this button to navigate to the Information Sub-Menu. Within this sub-menu is hardware configuration information and data logs. The data displayed can be lengthy and may require scrolling.
	Measure Sub-Menu Press this button to navigate to the Measure Sub-Menu. Within this sub-menu is the status of the current input/outputs. It is grouped by the physical hardware component tied to those I/O. The data displayed can be lengthy and may require scrolling.

	Adjust Sub-Menu Press this button to navigate to the Adjust Sub-Menu. Within this sub-menu are many configurable settings about how the machine operates. These settings affect how the machine operate. The data displayed can be lengthy and may require scrolling.
	Preferences Sub-Menu Press this button to navigate to the Preferences Sub-Menu. Within this menu are basic system preferences to do with the MD4 screen itself.
	Decrease Value This button will appear when attempting to modify a value. Press this button to decrease the value of the adjustment option.
	Increase Value This button will appear when attempting to modify a value. Press this button to increase the value of the adjustment option.
	Exit Press this button to return to the Advanced Menu.

5.9 Warnings and Alarms

(1) CBI Diagnostic Messages

The MD4 provides detailed information about the subsystems of the machine. As the machine is outfitted with numerous sensors, alerts and dangerous conditions can be quickly and automatically identified. The following section details the messages that could be displayed on the MD4, what triggers them to appear, and what needs to happen to reset them.

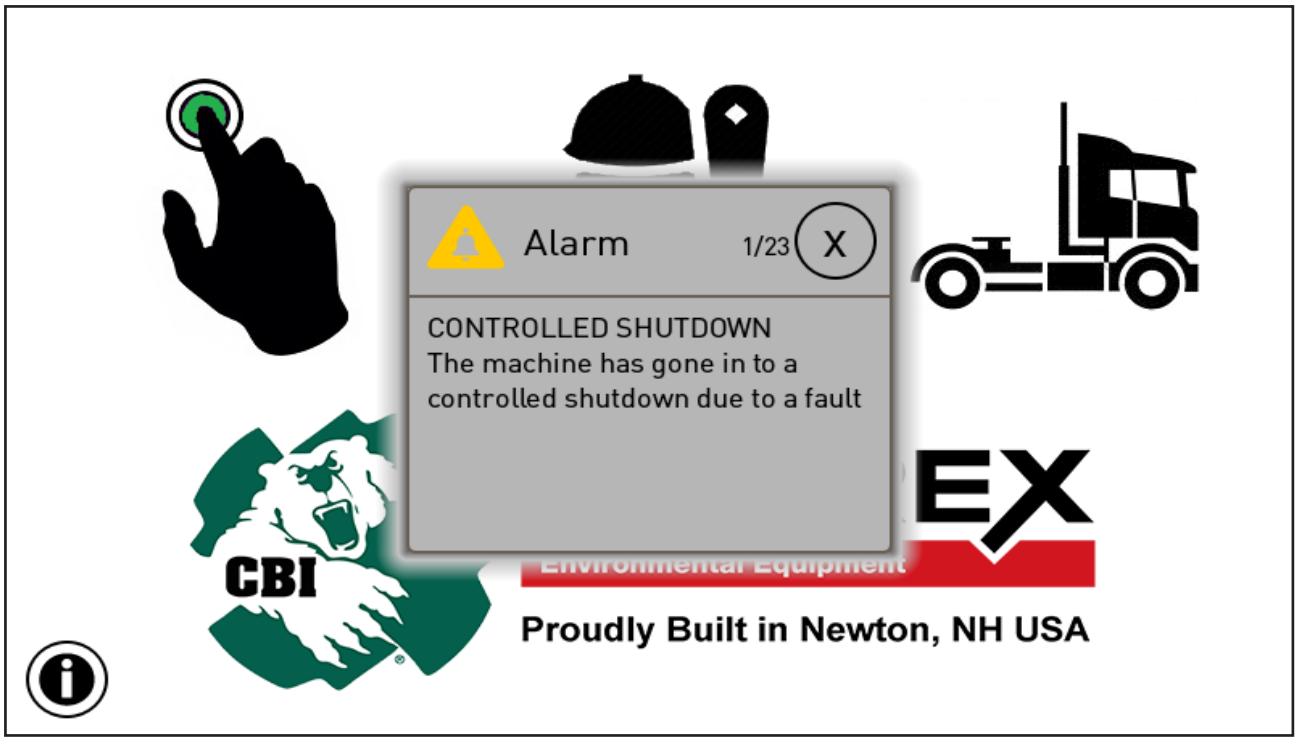


Figure 5.36 - An example of a CBI Diagnostic Message, Pressing the X will close it.

Table 5.1 - A comprehensive list of all CBI Diagnostic Messages

Item	Alarm	Message
1	TRACK MODE LOCKED OUT	Displayed Text: Movement inputs from the tethered remote system are currently active. This is preventing the machine from going into track mode for safety. Cause: Tethered remote control buttons are pressed while trying to engage track mode. Reset: Tethered movement inputs stop being pressed, and track mode is entered.
2	TRACK MODE LOCKED OUT	Displayed Text: Movement inputs from the radio remote system are currently active. This is preventing the machine from going into track mode. Cause: Non-tracking related buttons on the radio remote are being pressed while trying to engage track mode. Reset: Enter track mode while no other radio button is pressed.

3	HIGH PRESSURE	Displayed Text: The Regrind Conveyor is in an active high pressure condition. Cause: Regrind Conveyor pressure is over the pressure limit (default: 1700 PSI or ~117 Bar) for over 5 seconds. Reset: Regrind Conveyor pressure drops back under the pressure limit minus 500 PSI (~34.5 Bar) (default: 1200 PSI or ~82.7 Bar).
4	FEEDS STOPPED	Displayed Text: Warning, the Engine speeds command is less than the Load Sense Trip Setpoint. Either increase Engine speed or decrease Load Sense Trip Cause: In Auto mode, the Feeds Forward command is given when engine RPM is below Load Sense Trip Setpoint (default: 1850 RPM or ~127.5 Bar) Reset: No Feeds Forward command is given or engine RPM is above Load Sense Trip Setpoint
5	HIGH PRESSURE	Displayed Text: The Feed System is in an Active High Pressure Condition. Cause: Feed Conveyor pressure over the pressure limit (default: 4400 PSI or ~303 Bar) for over 5 seconds. (Not applicable to 6400 Series) Reset: Feed Conveyor pressure drops back under the bottom roll pressure limit minus 580 PSI (~40 Bar) (default: 2820 PSI or ~194 Bar).
6	HIGH PRESSURE	Displayed Text: The Bottom Roll is in an Active High Pressure Condition. Cause: Feed Conveyor pressure over the pressure limit (default: 4400 PSI or ~303 Bar) for over 5 seconds in a 6400 Series. Reset: Feed Conveyor pressure drops below the bottom roll pressure limit minus 580 PSI (~40 Bar) (default: 2820 PSI or ~194 Bar).
7	HIGH PRESSURE	Displayed Text: The machine has/had entered a High Pressure Condition. Cause: High pressure is detected in the Discharge Conveyor, Top Feed Roll, Feed Conveyor,Regrind Conveyor. These parameters are noted in those respective messages. Reset: The system stopped detecting high pressure.
8	TOP FEED ROLL	Displayed Text: Resetting the machine will release the Top Feed Roll if the Safety Pin is NOT installed! Make sure there is nobody in the infeed area! Cause: Metal was detected the last time the machine was on. Reset: System Reset PB

9	METAL DETECTED	Displayed Text: The system has detected a metal impact and is now shutting down. Please install top roll safety pin and inspect the Infeed for metal and the rotor for possible damage. Cause: M.D.S. Input measurement was over 1000 * M.D.S. Trip Setpoint (default: 2.4) or the M.D.S. Test button is pressed. Reset: System Reset PB or M.D.S. toggle off.
10	BELT DISENGAGED DISABLED	Displayed Text: Must be in Service Mode and Engine not running. Or disable in Adjust Group 'Disable Belt' when machine is stopped. Cause 1: The machine is in Auto Mode or Track Mode and the belt disengage PB is pressed on a non-clutch-equipped machine. Cause 2: The machine is in Service Mode, the belt disengage PB is pressed on a non-clutch-equipped machine, and the engine is running. Reset: -
11	START DISABLED	Displayed Text: The Rotor will not engage, lower Top Feed Roll, or disable the belt to start. Cause 1: Key in start position, belt is disabled in a non-clutch-equipped machine, and the Top Feed Roll is over 12 inches off of the deck. Cause 2: The hydraulics are engaged. Reset: -
12	ROTOR AUTOMATIC ENGAGE	Displayed Text: The Rotor is about to automatically engage, Keep all personal clear. Cause 1: Key in start position and belt is disabled in a non-clutch-equipped machine OR the hydraulics are engaged. Cause 2: The Top Feed Roll is over 12 inches off of the deck. Reset: -
13	ROTOR IS DISABLED	Displayed Text: To enable the rotor stop machine and go to Adjust Group 'Belt Settings'. Cause: Key in start position, belt disabled in a non-clutch-equipped machine. Reset: -
14	CLUTCH DISABLED	Displayed Text: The Engine RPM must be between Idle and 1100 to engage the clutch. Cause: Clutch toggle was commanded and engine RPM was not between 600 and 1100 RPM. Reset: -

15	LOW PRESSURE	Displayed Text: Belt pressure too low, belt failed to engage. Cause: The belt has not engaged and the engine RPM is over 600 RPM for over the time limit (default: 60 seconds). Reset: System Reset PB
16	JAM	Displayed Text: Regrind Conveyor is jammed. Please clear all material from Regrind Conveyor. Cause: Regrind Conveyor reverse has occurred 6 times in 2 minutes. Reset: System Reset PB Preliminary Cause: Regrind Conveyor reverse is caused by Regrind Conveyor pressure being above the pressure limit (default: 1700 PSI or ~117 Bar) for 5 seconds. Preliminary Cause Reset: Regrind Conveyor reverse drops back below the pressure limit minus 500 PSI (~34 Bar) (default: 1200 PSI or ~82.7 Bar).
17	HIGH TEMPERATURE	Displayed Text: Engine Coolant High Temperature Cause: Engine coolant temperature over 105 F (~40.5 C) for 5 seconds. Reset: System Reset PB
18	CONTROLLED STOP	Displayed Text: The machine has gone in to a controlled stop due to a fault. Cause: A 'Non-Critical Fault' was detected. Reset: All 'Non-Critical Faults' are no longer detected.
19	HIGH TEMPERATURE	Displayed Text: DRIVE SIDE BEARING HIGH TEMP The Drive Side Bearing temperature is too high. Cause: DS Bearing Temperature over the temperature limit (default: 195 F or ~90.5 C) for 5 seconds. Reset: System Reset PB
20	HIGH TEMPERATURE	Displayed Text: Non drive side bearing high temp The Non Drive Side Bearing temperature is too high. Cause: NDS Bearing Temperature over the temperature limit (default: 195 F or ~90.5 C) for 5 seconds. Reset: System Reset PB
21	CONTROLLED SHUTDOWN	Displayed Text: The machine has gone in to a controlled shutdown due to a fault. Cause: A 'Critical Fault' was detected. Reset: All 'Critical Faults' are no longer detected.
22	HYDRAULIC OIL LOW LEVEL	Displayed Text: Hydraulic tank #1 low oil Hydraulic Tank #1 Oil Level is too Low. Cause: Hydraulic Tank Level 'not OK' for 5 seconds. Reset: System Reset PB

23	HIGH TEMPERATURE	Displayed Text: hydraulic tank #1 high temp the oil temperature in Hydraulic Tank #1 is too high. Cause: Hydraulic Tank Temperature is over the temperature limit (default: 170 F or ~76.5 C) for 5 seconds. Reset: System Reset PB
24	HIGH PRESSURE	Displayed Text: The Top Feed Roll is in an Active High Pressure Condition Cause: Top Feed Roll system over the pressure limit (default: 4400 PSI or ~303 Bar) for 5 seconds. Reset: Top Feed Roll system drops back below the pressure limit minus 580 PSI (~40 Bar) (default: 3820 PSI or ~263 Bar)
25	HIGH PRESSURE	Displayed Text: The Discharge Conveyor is in an Active High Pressure Condition Cause: Discharge Conveyor system over the pressure limit (default: 2950 PSI or ~203 Bar) for 5 seconds. Reset: Discharge Conveyor system drops back below the pressure limit minus 580 PSI (~40 Bar) (default: 2370 PSI or ~163 Bar)
26	EMERGENCY STOP ACTIVE	Displayed Text: Check all E-stops are pulled out and press System Reset (Blue Button on Right). Cause: MCR stopped being energized, ie. An E-Stop was pressed. Reset: System Reset PB

(2) CBI Warnings

There are a selection of additional warnings that pop up on the MD4. These screens are included with brief details about their intended function.

(a) Hydraulic Oil Too Cold

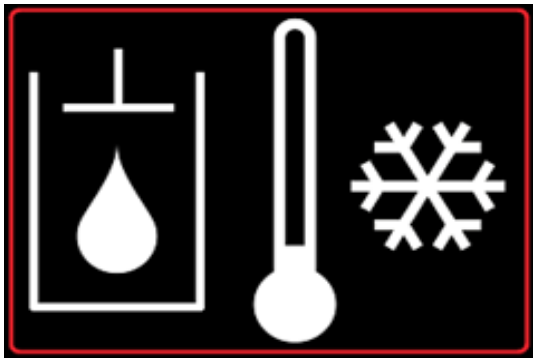


Figure 5.37 - Hydraulic Oil Too Cold

This warning will go off if:

- The hydraulic temperature is below 40°F (~4.4°C) and you attempt to feed forward OR
- The hydraulic temperature is below 32°F (0°C) and you attempted to run the engine too fast.

If this warning pops up, CBI recommends running the Hydraulic Warm Up process. See Section 5.6c Hydraulic Warm Up and Section 5.8d Hydraulic Warm Up Menu for more information.

(b) Track Mode Enabled

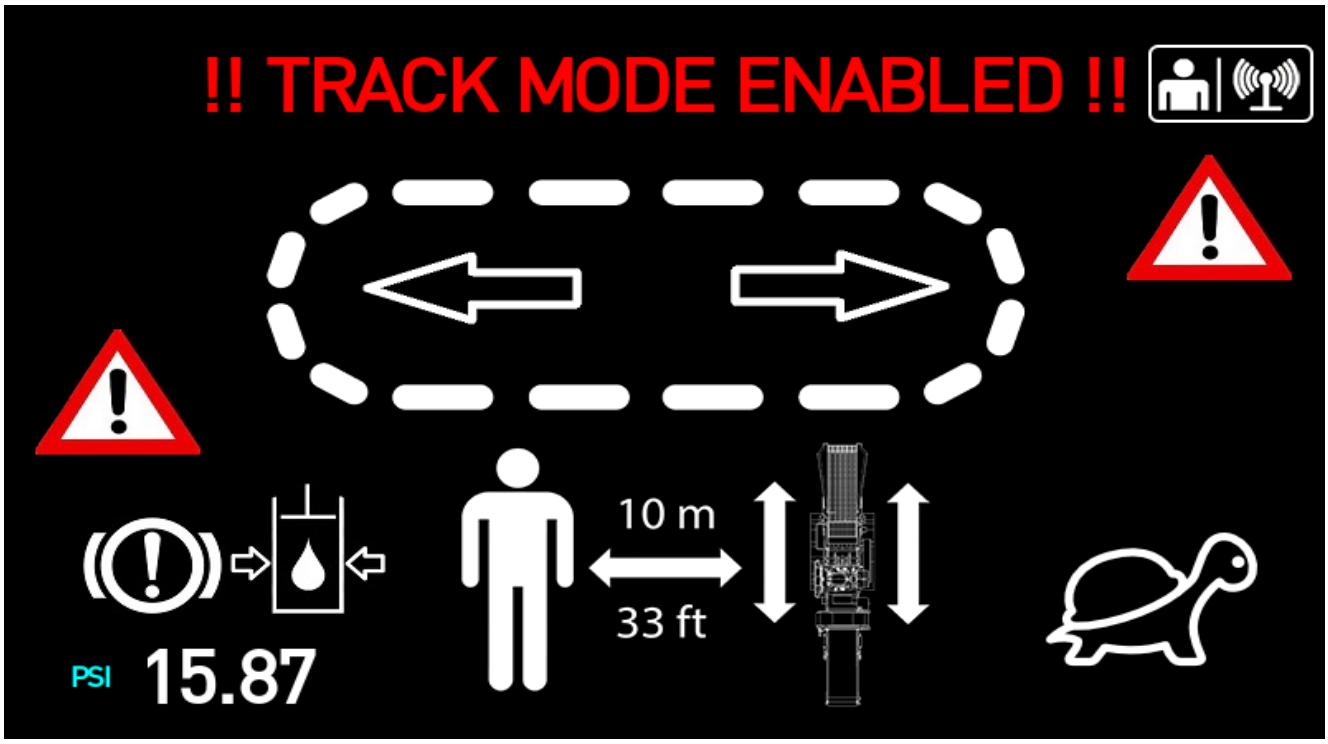


Figure 5.38 - Track Mode Enabled - Indicates Track Mode is enabled.

This warning will go off if:

- Track Mode is Enabled

The button in the top right of this screen is a fail safe. It allows toggling out of Radio Mode into Local Mode in case the remote disconnects.

There is an indicator of tracking speed in the bottom right. If it is a turtle then the tracks are in low speed, if it is a rabbit the tracks are in high speed.

(3) CAT Diagnostic Messages

The MD4 is connected to the CAT engine controller. It is able to provide detailed diagnostic information about the engine of the machine. As the engine is outfitted with numerous sensors by CAT, alerts and dangerous conditions are quickly and automatically identified and the engine alerts our electronics. The following section details the warnings and alarms specific to the engine that could be displayed on the MD4.

There are two CAT engine types, Tier 2 and Tier 4, each with their own diagnostic messages. The next pages have a list of diagnostic messages for Tier 2 engines and the Tier 4 engines. The CAT engine error messages start with the CAT SPN for those parameters.

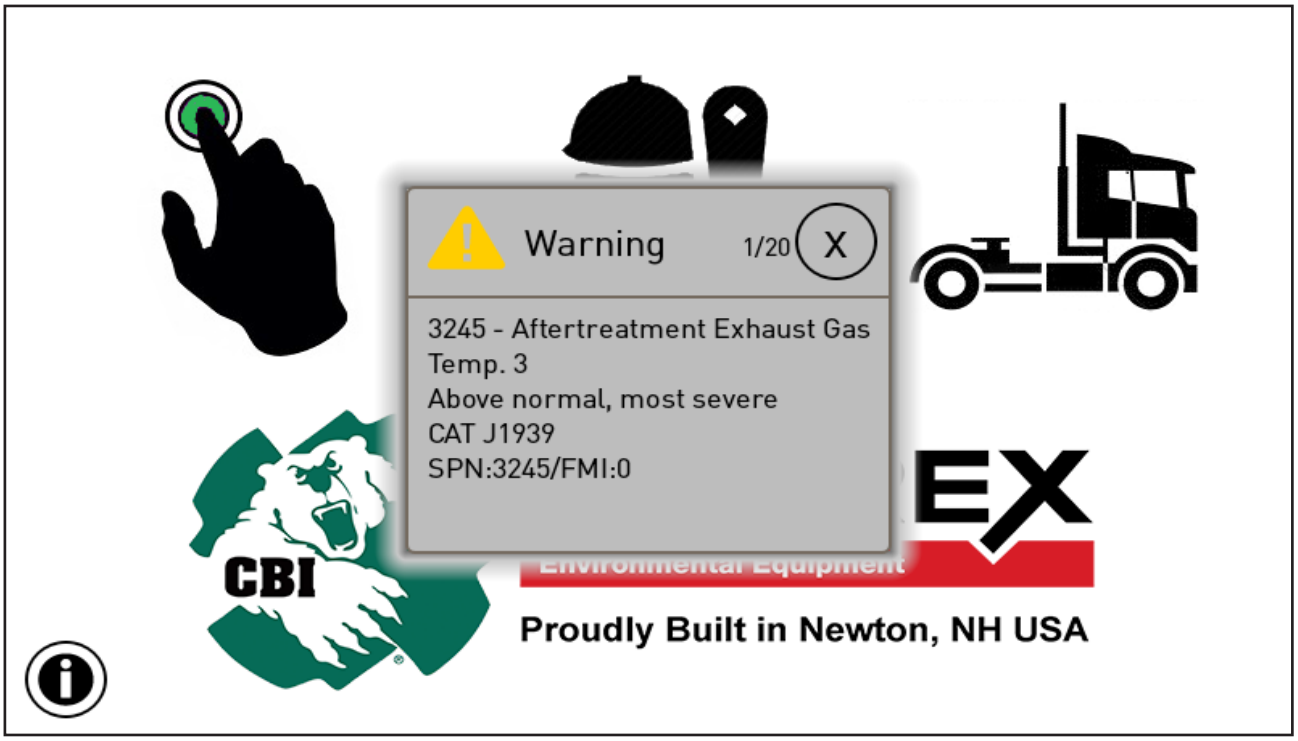


Figure 5.39 - An example of CAT Diagnostic Message, Pressing the X will close the Diagnostic Message.

Table 5.2 - A comprehensive list of all Tier 2 Engine CAT Diagnostic Messages:

Number	Message	Number	Message
51	Intake Air Throttle Position	171	Ambient Air Temperature
84	Vehicle Speed Sensor	174	Fuel Temperature
91	Accelerator pedal	175	Engine Oil Temperature Sensor
93	Aux. Alternate Torque Validation Switch	185	Engine Average Fuel Economy
94	Fuel Delivery Pressure	189	Engine Rated Speed
97	Water in Fuel Indicator	190	Engine Speed
98	Engine Oil Level	1761	Diesel Exhaust Fluid Level
99	Oil Filter Differential Pressure	3050	After-treatment DOC System
100	Engine Oil Pressure	3241	After-treatment Exhaust Gas Temp 1
102	Intake Manifold Pressure Sensor #1	3242	DOC Inlet Temperature
105	Intake Manifold Temperature Sensor #1	3245	After-treatment Exhaust Gas Temp 3
107	Air Filter Differential Pressure	3246	DPF Outlet Temperature
108	Barometric Pressure Sensor	3249	Aftertreatment Exhaust Gas Temp 2
109	Engine Coolant Pressure Sensor	3251	DPF Differential Pressure
110	Engine Coolant Temperature Sensor	3719	Soot Level
111	Engine Coolant Level	3720	DPF Ash
158	Key-switch Battery Voltage	4363	Catalyst Temperature
167	Charging System Voltage	4796	Aftertreatment DOC
168	Battery Voltage		

Table 5.3 - A comprehensive list of all Tier 4 Engine CAT Diagnostic Messages:

Number	Message	Number	Message
29	Accelerator pedal position 2	660	Engine Injector Cylinder #10
91	Accelerator pedal	611	Engine Injector Cylinder #11
100	Engine Oil Pressure	662	Engine Injector Cylinder #12
101	Engine Crankcase Pressure	678	ECU 8 Volts DC Supply
102	Intake Manifold Pressure Sensor #1	723	Engine Speed Sensor #2
105	Intake Manifold Temperature Sensor #1	1131	Engine Intake Manifold #2 Temperature
107	Air Filter Differential Pressure	1385	Auxiliary Temperature #1
108	Barometric Pressure Sensor	1387	Auxiliary Pressure #1
109	Engine Coolant Pressure Sensor	2959	EGR Mass Flow Rate
110	Engine Coolant Temperature Sensor	2791	EGR Valve Control
111	Engine Coolant Level	2813	Engine Air Shutoff Command Status
158	Keyswitch Battery Voltage	3358	EGR Recirculation Inlet Pressure
168	Battery Voltage	3509	Sensor Supply Voltage 1
172	Engine Air Inlet Temperature	3510	Sensor Supply Voltage 2
174	Fuel Temperature	3563	Intake Manifold #1 Absolute Pressure
190	Engine Speed	3659	Injector Cylinder #1 Actuator #2
411	Engine EGR Differential Pressure	3660	Injector Cylinder #2 Actuator #2
412	Engine EGR Temperature	3661	Injector Cylinder #3 Actuator #2
593	Engine Idle Shutdown has Shutdown Engine	3662	Injector Cylinder #4 Actuator #2
626	Engine Start Enable Device 1	3663	Injector Cylinder #5 Actuator #2
630	Calibration Memory	3664	Injector Cylinder #6 Actuator #2
631	Calibration Module	3665	Injector Cylinder #7 Actuator #2
637	Engine Timing Sensor	3666	Injector Cylinder #8 Actuator #2
639	J1939 Network #1	4797	Injector Cylinder #9 Actuator #2
651	Engine Injector Cylinder #01	4798	Injector Cylinder #10 Actuator #2
652	Engine Injector Cylinder #02	4799	Injector Cylinder #11 Actuator #2
653	Engine Injector Cylinder #03	4800	Injector Cylinder #12 Actuator #2
654	Engine Injector Cylinder #04	5276	Exhaust Manifold Bank #1 Flow Balance Valve Actuator Control
655	Engine Injector Cylinder #05	5576	After-treatment #1 Identification
656	Engine Injector Cylinder #06	5577	After-treatment #2 Identification
657	Engine Injector Cylinder #07	5578	Fuel Pressure Sensor
658	Engine Injector Cylinder #08	5580	Filtered Fuel Delivery Absolute Pressure
659	Engine Injector Cylinder #09	5584	Fuel Filter Restriction

(4) PT Tech Diagnostic Messages

If the machine is equipped with a clutch the MD4 is connected to the PT Tech clutch controller. As such, It is able to provide detailed diagnostic information about the clutch of the machine. As the clutch is outfitted with numerous sensors by PT Tech, alerts and dangerous conditions are quickly and automatically identified and the clutch alerts our electronics. The following section details the warnings and alarms specific to the clutch that could be displayed on the MD4.

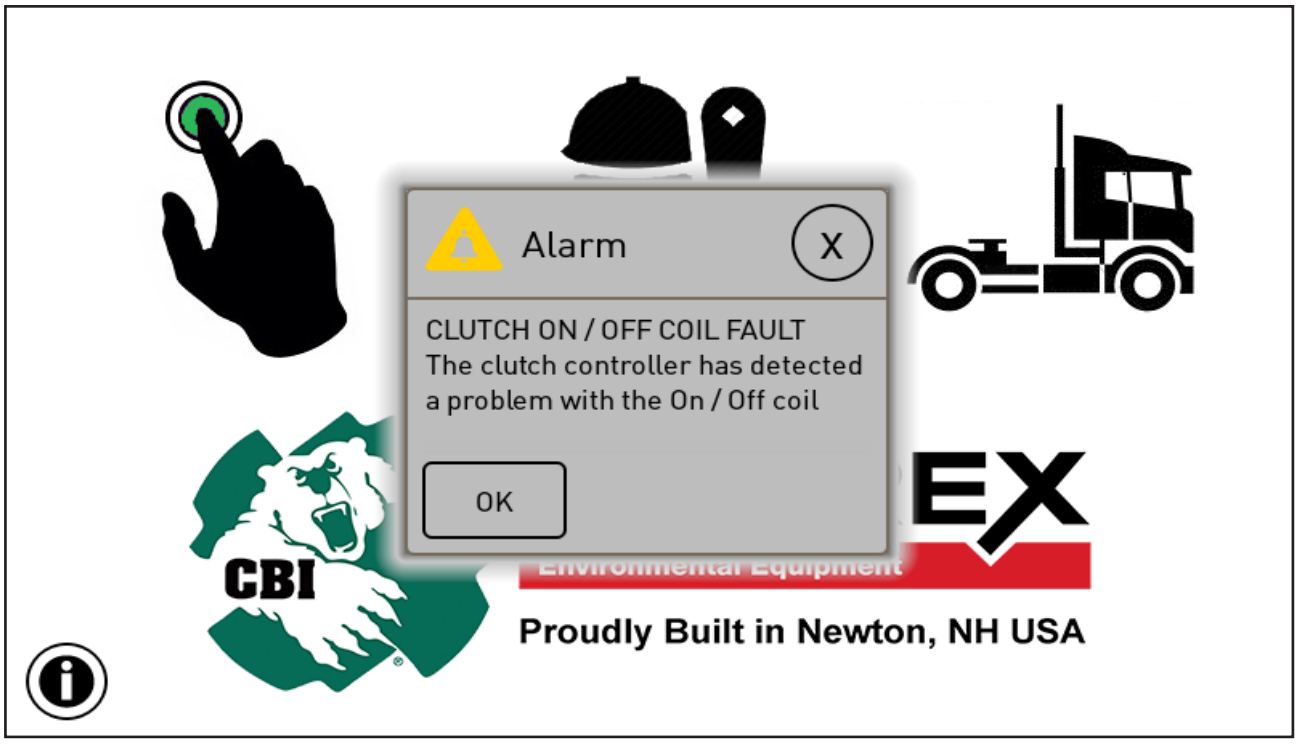


Figure 5.40 - An example of PT Tech Diagnostic Message, Pressing the X will close the Diagnostic Message.

Table 5.4 - A comprehensive list of all PT Tech Clutch Diagnostic Messages:

Item	Alarm	Message
1	PWM Coil Fault	The clutch controller has detected a problem with the PWM Coil.
2	ON/OFF Coil Fault	The clutch controller has detected a problem with the On / Off Coil.
3	CLUTCH OIL PRESSURE Fault	The clutch controller has detected a problem with the clutch system oil pressure.
4	CLUTCH OIL PRESSURE Fault	The clutch controller has detected a problem with the clutch system oil pressure with the clutch engaged.
5	CLUTCH OIL TEMPERATURE	The HPTO oil system temperature has exceeded 200°F (~93°C).
6	CLUTCH SAFETY SWITCH	The clutch controller has detected no input signal from the machine MCR emergency stop relay. No clutch engagement possible.

7	CLUTCH TIMED LOCK-OUT	The clutch controller has locked out operation for 5 minutes. The Engine must remain running for the 5 minutes time to count down.
8	CLUTCH PRESSURE TRANSDUCER	The clutch controller has detected a problem with the pressure transducer.
9	CLUTCH CONTROLLER LOW VOLTAGE	The clutch controller has detected a supply voltage of less than 20VDC.
10	CLUTCH FILTER CLOGGED	The clutch controller has detected the oil filter is clogged.
11	ENGINE RPM TOO HIGH	The clutch controller has detected the engine's RPM is too high for engagement. Engine RPM must be between 600-1100 RPM to engage or disengage the clutch.
12	ENGINE RPM RISING	The clutch controller has detected the engine RPM being raised during engagement. Engine RPM must be between 600-1100 RPM to engage or disengage the clutch.
13	CLUTCH OVERLOAD	The clutch controller has detected too great of a difference between the input speed and output speed. Wait for clutch overload to clear then re-attempt clutch engagement.
14	J1939 COMMUNICATION ERROR	The clutch controller has lost communication on the SAE J1939 network.
15	J1939 COMMUNICATION ERROR	The clutch controller has not established communication on the SAE J1939 network.
16	CLUTCH SHOCK DETECTED	The clutch controller has detected a shock-load that dropped the engine RPM below 500 RPM when engaging.

5.10 Scanreco Remote Control

(1) Remote Control

The remote control is used to operate the machine from a distance to keep personnel out of the danger zone. For more information, see Section 2.10 Danger Zones. The remote also relays important opera¬tional data from the machine back to the operator through its OLED screen. The remote is usually placed inside the cabin of the vehicle that is loading your machine.

The remote has an OLED screen (Figure 5.41). Towards the top is displayed the machine name. Right below that scrolls through machine data such as: engine RPM, engine temperature, oil pressure, fuel consumption, fuel pressure, feed power, feed rate, and clutch pressure (if a clutch is equipped). The real-time value is displayed below this rolling title. At the bottom of the screen is a space for messages from the machine.

The left of the screen shows the current signal strength. The right shows the current remote battery level.

There are 14 buttons (Figure 5.41 / 4 through 17) on the remote that are used for operating the ma¬chine. By utilizing combinations of multiple buttons in conjunction with alternate control schemes (called function modes), the 14 buttons on the controller may be used to control many more than 14 machine functions. For detailed information, see Section 5.10.5 Remote Control Function Modes.

There are also six LEDs flanking the sides of the OLED screen. These are used to provide feedback to the operator. See Section Status LEDS 5.10.4 for more information.

The following sections are provided to familiarize the operator with remote control operation.

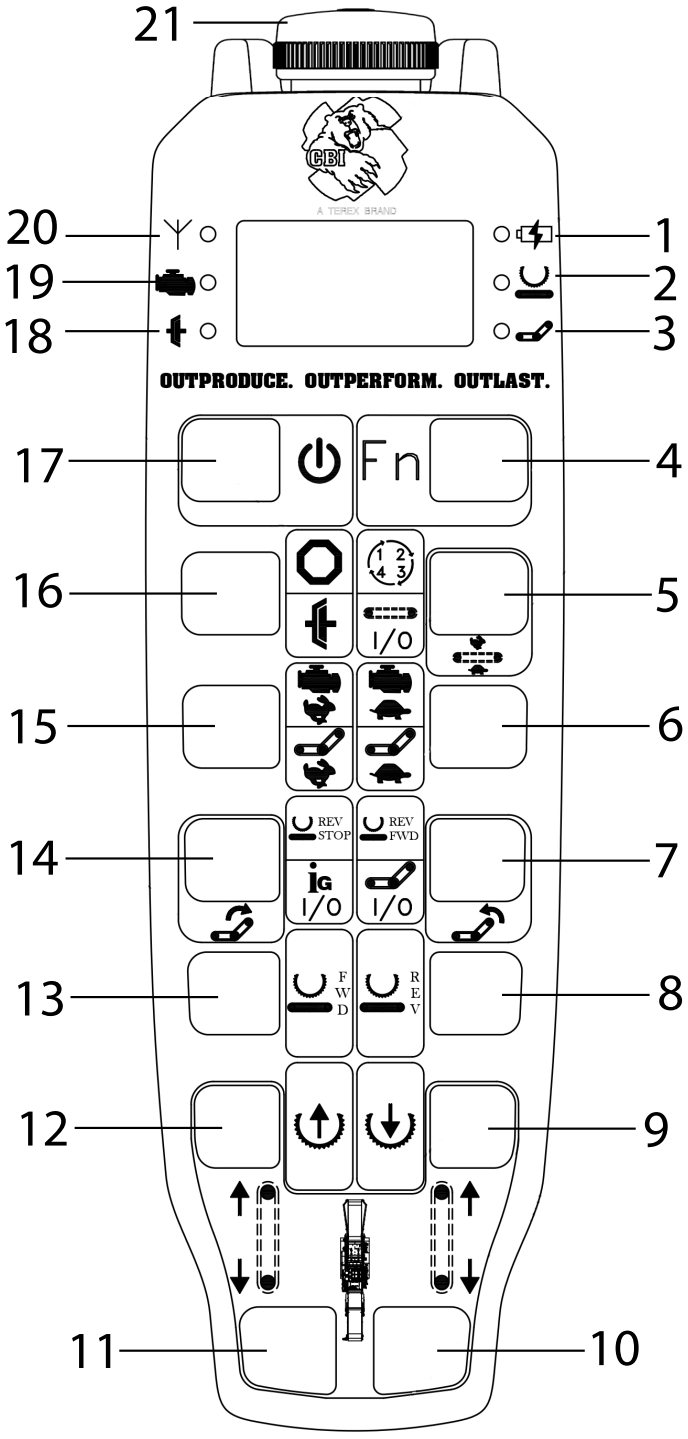


Figure 5.41 - Remote Control

(2) Remote Control Battery

The remote control is powered by three AA rechargeable batteries, the batteries are charged via two contacts on the back of the remote. A charging cradle is slid on from the bottom to make contact and charge the batteries.

The remote can be charged with the cradle located on the machine, or during operation with an optional cradle using a cigarette lighter socket in the cab of the vehicle. Connect the remote controller to this cradle when the machine is not being operated to keep the battery charged.

Failure to maintain the remote control's battery charge will result in loss of radio communications.

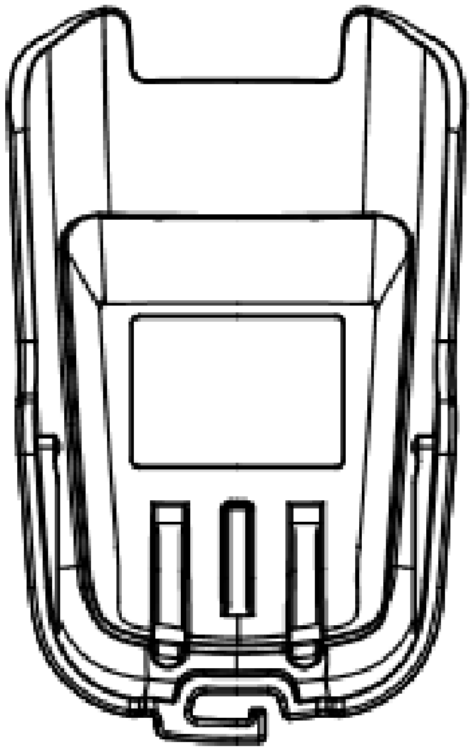
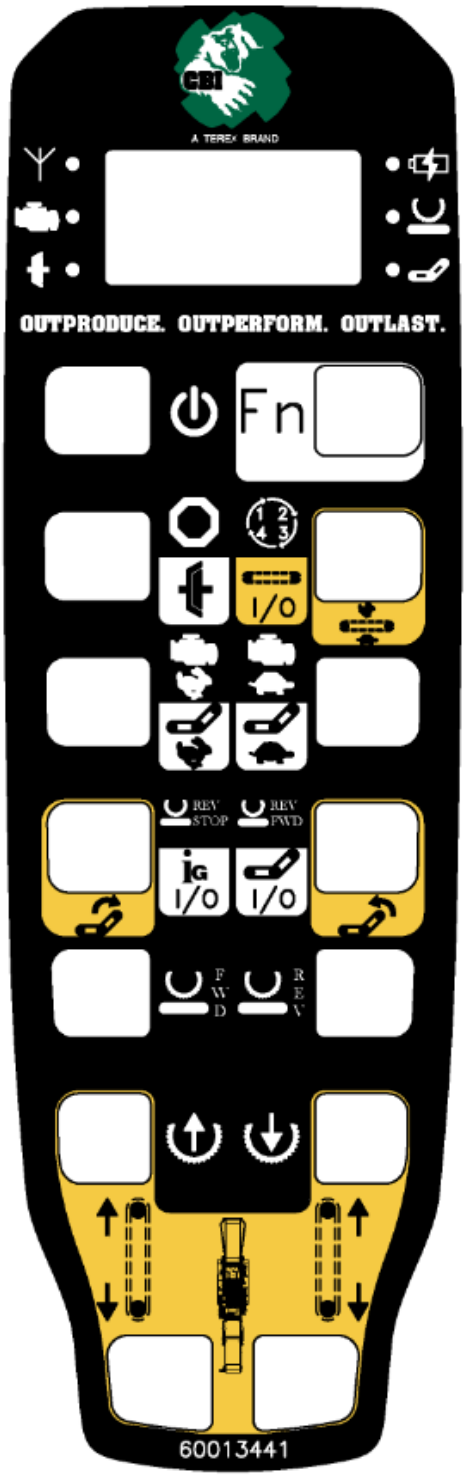


Figure 5.42 - Remote Control Charging Cradle

(3) Remote Control Label

The two remote control label variants are shown here for documentation purposes. The only difference is the clutch button and clutch status LED.



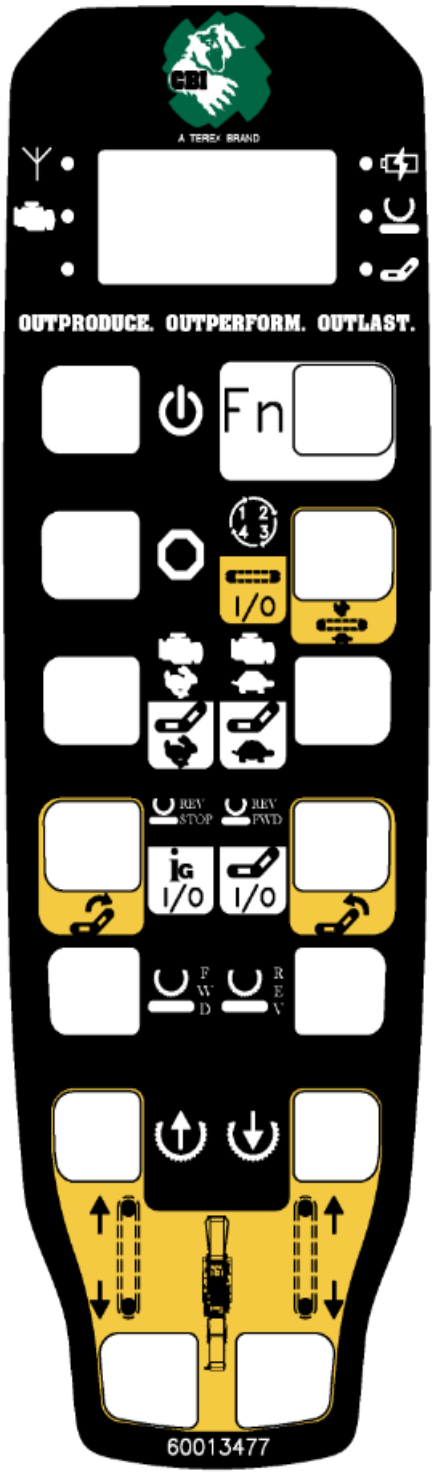


Figure 5.43 - Remote Label for a Clutch-Equipped Machine (Left)

Figure 5.44 - Remote Label for a Non-Clutch Equipped Machine (Right)

(4) Status LEDs

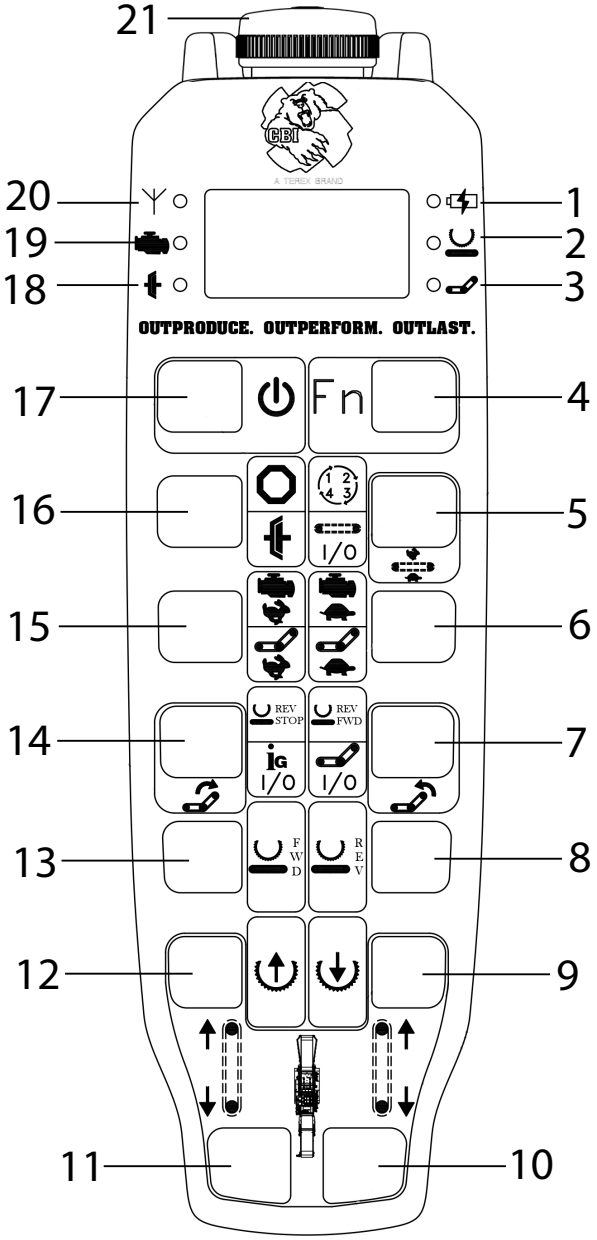


Figure 5.45 - Remote Control

Reference	LED Status	Function
Ref 20	Power Status	Indicates the remote is on and attempting to transmit
Ref 19	Engine Status	Indicates whether the Engine is running
Ref 18	Clutch Status*	Indicates whether the Clutch is engaged
Ref 1	Charge Status	Indicates whether the remote is charging
Ref 2	Feed Status	Indicates whether the Feeds are running
Ref 3	DC Status	Indicates whether the Discharge Conveyor is running

*Only present on machine equipped with a clutch

(5) Remote Control Function Modes

Function modes are used because there are more machine functions that need to be controlled than there are buttons on the remote. Function modes enable a single button on the remote to control multiple functions depending which mode is enabled.

The following sections detail what the various function modes are on your machine are, how they're enabled, and what the specific remote control button functions are for them.

(6) Standard Function Mode

Standard Function Mode is the default control scheme on the remote controller. The following is a list of functions controlled by the remote under normal conditions.

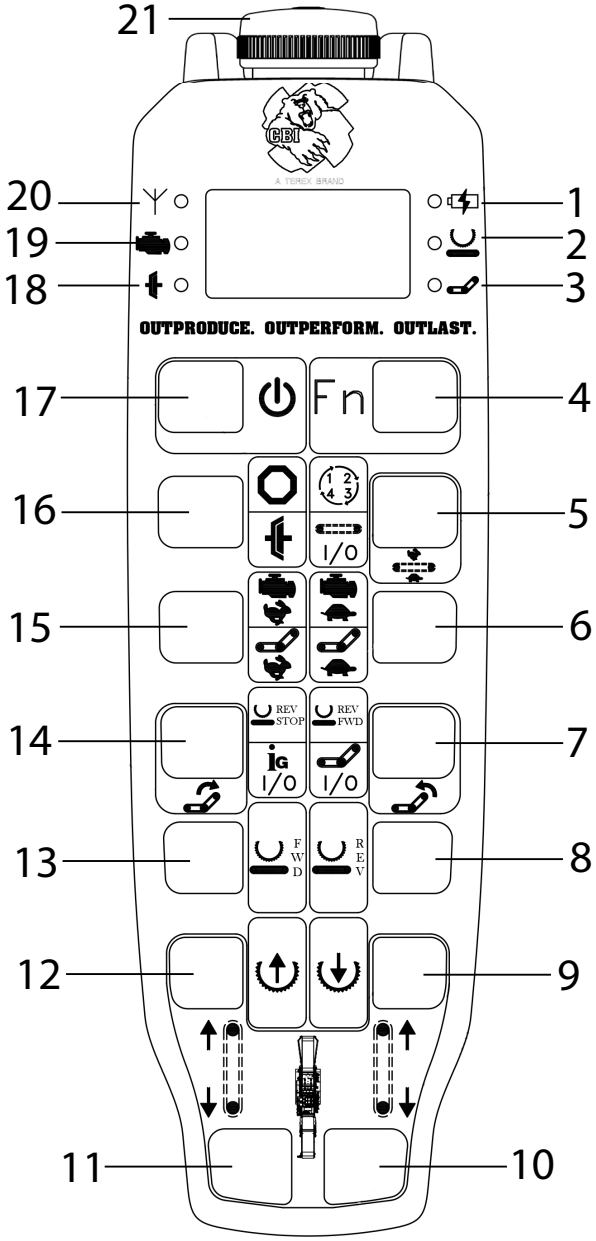


Figure 5.46 - Remote Control

Reference	Name	Function
Ref 21	Emergency Stop	Press this button to emergency stop the machine. The machine must be in radio mode and a radio link must be established for it to work.
Ref 17	On/Off	Holding this button briefly will turn on the remote. Do this again to turn it off. The emergency stop button (Ref 21) must be pulled up to turn on the remote.
Ref 4	Auxiliary Function	Holding this button down and pressing another button enables that button's auxiliary function. See Auxiliary Function Mode in the next section.
Ref 16	Controlled Stop	Press this button to bring the machine to a controlled stop. This stops the feeds, idles down the engine, and will disengage the clutch (if equipped). It does not emergency stop the machine.
Ref 5	Run Mode Scroll	Press this button to scroll through the available feed rates.
Ref 15	Engine Fast	Hold this button to increase the engine's speed.
Ref 6	Engine Slow	Hold this button to decrease the engine's speed.
Ref 14	Roll Reverse	Hold this button to reverse the Top Feed Roll and Bottom Roll (if equipped) with the Feed Conveyor is stopped.
Ref 7	Top Roll Reverse	Hold this button to reverse the Top Feed Roll while the Feed Conveyor and Bottom Roll (if equipped) go forward. This function is useful for spinning material end over end.
Ref 13	Feed Forward	Press this button to engage the feed system. The feeds can only be engaged when the rotor is spinning and the discharge is running, or if the machine is in Service Mode.
Ref 8	Feed Stop/Reverse	Press this button with the feed system engaged to stop the feed system. Hold this button to reverse the feed system.
Ref 12	Top Roll Up	Hold this button to raise the Top Feed Roll.
Ref 9	Top Roll Down	Hold this button to lower or apply down pressure to the Top Feed Roll.

(7) Auxiliary Function Mode

Auxiliary Function Mode is an alternate control scheme for the remote controller. To enable auxiliary function mode, hold down the function button (Figure 5.47 / 4); this will enable the auxiliary functions for the other buttons. To exit auxiliary function mode, release the function button. The following is a list of special functions controlled by the remote only when Auxiliary Function Mode is enabled.

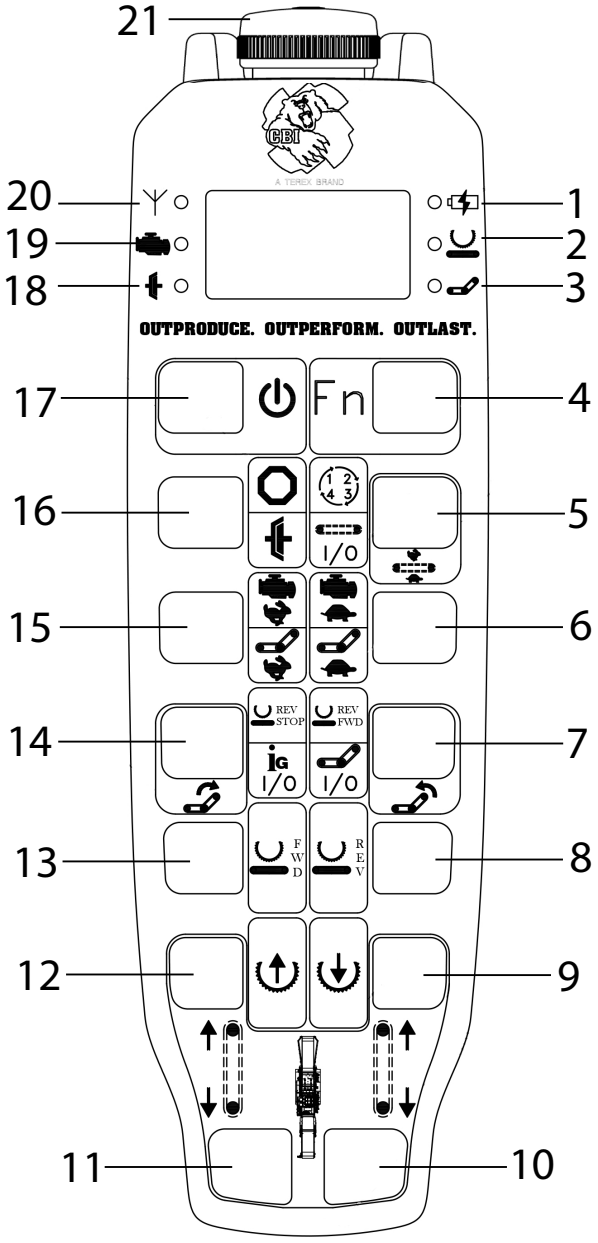


Figure 5.47 - Remote Control

Reference	Name	Function
Ref 21	Emergency Stop	Press this button to emergency stop the machine. The machine must be in radio mode and a radio link must be established for it to work.
Ref 4 + Ref 16	Clutch Engage*	Hold this button combination for three seconds to engage the clutch. Repeat to disengage the clutch.
Ref 4 + Ref 5	Enter Track Mode	Hold this button combination for three seconds to enable track mode; a track mode warning beeper will sound. Hold this button combination for one second to exit track mode.
Ref 4 + Ref 15	Discharge Fast	Hold this button combination to increase the discharge's speed.
Ref 4 + Ref 6	Discharge Slow	Hold this button combination to decrease the discharge's speed.
Ref 4 + Ref 14	Intelligrind™ Toggle	Press this button combination to toggle the Intelligrind™ feature on or off.
Ref 4 + Ref 7	Discharge Toggle	Press this button combination to toggle the Discharge Conveyor on or off.

*Only present on machine equipped with a clutch

(8) Track Function Mode

Track Function Mode is an alternate control scheme used for moving the machine. To enable track mode, hold down the function button (Figure 5.48 / 4) and the track button (Figure 5.48 / 5) for three seconds. An alarm will sound to notify track mode is enabled and a notification will show up on the screen. Right and left tracks can both be moved forward or in reverse at the same time or separately. To exit track mode, hold down the function button and the track button for one second. The following is a list of functions controlled by the remote only when Track Function Mode is enabled.

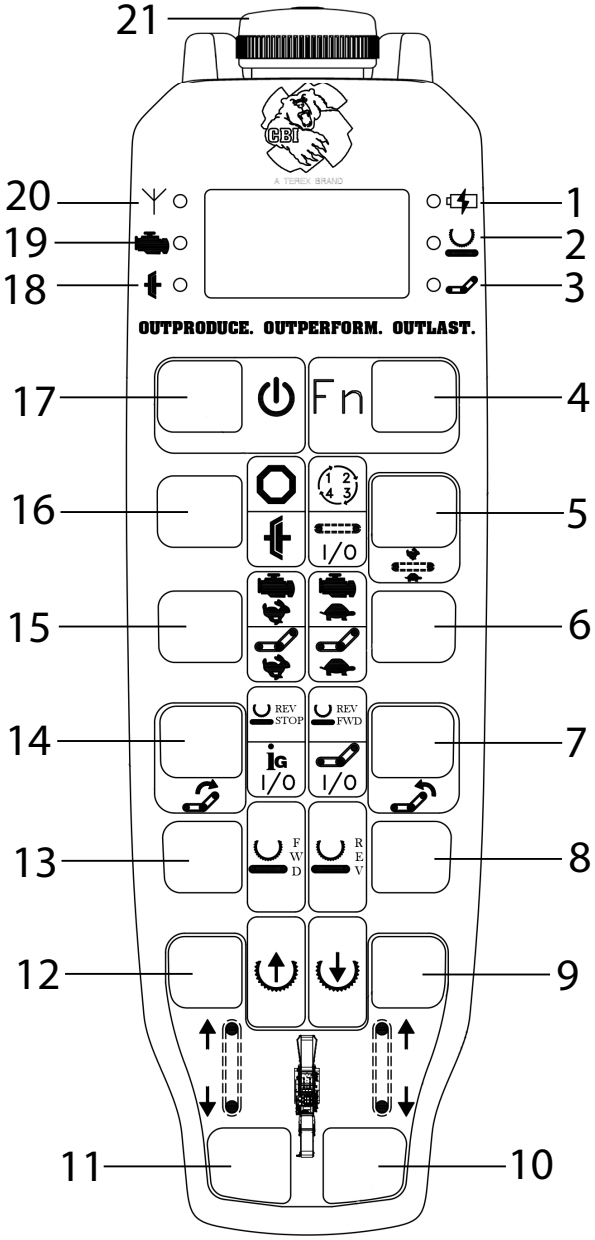


Figure 5.48 - Remote Control

Reference	Name	Function
Ref 21	Emergency Stop	Press this button to emergency stop the machine. The machine must be in radio mode and a radio link must be established for it to work.
Track Mode + Ref 5	Track Speed Toggle	Press this button with track mode enabled to toggle between high and low speeds.
Track Mode + Ref 14	Discharge Unfold	Press this button with track mode enabled to unfold the discharge conveyor.
Track Mode + Ref 7	Discharge Fold	Press this button with track mode enabled to fold the discharge conveyor.
Track Mode + Ref 12	Left Track Forward	Press this button with track mode enabled to move the left track forward.
Track Mode + Ref 9	Right Track Forward	Press this button with track mode enabled to move the right track forward.
Track Mode + Ref 11	Left Track Reverse	Press this button with track mode enabled to move the left track reverse.
Track Mode + Ref 10	Right Track Reverse	Press this button with track mode enabled to move the right track reverse.

(9) Pairing the Remote

PROCEDURE

1. Ensure the machine electrical control panel is turned off.
2. Locate the three cables coming out of the receiver.
3. Install the remote pairing plug (Figure 5.49) (60013478) into the cable marked ‘B’ (Figure 5.50 / 1).

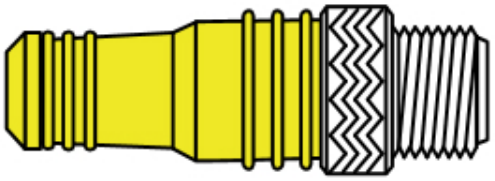


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Figure 5.49 - Pairing plug

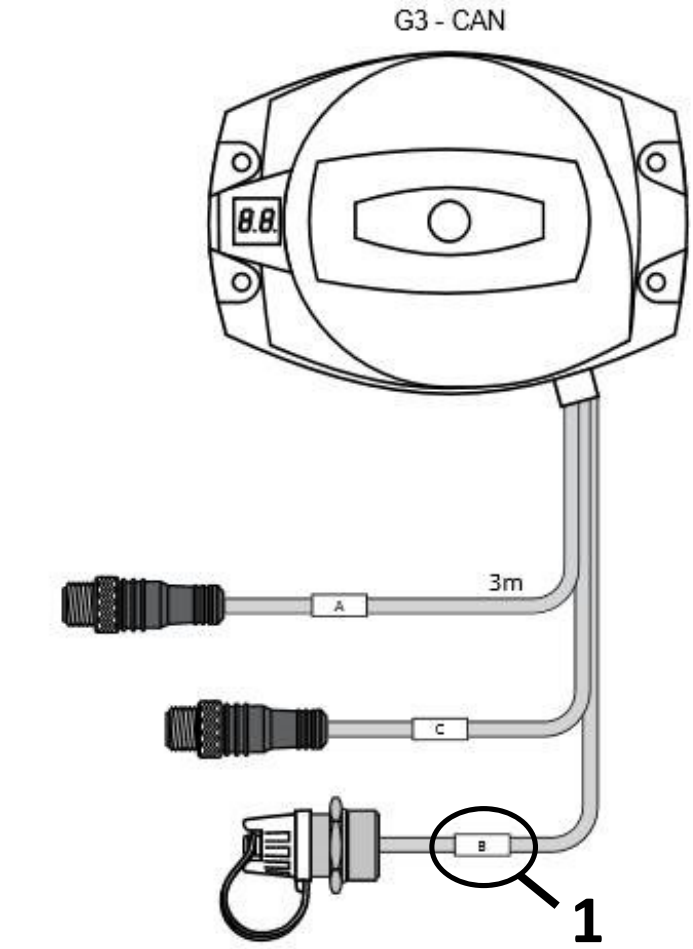

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Figure 5.50 - Receiver

4. Ensure the Emergency Stop is pulled up on the remote.

5. Press and hold the pairing button (Figure 5.51 / Ref 16). Continue holding, and press and release the power button (Figure 5.51 / Ref 17). A single beep will occur. Release all buttons.

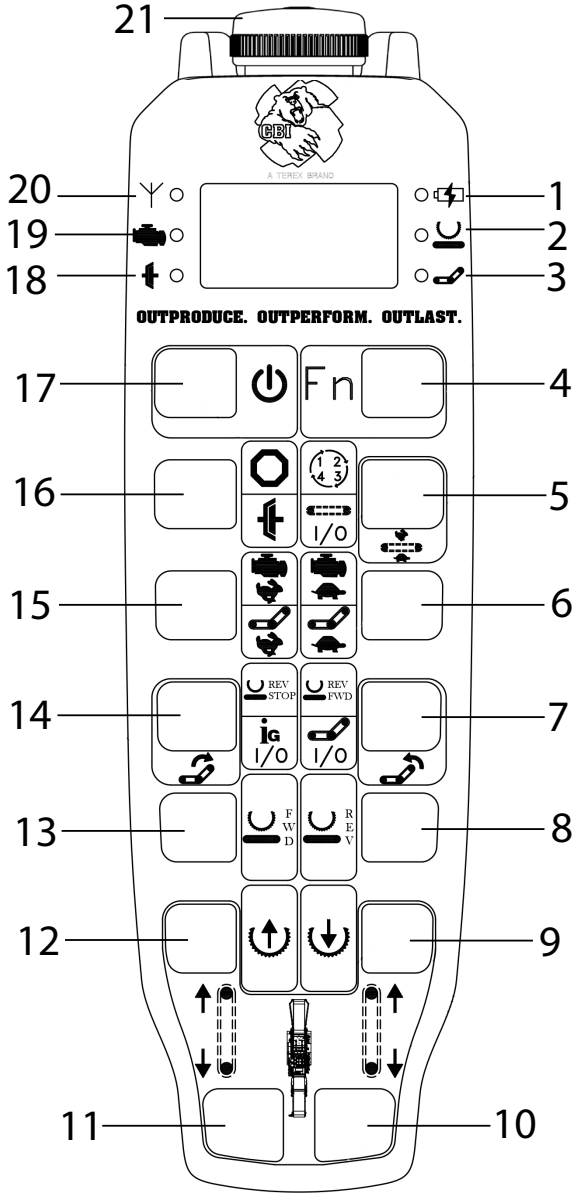


Figure 5.51 - Remote Control

6. Turn on the panel. This must be done within 10 seconds of Step 5.
7. Three beeps will occur and the remote will power off. Wait a few minutes, until 'LOADING TEXTS...IS DONE'. The receiver will indicate '1H'.
   - If this did not work, try again with the panel off at Step 4.
8. Turn the panel off.
9. Remove pairing plug.
10. Turn the panel on.
11. Do a full function test of all remote functions.

5.11 Hetronic ERGO-S Remote Control

(1) Remote Control

The remote control is used to operate the machine from a distance to keep personnel out of the danger zone. For more information, see Section 2.10 Danger Zones. The remote also relays important operational data from the machine back to the operator through its LCD screen. The remote is usually placed inside the cabin of the vehicle that is loading your machine.

There are twelve buttons (Figure 5.52) on the remote that are used for operating the machine. By utilizing combinations of multiple buttons in conjunction with alternate control schemes (called function modes), the twelve buttons on the controller may be used to control many more than twelve machine functions. For detailed information, see Section 5.10 Remote Control Function Modes.

The following sections are provided to familiarize the operator with remote control operation.

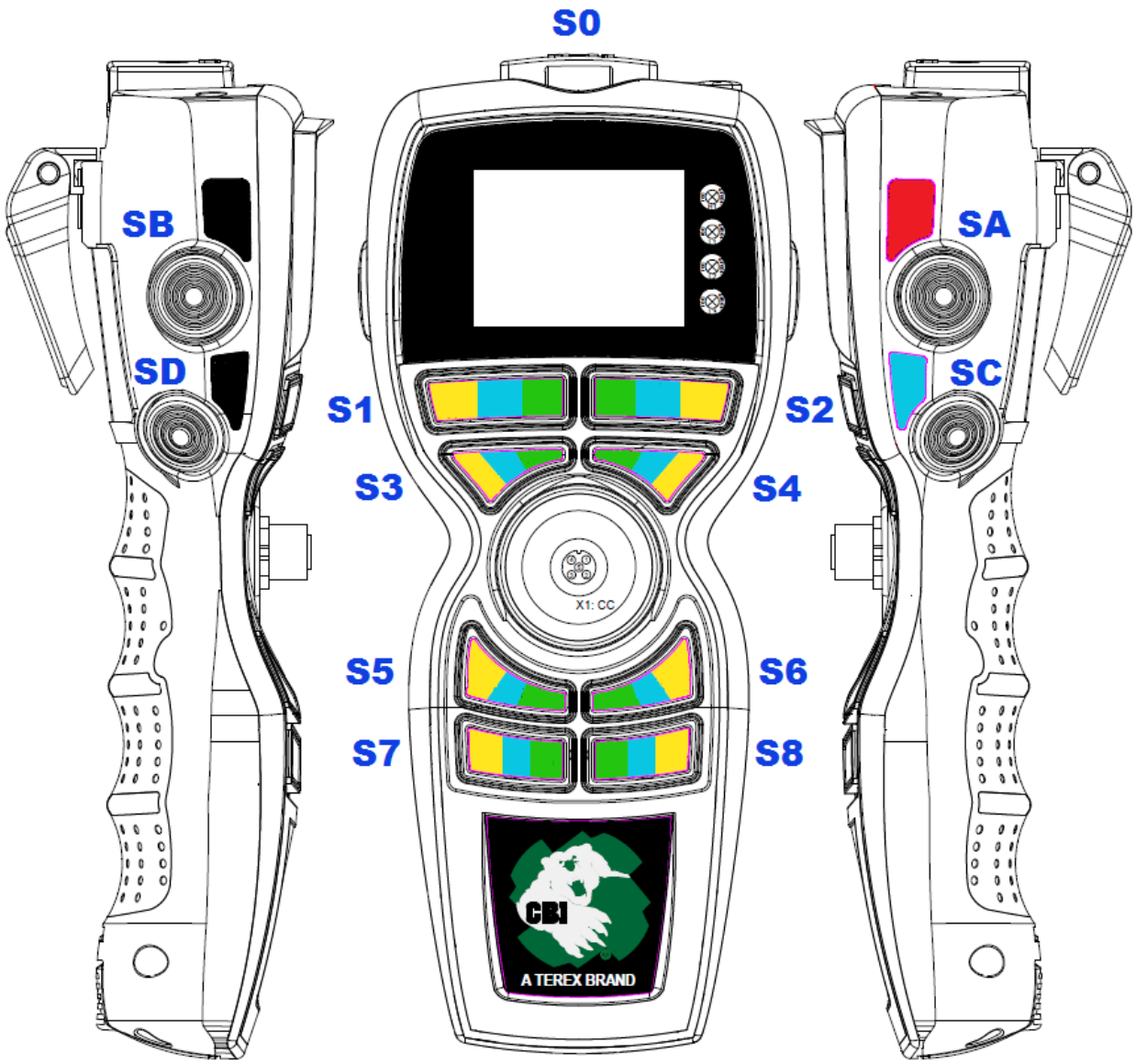


Figure 5.52 - Remote Control

(2) Powering Up and Starting

NOTICE

When the remote is not being used by the operator, it must be stored in a safe place.

PROCEDURE

1. Confirm that all safety measures required by the equipment have been followed, and turn on the control panel. See Section 5.2 Normal Machine Startup for further information.
2. Ensure the remote has been charged, or insert a fresh battery into the battery compartment. For more information, See Section 5.11.4 Charging the Battery.
3. Press the POWER button (Figure 5.52 / SA), the remote will perform a routine initialization upon startup.
4. Pull up on the Emergency Stop button (Figure 5.52 / S0).
5. Once the remote is fully started and is displaying normal operating information, press the POWER button again to activate the remote.
   - Machine parameters will display and the indication LED will flash to indicate connection.
6. On the control panel, change the machine into Radio Mode. For more information, See Section 5.4 Control Modes.

(3) Turning OFF the Remote

PROCEDURE

1. Set the machine to Local Mode. For more information, see Section 5.4 Control Modes. If the remote is turned off when in Radio Mode an Emergency Stop will occur.
2. Press the Emergency Stop button (Figure 5.52 / S0). The remote will display the following screen.

Figure 5.53 - Remote Display: Emergency Stop

3. Hold the power button (Figure 5.52 / SA) for 2 seconds. The remote will switch off.

(4) Charging The Battery

⚠ WARNING

Failure to maintain the remote control's battery charge will result in loss of radio communications.

NOTICE

Charging time could take up to 3.5 hours, depending on the condition of the battery. Leave the battery in the charger until it is needed. The charger supplies a "trickle" charge but it will not over-charge the battery.

The remote control is powered by a rechargable battery, there are two methods which can be used to charge the battery, (Figure 5.54).

- The user can choose to remove the battery from the transmitter and place it directly in the charging unit.
- Else, the user can opt to charge the battery by placing the whole remote in the charger docking station.

Figure 5.54 - Battery Charging

When the transmitter (or the battery) is placed in the docking station, the LED labelled "CHARGE" flashes for two seconds, and then stays lit during the charging process. When the battery is fully charged, the "READY" LED lights up and the "CHARGE" LED go off.

(5) Remote Label

The remote label is documented here for future reflection.

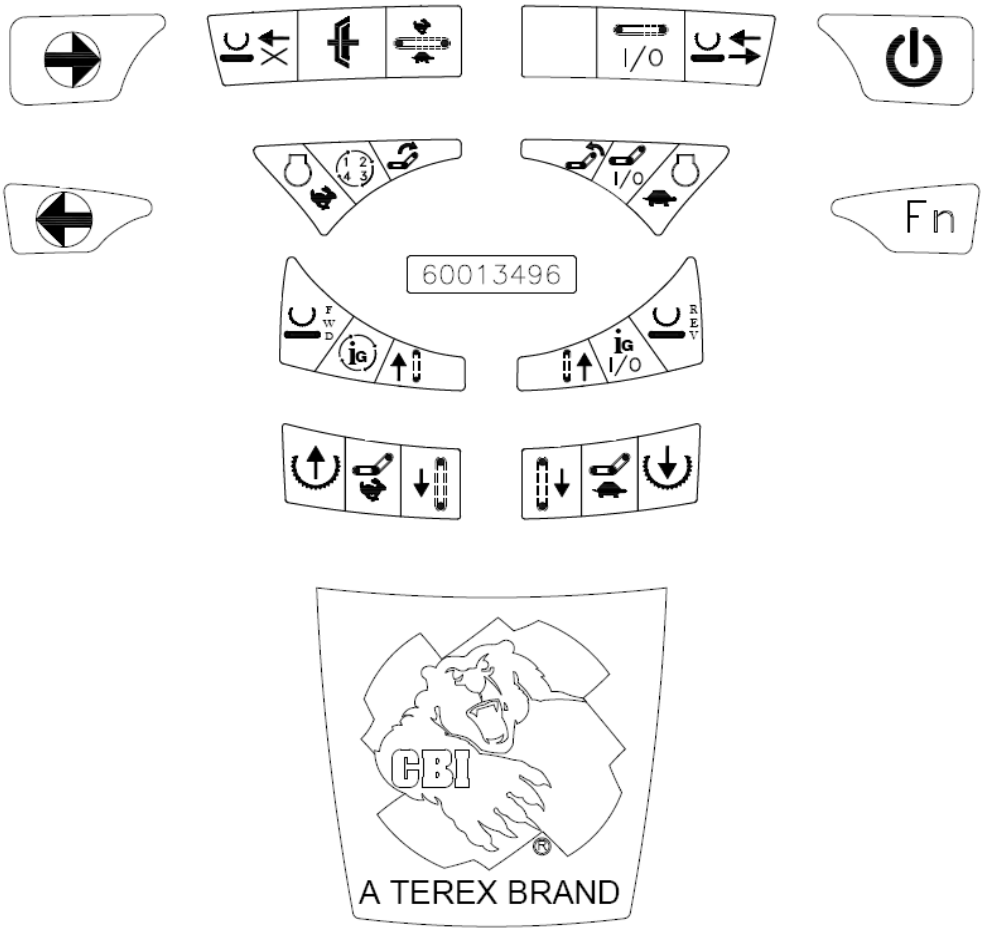


Figure 5.55 - Remote Control Button Layout

(6) Remote Control Function Modes

Function modes are used because there are more machine functions that need to be controlled than there are buttons on the remote. Function modes enable a single button on the remote to control multiple functions depending which mode is enabled.

The remote has colored indicators on screen to show which mode the remote is in.

- Yellow represents Standard Function Mode, blue represents Auxillary Function Mode, and green represents Track Function Mode.

The following sections detail what the various function modes are on your machine are, how they're enabled, and what the specific remote control button functions are for them.

(7) Standard Function Mode

Standard Function Mode is the default control scheme on the remote controller. This mode is identified with the yellow portion of the label. The following is a list of functions controlled by the remote under normal conditions.

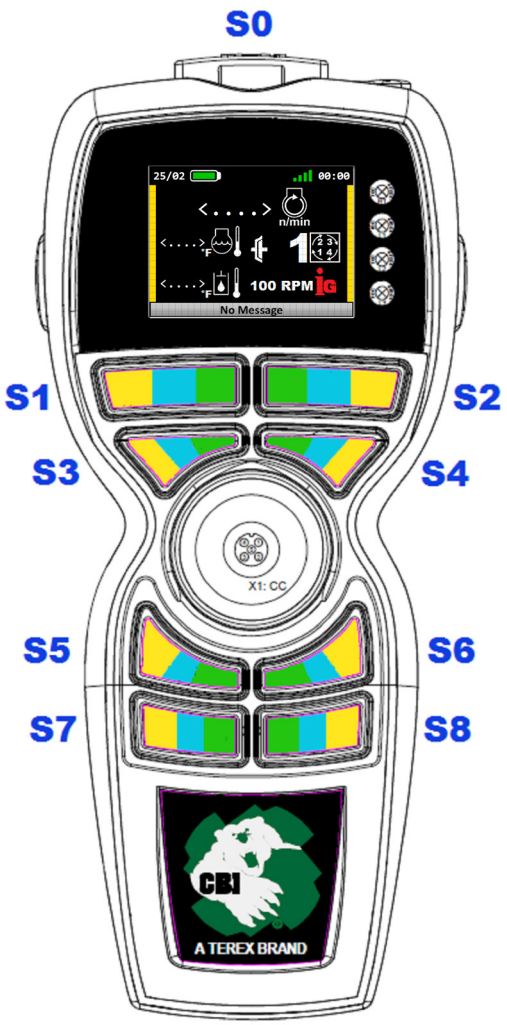
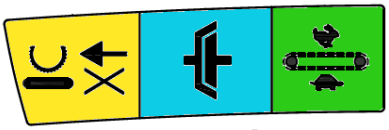
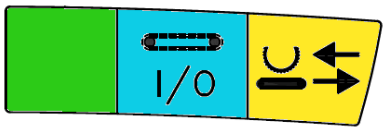
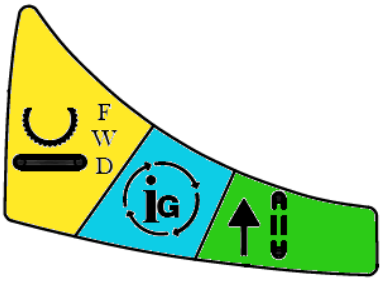
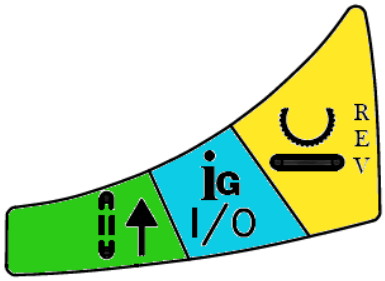
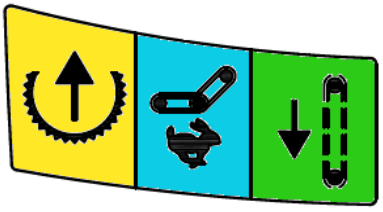
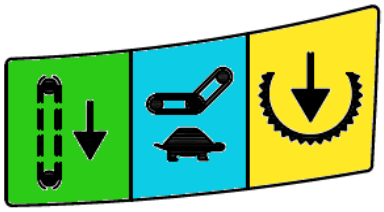


Figure 5.56 - Remote Control

Ref.	Image	Function
S1		Roll Reverse Hold this button down to reverse the Top Feed Roll and Bottom Roll while the Feed Conveyor remains stopped.
S2		Top Roll Reverse Hold this button down to reverse the Top Feed Roll while the Bottom Roll and Feed Conveyor go forward.
S3		Idle Engine Up Hold this button to increase the engine speed.
S4		Idle Engine Down Hold this button to decrease the engine speed.
S5		Engange Feed System Press this button to engage the feed system. The feeds can only be engaged when the rotor is spinning and the discharge is running, or if the machine is in Service Mode.
S6		Stop / Reverse Feed System Press this button with the feed on to stop the feed system. Hold the button down to reverse the feed direction.
S7		Raise Infeed Top Roll Hold this button to raise the top feed roll.

S8		Lower Infeed Top Roll Hold this button to lower or apply down pressure with the top feed roll.

(8) Auxiliary Function Mode

Auxiliary Function Mode is an alternate control scheme for the remote controller. This mode is identified with the blue portion of the label. To enable auxiliary function mode, hold down the function button (Figure 5.52 / SC); this will enable the auxiliary functions for the other controller buttons. The following is a list of functions controlled by the remote only when the function button is pressed.

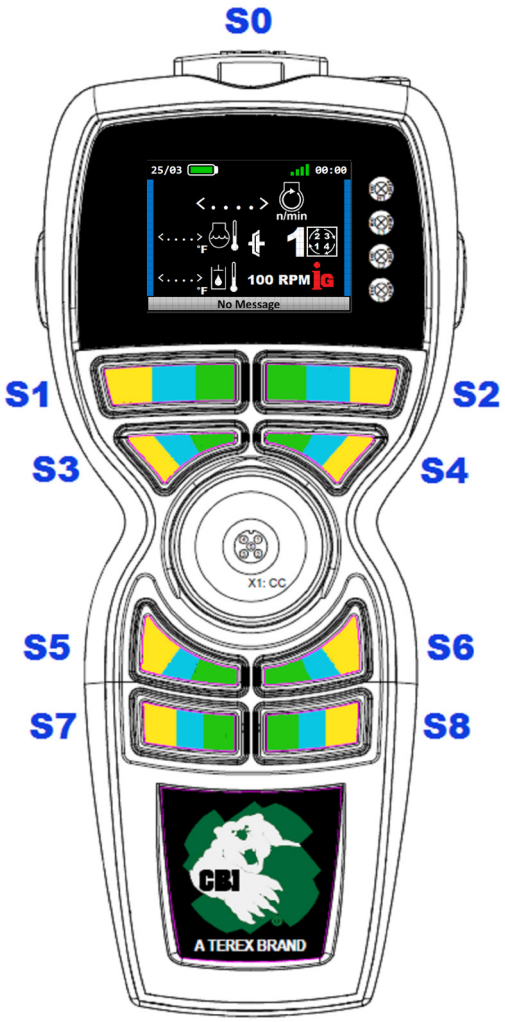
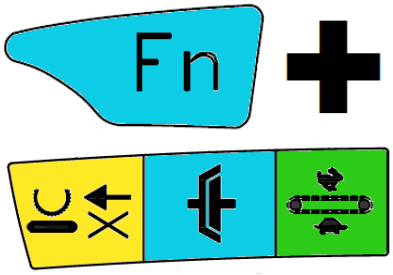
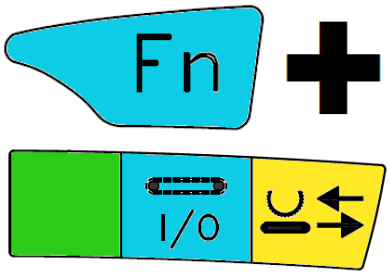
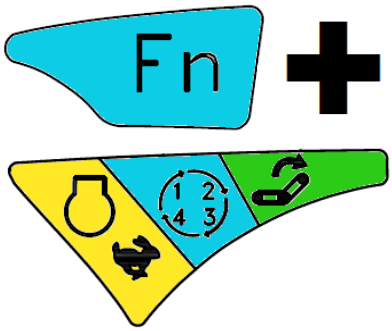
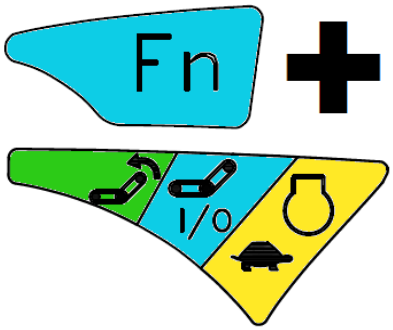
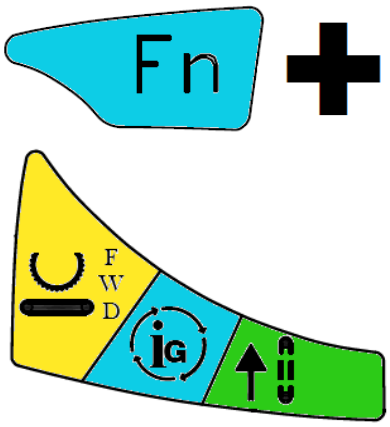
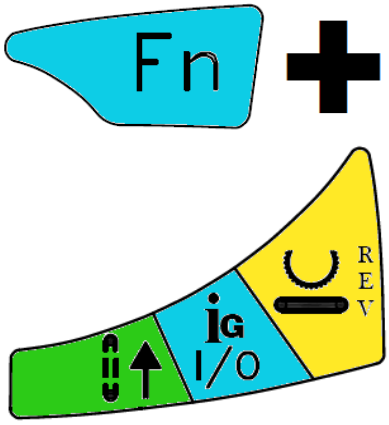


Figure 5.57 - Remote Control

Ref.	Image	Function
SC + S1		Engage / Disengage Clutch Hold down this button combination for three seconds to engage the clutch. Repeat to disengage the clutch.
SC + S2		Enter Track Mode Hold down this combination for three seconds to enable track mode. A track mode warning beeper will sound and track mode will be displayed on the MD4 and remote screen. Repeat to exit track mode.
SC + S3		Feed Rate Toggle Press this button combination to toggle through the available feed rates.
SC + S4		Discharge Conveyor Toggle Press this button combination to toggle the Discharge Conveyor on and off.

SC + S5		Intelligrind™ Feed Rate Press this button combination to scroll through the available Intelligrind feed rates.
SC + S6		Intelligrind™ On/Off Press this button combination to toggle the Intelligrind™ feature on and off.

(9) Track Function Mode

Track Function Mode is an alternate control scheme used for moving the machine. This mode is identified with the green portion of the label.To enable track mode, hold down the function button (Figure 5.52 / SC) and the track button (Figure 5.58 / S1) for three seconds. An alarm will sound to notify track mode is enabled and a notification will show up on the control panel screen and the remote screen. Right and left tracks can both be moved forward or in reverse at the same time or separately. To exit track mode, hold down the function button and the track button for one second. The following is a list of functions controlled by the remote only when Track Mode is enabled.

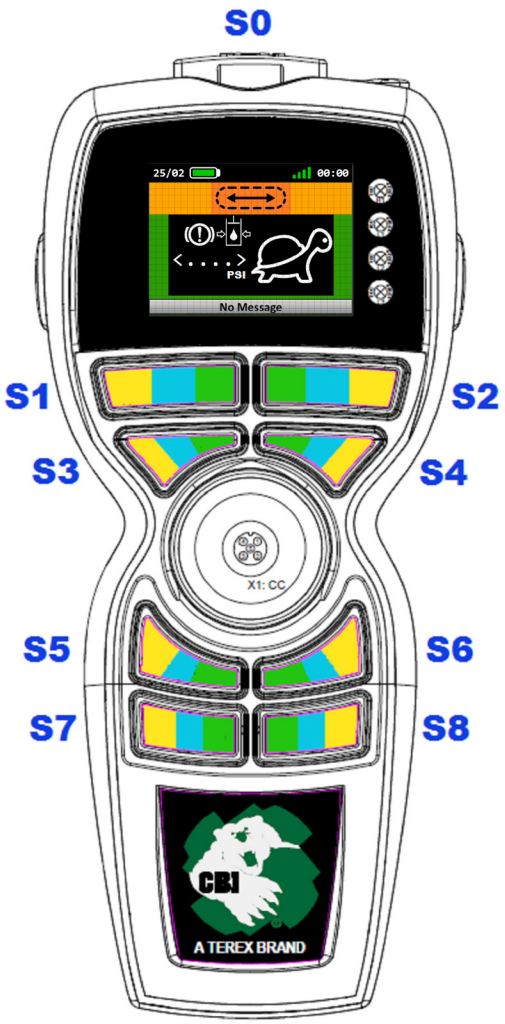
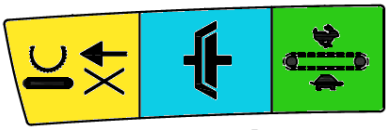
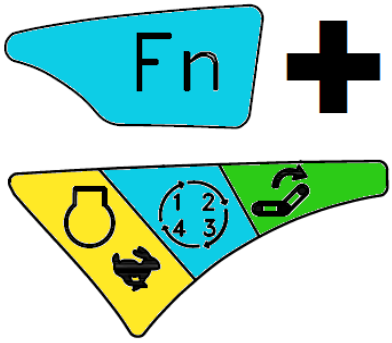
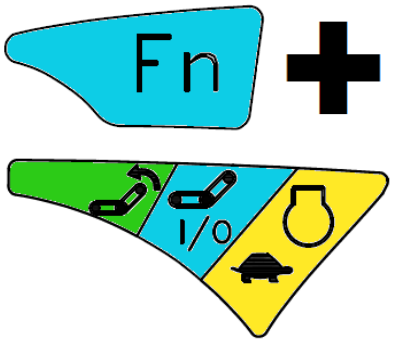
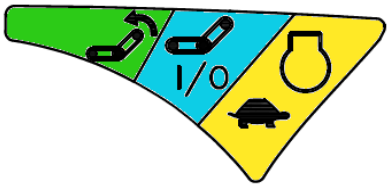
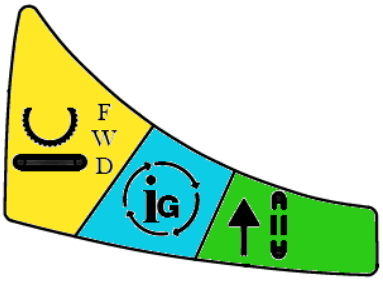
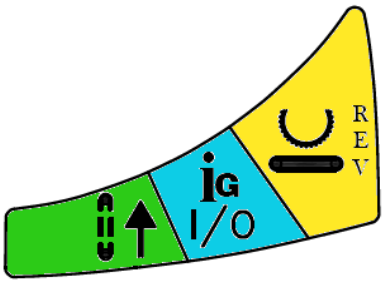
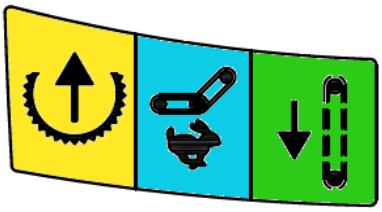
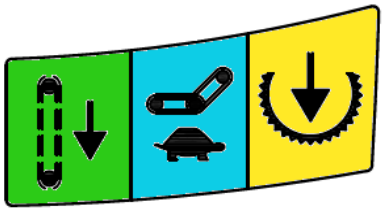


Figure 5.58 - Remote Control

Ref.	Image	Function
Track Mode + S1		Toggle Track Speed Pressing this button with track mode enabled toggles the tracks between high and low speeds.
Track Mode + SC + S3		Unfold Discharge Conveyor Press this button combination with track mode enabled to unfold the Discharge Conveyor.
Track Mode + SC + S4		Fold Discharge Conveyor Press this button combination with track mode enabled to fold the Discharge Conveyor.
Track Mode + S3		Engine Fast Pressing this button with track mode enabled will increase the engine's speed.
Track Mode + S4		Engine Slow Pressing this button with track mode enabled will decrease the engine's speed.
Track Mode + S5		Left Track Forward Pressing this button with track mode enabled will move the left track forward.

Track Mode + S6		Right Track Forward Pressing this button with track mode enabled will move the right track forward.
Track Mode + S7		Left Track Reverse Pressing this button with track mode enabled will move the left track reverse.
Track Mode + S8		Right Track Reverse Pressing this button with track mode enabled will move the right track in reverse.

(10) Remote Display

Your remote has an LCD display that provides information about machine running conditions and operation. Machine settings, controls, and information are displayed. The purpose of this section is to familarize the operator with information available on the display.

(a) Display Navigation

The operator can navigate through the different display pages using the Page Up (Figure 5.52 / SB) and Page Down (Figure 5.52 / SD) buttons.

(b) Fundamental Display Elements

Some information can be found on every page. This is essential remote and machine information. Such as battery status, signal strength, and messages from the machine.

One critical piece of information is the remote function mode. The colored stripes on the side of the screen change color to indicate the current remote state. These colors coincide with the button label colors.

Standard Function Mode	Yellow
Auxillary Function Mode	Blue
Track Function Mode	Green

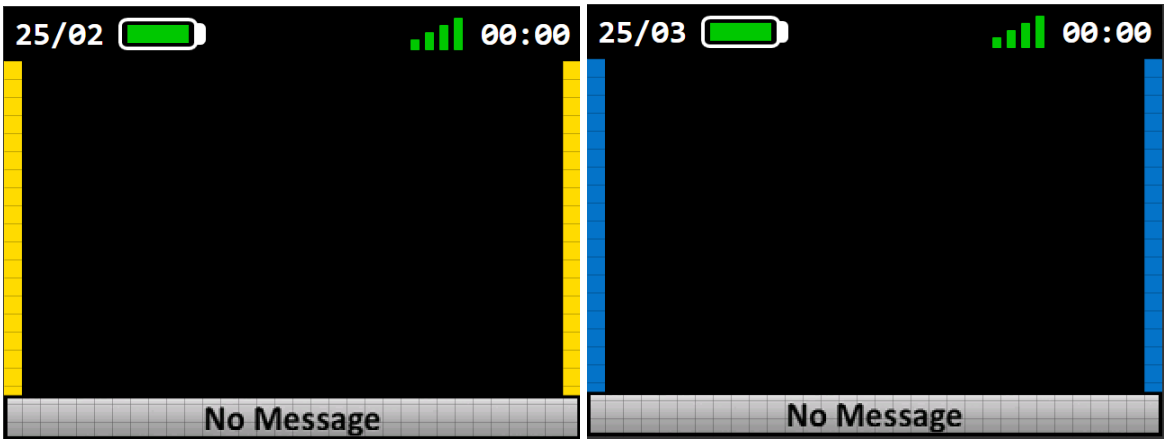


Figure 5.59 - Remote Display Page in Standard Function Mode

For more information, See Section 5.10 Remote Control Function Modes.

Another section of the main display is the upper status bar. This indicates the following information, from left to right:

Date, Battery Status, Signal Strength, and Time

Figure 5.60 - Remote Display Upper Status Bar

The final fundamental element is the message bar. This location on the bottom of the screen relays current machine status information in text form. This may compliment data in the rest of the screen, or be independant. ‘No Message’ is indicated when the link is not active between the remote and the machine.

Figure 5.61 - Remote Display Message Bar

(c) Display Base Page

The default page before pressing Page Up or Page Down is the base page.

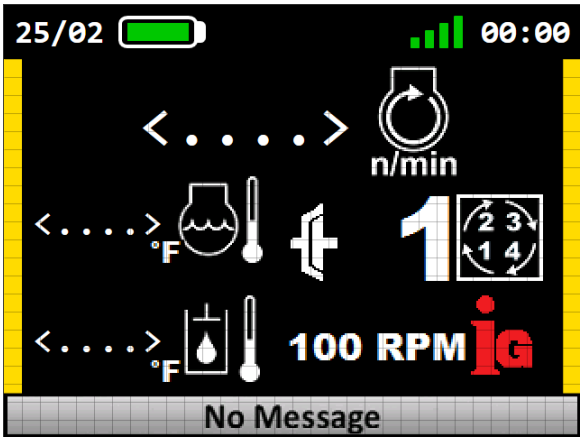
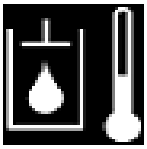
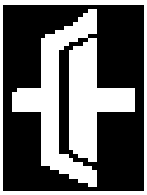


Figure 5.62 - Remote Display Base Page

Pictograph	Function
	Engine Speed This displays the current engine RPM.
	Engine Coolant Temperature This displays the current engine coolant temperature.
	Hydraulic Oil Temperature This displays the current hydraulic oil temperature.
	Clutch Status This displays the current status of the clutch. White indicates the clutch is disengaged, Flashing Green indicates it is engaging, and Green indicates it is engaged.
	Run Mode The number to the left indicates the current operational run mode.
	Intelligrind Status This displays the current status of Intelligrind. White indicates Intelligrind is enabled, Green indicates it is enabled and active, Red indicates it is disabled. The current Intelligrind Setting is also displayed to the left of the icon. Indicating the current agression setting: 100-400 RPM.

(d) Display Engine Pages

The following two engine data pages are available by navigating to them by pressing the PageUp or Page Down buttons.

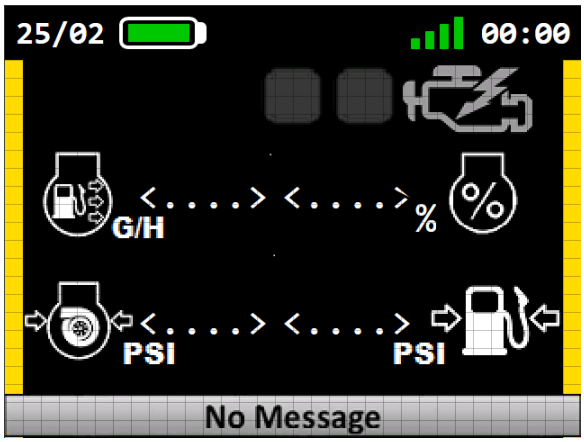


Figure 5.63 - Remote Display Engine Page 1

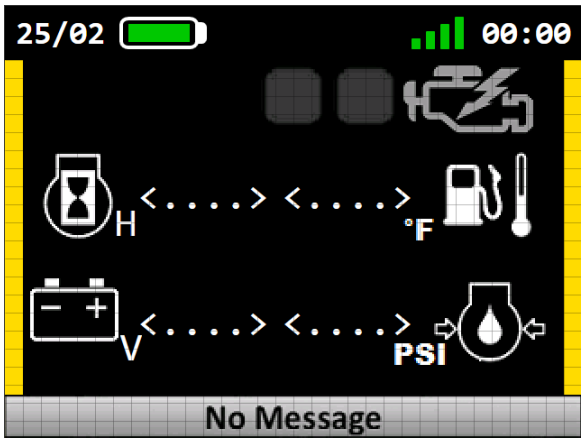
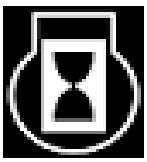


Figure 5.64 - Remote Display Engine Page 2

Pictograph	Function
	Engine Diagnostics Lamps The symbol may turn red to indicate a CAT engine fault code has been detected. The two lamps to the left would then indicate in either red or amber the CAT fault code. Refer to the CAT engine manual for a breakdown of the fault codes.
	Fuel Consumption This displays the current engine fuel consumption.
	Engine Percent Load This displays the current percent of load the engine is experiencing.
	Boost Pressure This displays the current engine boost pressure.
	Fuel Pressure This displays the current engine fuel pressure.
	Engine Hours This displays the current total cumulative hours in which the engine has run.
	Fuel Temperature This displays the current engine fuel temperature.
	Battery Voltage This displays the current machine battery voltage.
	Engine Oil Pressure This displays the current engine oil pressure.

(e) Bearing Temperature Page

An additional page available by navigating vis the Page Up or Page Down buttons is the Bearing Temperature page.

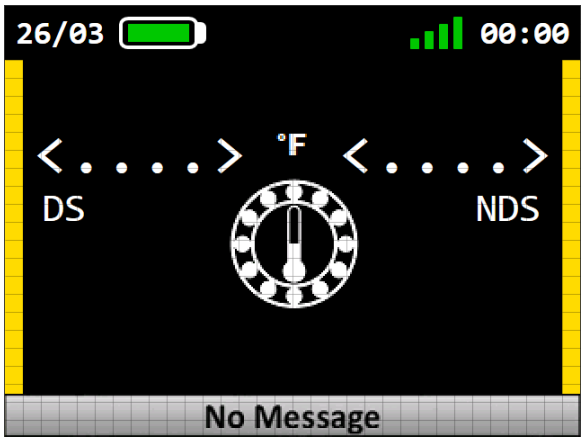


Figure 5.65 - Remote Display Bearing Temperature Page

Pictograph	Function
	Bearing Temperatures This displays the current rotor bearing temperatures on the machine as reported by the bearing temperature sensors. Drive Side bearing is indicated on the left, Non-Drive Side on the right.

(f) Machine Pressures Page

An additional page available by navigating vis the Page Up or Page Down buttons is the Machine Pressures page.

Figure 5.66 - Remote Display Machine Pressures Page

Pictograph	Function
	Top Feed Roll Pressure This displays the current rotational hydraulic pressure of the Top Roll circuit.
	Feed Conveyor Pressure This displays the current rotational hydraulic pressure of the Feed Conveyor circuit.
	Bottom Feed Roll Pressure This displays the current rotational hydraulic pressure of the Bottom Roll circuit.
	Discharge Conveyor Pressure This displays the current rotational hydraulic pressure of the Discharge Conveyor circuit.

(g) Track Mode Page

The following page is displayed only when track mode is active.

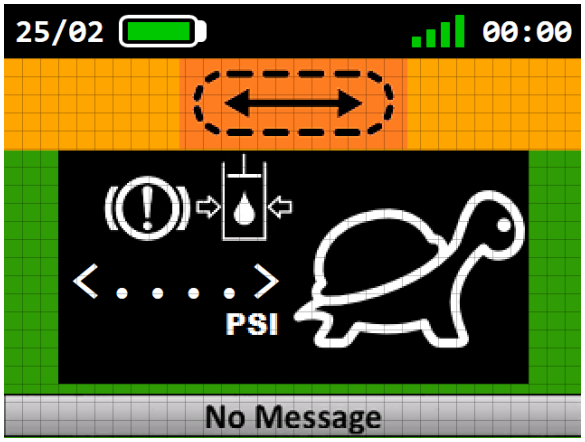
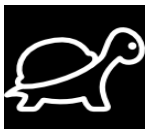


Figure 5.67 - Remote Display Machine Pressures Page

Pictograph	Function
	Track Brake Pressure This displays the current hydraulic pressure of the track brake circuit.
 	Track Speed This displays the current speed selection of track mode. **The turtle symbol indicates low track speed.** **The rabbit symbol indicates high track speed.**

(h) Backup Track Controller

Your machine is equipped with a tethered backup controller (Figure 5.68). This is an additional controller for moving the machine in case the remote control is lost or its battery is dead. The backup controller is also convenient for supplying to personnel, such as truck drivers, that need to be able to move the machine but do not need full access to all machine functions. The purpose of this section is to familiarize the operator with use of the backup controller.

⚠ WARNING

Always use extreme caution when using tethered devices to ensure you remain a sufficient distance away from the machine to eliminate potential injuries.

- Connecting Controller

Locate the backup track controller cable (Figure 5.68 / A); this is typically located in the control panel. Plug the electrical connector coming out of the top of the backup controller into this cable.

- Using Controller

Once the backup controller (Figure 5.68) is connected, the machine can be positioned. The following table is a list of machine functions controlled using the tethered backup controller.

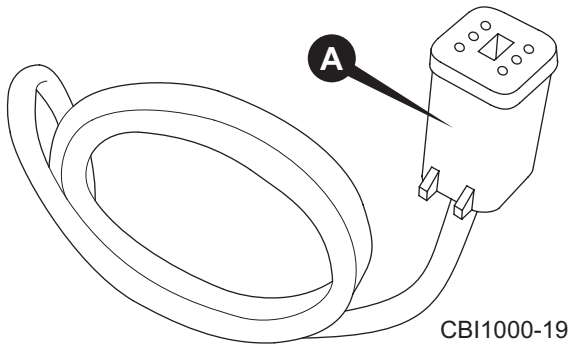


Figure 5.68 - Backup Track Controller Cable

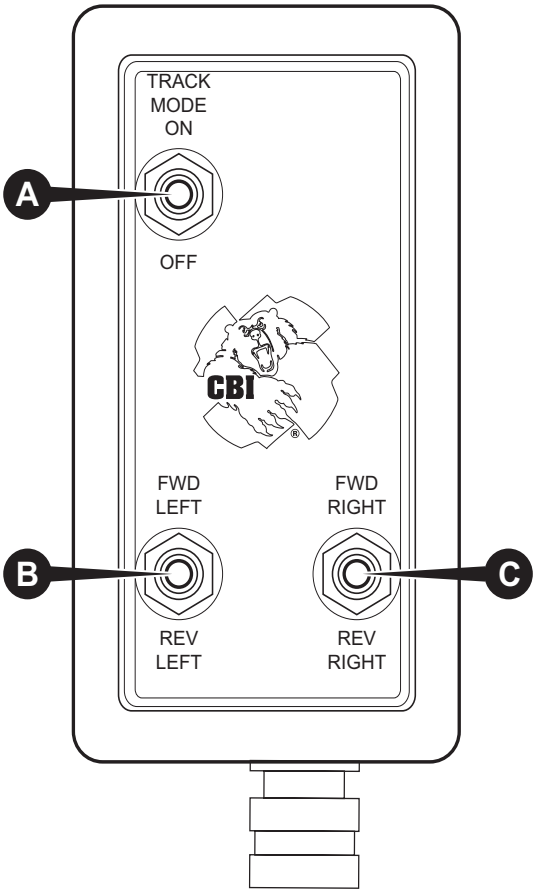


Figure 5.69 - Backup Controller

Ref.	Image	Function
A	TRACK MODE ON	Enable Track Mode Toggling this switch forward (away from you) enables track mode.
A	OFF	Disable Track Mode Toggling this switch backwards (toward you) disables track mode.
B	FWD LEFT	Left Track Forward Holding this switch forward (away from you) when track mode is enabled moves the left track forward.
B	REV LEFT	Left Track Reverse Holding this switch backwards (toward you) when track mode is enabled moves the left track in reverse.
C	FWD RIGHT	Right Track Forward Holding this switch forward (away from you) when track mode is enabled moves the right track forward.
C	REV RIGHT	*Right Track Reverse* Holding this switch backwards (towards you) when track mode is enabled moves the right track in reverse.

5.13 Hog Box Control Panel

The Hog Box Control Panel is used for quick access to start or stop various components on the machine. It is a small panel that contains one button and two switches. The purpose of this section is to help operators know the functions available on this panel.

NOTICE

This section applies to all machines except the 5400 Series. The 5400 Series have a fixed Hog Box and therefore lack an Hog Box Control Panel.

(1) Hog Box Control Panel Functions

The following is a reference picture of said panel and a list of functions controlled by the panel.

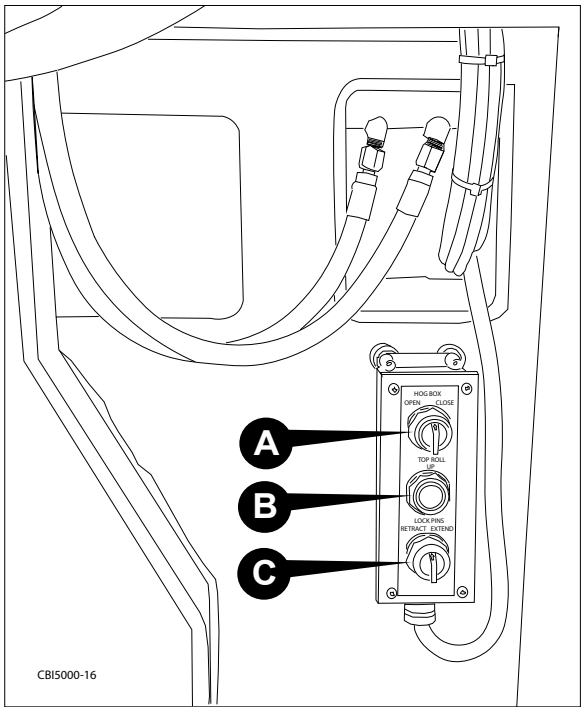


Figure 5.70 - Hog Box Control Panel (6400/6800 Series)

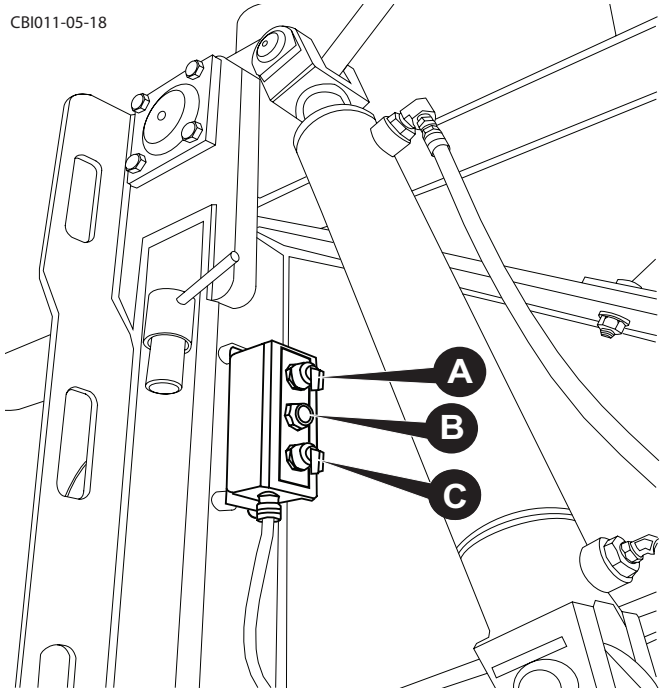


Figure 5.71 - Hog Box Control Panel (5800 Series)

Reference	Function
Figure 5.70 / A Figure 5.71 / A	Hog Box Open/Close Move the switch to the left to engage the HOG BOX OPEN command. Move the switch to the right to engage the HOG BOX CLOSE command.
Figure 5.70 / B Figure 5.71 / B	Top Roll Up When pushed, this button raises the top roll. Press it again to lower the top feed roll.
Figure 5.70 / C Figure 5.71 / C	Lock Pins Retract/Extend Move the switch to the left to engage the LOCK PIN RETRACT command for the Hog Box. Move the switch to the right to engage the LOCK PIN EXTEND command for the Hog Box.

(2) Opening and Closing the Hog Box

NOTICE

This section applies to all machines except the 5400 Series. The 5400 Series have a fixed Hog Box and therefore lack an Hog Box Control Panel.

(a) Opening the Hog Box

The Hog Box will need to be opened in order to perform maintenance on various machine components. The purpose of this section is to help operators to properly and safely open the Hog Box.

⚠ WARNING

Always use extreme caution when opening the upper Hog Box and when preparing to perform any maintenance procedures on the components inside. Ensure personnel utilize the appropriate PPE. Failure to comply may result in severe injury to personnel.

NOTICE

Ensure the steps for opening the Hog Box are in the sequence as outlined above to avoid causing damage to the machine.

PROCEDURE

1. (Only if a Clutch is Equipped) Disengage Clutch - Using the MD4 controller menus, navigate to the Basic Run Menu and disengage the clutch. For more information refer to Section 5.8b Basic Run Menu.

NOTICE

Ensure the rotor stops spinning completely before continuing.

2. (Only if a Clutch is NOT Equipped) Turn Off Engine, Reset System - With the machine shut down but with the power still on, turn the key on the control panel to Run. Once the rotor stops moving, hit the Reset button. For more information, see Section 5.7 Panel Controls & Settings.
3. Put Machine into Service Mode - Using the MD4 controller menus, navigate to the Basic Run Menu and put the machine into service mode. For more information, see Section 5.8b or 5.8c Basic Run Menu. Do not turn off the MD4.

4. Install Grate Retention Pin (if applicable) - Insert the grate retention pin (Figure 5.72 / Figure 5.73) and secure it. On the 6400C and 6800C Series machines, you insert the pin by pulling the arm towards the outside of the machine. See Section 2.2b for decal location.

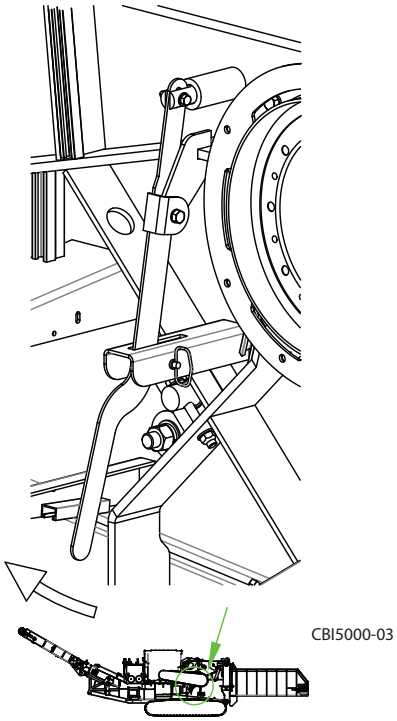


Figure 5.72 - Install Grate Retention Pin (6400/6800 Series)

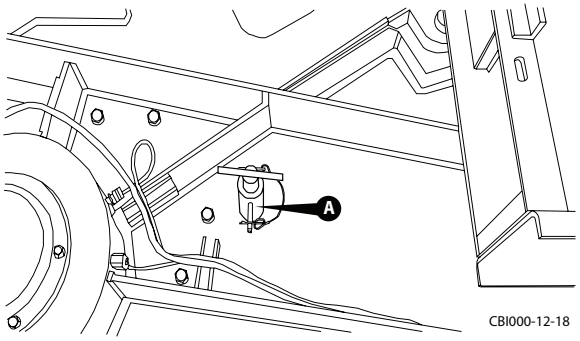


Figure 5.73 - Install Grate Retention Pin (5800 Series)

5. Raise Top Feed Roll - Locate the Hog Box Control Panel and press the Top Roll Up button to raise the Top Feed Roll. For more information, see “5.13 Hog Box Control Panel”.

6. Pin Top Feed Roll Once the top roll has fully risen, insert the top roll safety lock pin (Figure 5.74) to lock it into position. Do not attempt to install the safety lock pin until the Top Feed Roll has fully risen. Press the Top Roll Up button again to release the Top Feed Roll. Ensure the Top Feed Roll is contacting the safety pin.

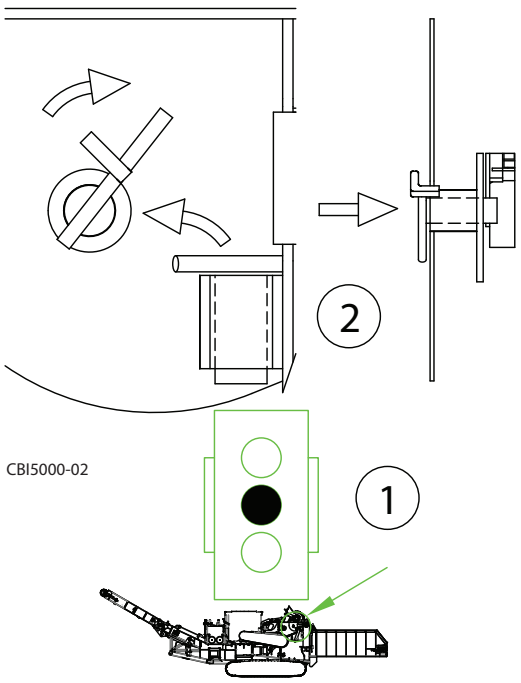


Figure 5.74 - Top Roll Safety Lock Pin (6400/6800 Series)

⚠ WARNING

The Top Feed Roll must be raised before opening the Hog Box in order to avoid causing major damage. Never attempt to install the safety lock pin until the Top Roll has fully risen.

7. Retract Hog Box Lock Pin - Locate the Hog Box Control Panel and retract the locking pins. This refers to turning the Lock Pins Retract / Extend switch to the left. Confirm that the hog box lock pins are fully retracted before proceeding.

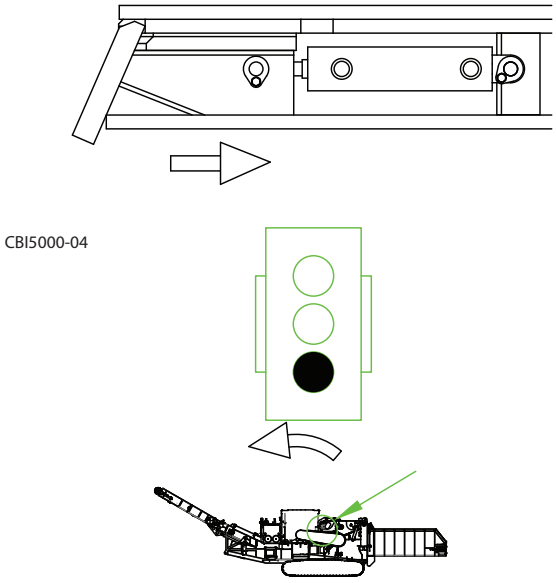


Figure 5.75 - Retract Locking Wedge

8. Open Hog Box - Use the Hog Box Open / Close switch to open the Hog Box all of the way. This refers to turning the Hog Box Open / Close switch to the left. Ensure it has reached it's maximum position.
9. Install Upper Hog Box Stop Locking Pin.

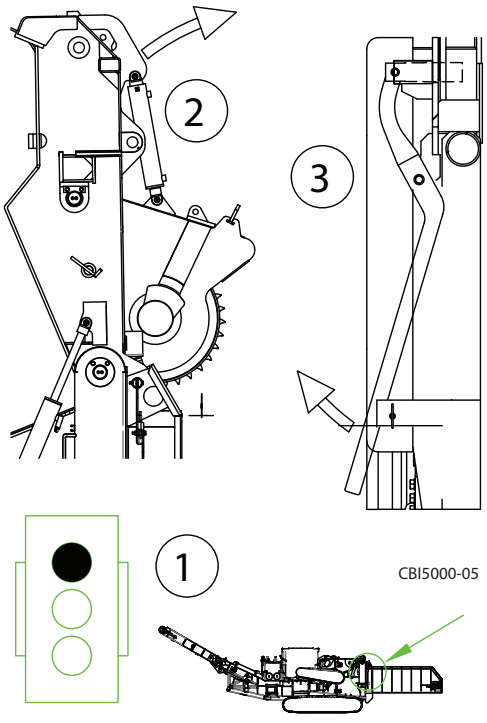


Figure 5.76 - Install Locking Pin (6400/6800 Series)

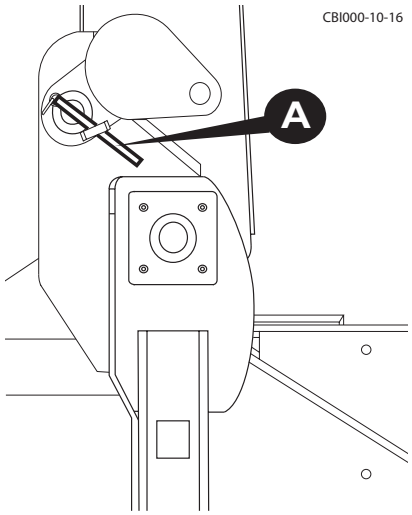


Figure 5.77 - Install Locking Pin (5800 Series)

⚠ WARNING

Do not attempt to lower the Hog Box once the stop locking pin is in place. The pin is used as a backup in case the cylinder were to fail, and is not meant to support the entire weight of the Hog Box. Trying to lower the Upper Hog Box so it contacts the safety pin can cause serious damage to the hydraulic cylinder.

On C Series machines this pin is monitored by the system in an attempt to prevent this damage from occuring. The system will not allow the Hog Box to be closed with the pin in place.

To lower the Hog Box, ensure the Upper Hog Box Stop Locking Pin is removed. For detailed information, see Section 5.12b Closing the Hog Box.

10. Lockout/Tagout the Machine - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. This includes turning off the engine if it is on, turning off the control panel, and locking out the electricity with a lockout tag, hasp, and padlock. For more information, see Section 2.11b Lockout/Tagout.

(b) Closing the Hog Box

The purpose of this section is to help operators to properly and safely close the Hog Box after performing maintenance.

PROCEDURE

1. Clean the Machine - Ensure the that the Hog Box and Top Feed Roll have a clear path for them to be lowered safely without obstruction.
2. Remove Lockout/Tagout - Remove the lockout tag, hasp, and padlock from the main power switch. For more information, see Section 2.11b Lockout/Tagout.
3. Power on Control Panel, Put into Service Mode - Turn the key on the control panel to Run, then press the Reset button. Once the MD4 is powered on, put the machine into Service Mode. For more information, see Section 5.8b or 5.8c Basic Run Menu. Do not turn off the MD4.
4. (Only if a Clutch is Equipped) Turn on Engine - Turn on the engine by turning the key on the control panel to Start.

NOTICE

Ensure the clutch is disengaged and not spinning before continuing. The user must wait until it has stopped spinning (all rotation of the clutch has ceased).

5. Remove Upper Hog Box Stop Locking Pin - Remove the Upper Hog Box Stop Locking Pin by pushing the locking arm towards the machine. After the pin is pulled out, secure the arm in place. For more information, see Section 2.2b for decal location.

⚠ WARNING

Ensure the stop locking pin is fully removed before attempting to close the Hog Box. If you attempt to close the Hog Box first, it can and will cause serious damage to the hydraulic cylinder.

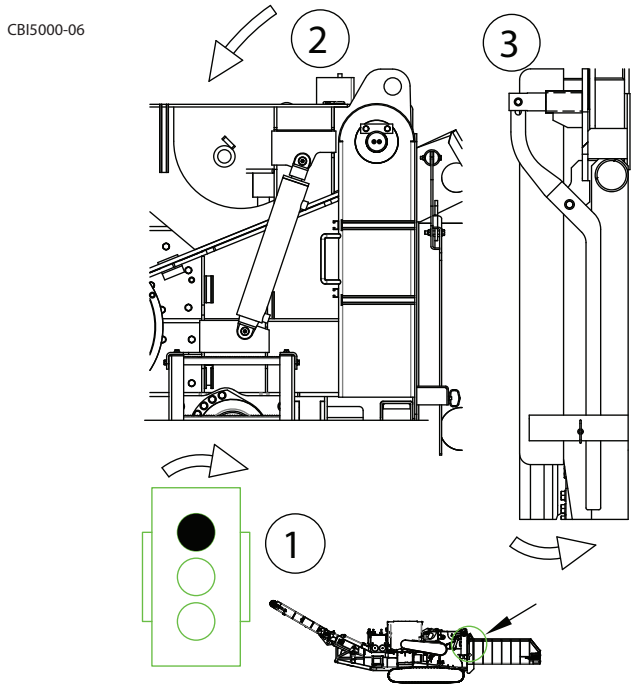


Figure 5.78 - Remove Locking Pin (6400/6800 Series)

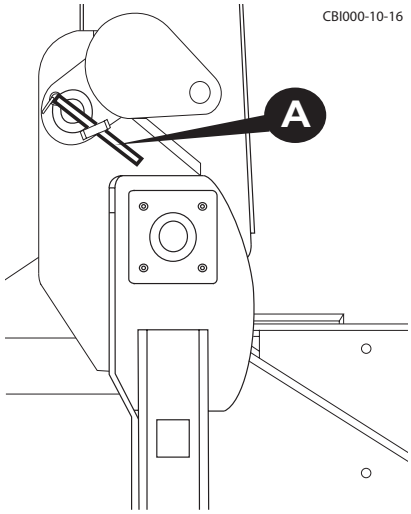


Figure 5.79 - Remove Locking Pin (5800 Series)

6. Close Hog Box - Turn the HOG BOX OPEN / CLOSE selector switch to the right and lower the hog box lid until it's completely closed.
7. Extend Hog Box Lock Pin - When the hog box is down fully, extend the hog box lock pins. Turn the LOCK PINS RETRACT / EXTEND switch to the right to extend the pins. For more information, see "5.13 Hog Box Control Panel".

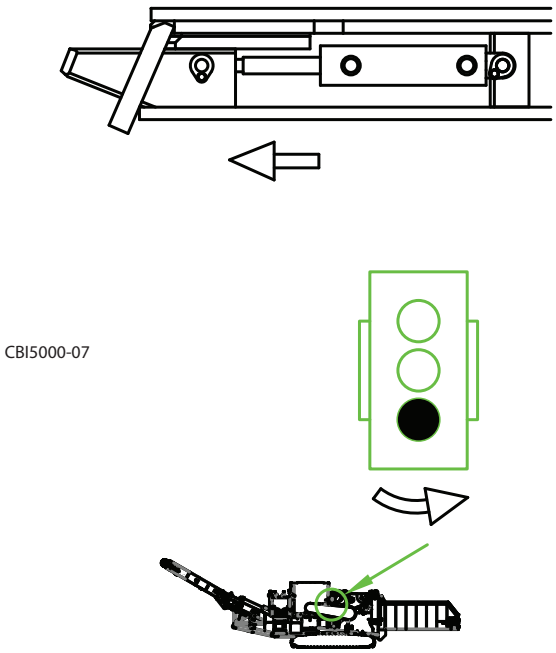


Figure 5.80 - Retract Locking Wedge

NOTICE

Ensure the lock pins are fully extended before proceeding.

8. Unpin and Lower Top Feed Roll - Momentarily press the Top Roll Up button on the Hog Box Control Panel to raise the Top Feed Roll off of the safety pin is in an accessible position, then remove the safety pin. Disengage the safety pin by turning clockwise, then pull outward. Momentarily press the pushbutton again and allow the top feed roll to fall back into position.

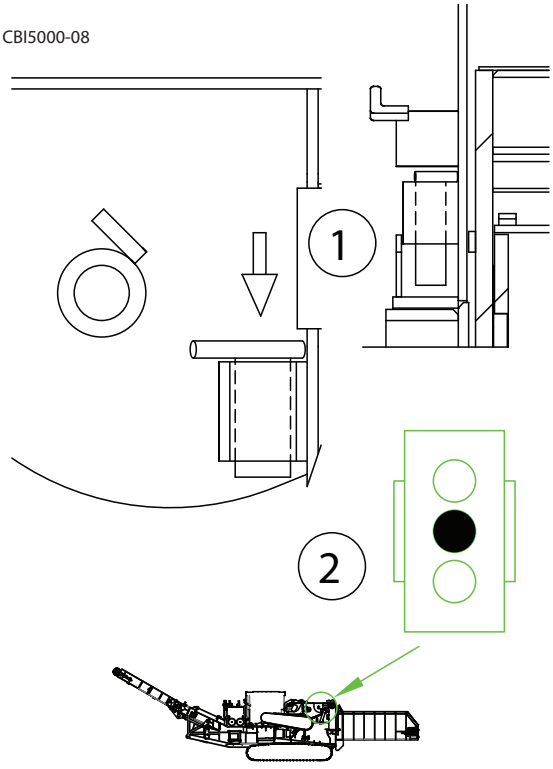


Figure 5.81 - Retract Locking Wedge

⚠ WARNING

The top feed roll will lower automatically once the Top Roll Up button is pressed, so ensure the safety pin has been removed first to avoid any damage to the machine.

9. Remove Grate Retention Pin (if applicable) - Remove the grate retention pin. It must be removed prior to grinding again or severe machine damage will occur.

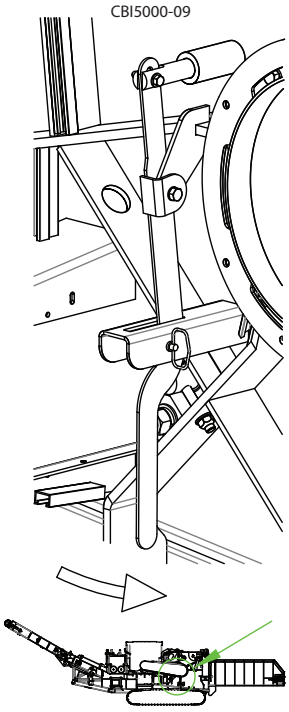


Figure 5.82 - Remove Grate Retention Pin (6400/6800 Series)

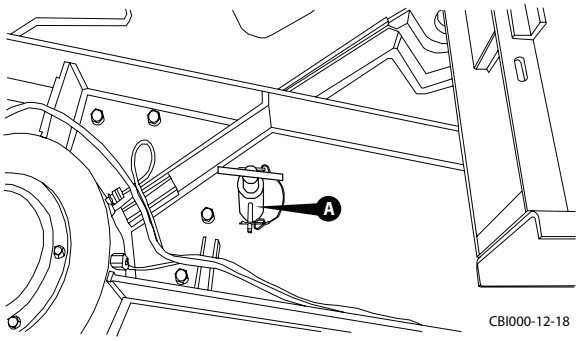


Figure 5.83 - Retention Pin

10. Take Machine out of Service Mode - Using the MD4 controller menus, navigate to the Basic Run Menu and put the machine into auto mode. For more information, see Section 5.8b or 5.8c Basic Run Menu.

5.14 Manual Valve Control

Certain components on your machine can be operated manually from the control valves (Figure 5.84 or Figure 5.85). Manual operation can be used as a backup for certain functions in case the remote controller battery dies. The valves are located under the belt guard. The purpose of this section is to familiarize the operator with the manual controls on this equipment.

NOTICE

The 5400 Series have a fixed Hog Box and therefore have less manual control valves. For all other machines reference Figure 5.70 and for the 5400 Series reference Figure 5.71.

⚠ WARNING

Electronic safety switches may be bypassed when using manual controls; always use extreme caution and ensure components are safe to position before using manual controls. Failure to comply may result in severe equipment damage.

Always use extreme caution when using manual controls. Ensure personnel are a sufficient distance away from components prior to positioning them. Failure to comply may result in severe injury.

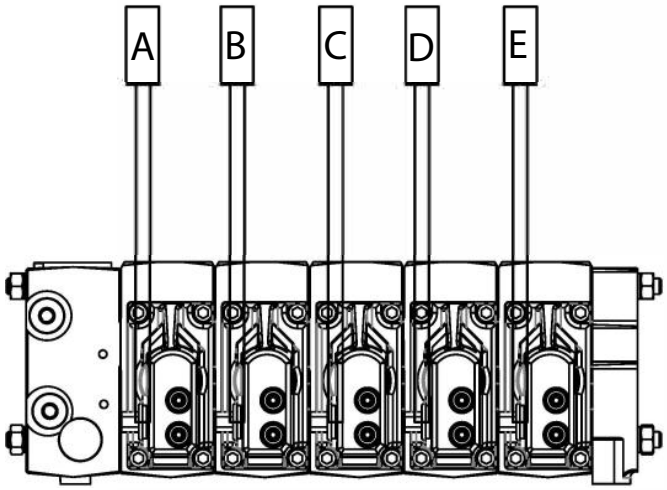


Figure 5.84 - Manual Control Valves

Reference	Function
Figure 5.84 / A	Discharge Conveyor – Forward Push the handle toward the machine (away from you).
Figure 5.84 / A	Discharge Conveyor – Reverse Pull the handle away from the machine (toward you).
Figure 5.84 / B	Flexxaire Fan – Pull Push the handle toward the machine (away from you).
Figure 5.84 / B	Flexxaire Fan – Push Pull the handle away from the machine (toward you).

Figure 5.84 / C	Fold Discharge Conveyor Push the handle toward the machine (away from you).
Figure 5.84 / C	Unfold Discharge Conveyor Pull the handle away from the machine (toward you).
Figure 5.84 / D	Lock Hog Box Lock Pin Push the handle toward the machine (away from you).
Figure 5.84 / D	Unlock Hog Box Lock Pin Pull the handle away from the machine (toward you).
Figure 5.84 / E	Open Hog Box Push the handle toward the machine (away from you).
Figure 5.84 / E	Close Hog Box Pull the handle away from the machine (toward you).

⚠ WARNING

Electronic safety switches may be bypassed when using manual controls; always use extreme caution and ensure components are safe to position before using manual controls. Failure to comply may result in severe equipment damage.

Always use extreme caution when using manual controls. Ensure personnel are a sufficient distance away from components prior to positioning them. Failure to comply may result in severe injury.

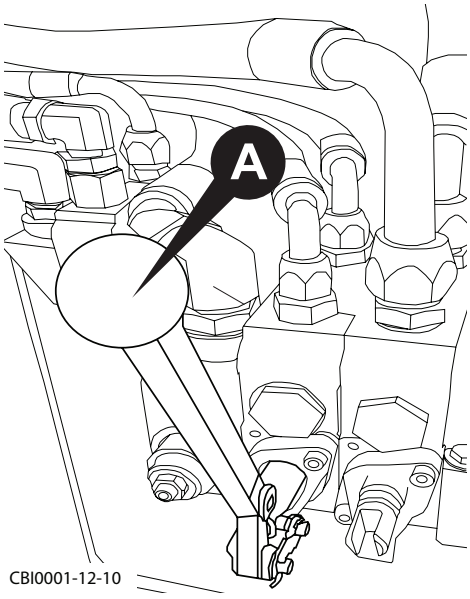


Figure 5.85 - Manual Control Valves (5400 Series)

Reference	Function
Figure 5.85 / A	Fold Discharge Push this lever up to fold the discharge.
Figure 5.85 / A	Unfold Discharge Pull this lever down to unfold the discharge.

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Table of Content

6 Maintenance

6.1 General

(1) Introduction

Careful maintenance preserves the operational reliability and increases the useful life of the important parts. Inspections and maintenance work, such as lubrication, must be carried out by trained and certified personnel. Other maintenance and repair work can be carried out by Terex or Terex authorized service representatives. Spare parts used must meet the specifications of the manufacturer. When genuine parts are used this is guaranteed. Parts that do not meet the specifications of the manufacturer may risk the proper functioning of the machine and endanger the safety of people.

(2) Safety

(a) Maintenance Safety

⚠ WARNING

Always use safe lifting practices when handling parts or material related to this machine.

When performing maintenance work, ensure to observe all applicable safety instructions and guidelines. Ensure that a lockout/tagout procedure is used to ensure the machine is secured against unintentional energy release any time personnel are in danger from unintended machine actions. Ensure that the power supply has been switched off and cannot be switched on during maintenance or repair to the electrical system, unless power is needed to locate and remedy faults.

(b) Chemical Safety

Used oil must be collected and disposed of in an environmentally friendly manner. Products that are used during the work have to be processed in such a way as to burden the environment as little as possible. Remove any excess grease and any oil spills with a cleaning cloth. Always utilize the appropriate PPE when dealing with chemicals.

(3) Start-up

The machine is thoroughly inspected and properly set up when it leaves the factory. Terex recommends checking all nuts and bolts, bearing housings, infeed chute, knives (strikers, or tips), and anvil. Tighten or adjust, where necessary, before putting the machine into operation. Also make sure that belt guards are mounted. Spin the machine's rotor to make sure it rotates freely.

Before starting the machine, also check and make sure that there are no foreign objects in feed conveyor and infeed opening, and that nobody is standing in front of the infeed.

After a few hours of operation, check the tightness of the belts and tighten them if necessary. Also check nuts and bolts once more and tighten them as required. Then repeat belt checks at regular intervals, as well as checks of nuts and bolts which can loosen by vibrations.

In case of increased capacity requirements or problems with the machine, please contact Terex for advice.

6.2 Checklists

(1) Daily Startup Checklist

Before performing maintenance or service, follow the lockout/tagout procedure as described in this manual. Make sure that all maintenance personnel wear proper Personal Protection Equipment (PPE). Check that all safety and warning decals are in place and are legible. For more details, refer to the Safety section of this manual.

Checklist Item	
Check bearing temperature after 8 hours of operation - should not exceed 240° F (116° C).	
Observe if bearings are creating unusual or excessive noise or heat when running.	
Check engine oil and level.	
Check clutch oil and level.	
Check radiator coolant level - check when engine is cool.	
Check air cleaner service indicator.	
Remove and blow out outer filters - replace if necessary.	
Inspect engine for leaks and loose connections.	
Keep engine, radiator and surrounding area clear of debris.	
Inspect drive components - clean v-belts and sheave grooves.	
Check drive belt tension - see drawing in this section.	
Inspect and/or adjust engine fan belts	
Inspect and/or adjust alternator belt.	
Segmented Rotor:	
- Raise and lock out top roll – inspect strikers and hardware. Ensure they are secure and serviceable	
- Inspect rotor for cracking, damage or excessive wear. Hardface as needed.	
- Inspect grate liner, side liners and anvil for damage or excessive wear.	
Check that the machine is level.	
Clean machine with pressurized air or water.	
Check fuel level - use diesel only.	
Check that engine fan is cycling before feeding material to machine.	
Inspect conveyor chains or belts - adjust belt tracking if applicable.	

Inspect entire machine for loose fasteners.	
Check for loose electrical connections or hydraulic leaks.	
Clean and remove all combustible debris in hog box before welding inside of it.	
When welding on rotor, make sure welder is grounded directly to rotor.	
Cold weather start - run engine at 700 rpm for 14 minutes. Turn auto feed off. Engage conveyors and run for 20 minutes. Turn auto feed on then feed material.	
Dispose or remove all hazardous or flammable liquids or materials.	
Ensure that all guarding is securely in place.	
All decals must be legible and visible on machine. Replace where required.	
Check track tension - adjust as required.	
Inspect tracks for loose fasteners, excessive wear and hydraulic leaks.	
Lubricate the machine in accordance with the Lubrication Schedule.	

(2) 50-Hour Maintenance Schedule Checklist

Before performing maintenance or service, follow the lockout/tagout procedure as described in this manual. Make sure that all maintenance personnel wear proper Personal Protection Equipment (PPE). Check that all safety and warning decals are in place and are legible. For more details, refer to the Safety section of this manual.

Checklist Item	
Remove drive belt guard, inspect and adjust belt tension as needed. Check sheave alignment and belts for any unusual wear or damage.	
Remove engine air filters. Replace elements if necessary and reset service indicators.	
Inspect alternator. Adjust Flexxaire fan belt tension.	
Inspect Flexxaire fan hub for leaks – ensure that fan blades rotate smoothly.	
Inspect Flexxaire fan blades for damage – replace as needed.	
Take sample of Flexxaire fan hub oil. Analyze oil for indications of wear to internal components.	
Inspect hydraulic hose routing and valve wire routing. Check for leaks or chafing.	
Inspect hydraulic motors, steel lines, and gearboxes for leaks – ensure connections are secure.	
Inspect hydraulic oil tank level and condition – ensure there are no leaks. Check that tank breather is serviceable, replace as needed.	
Inspect hydraulic valves for leaks. Check solenoids and connectors for damage.	
Check engine coolant level – should be halfway up inner filler neck.	
Always keep spare water separator and several fuel filters on hand.	
Consult the CAT engine service manual or dealer for further service or maintenance instructions.	
Inspect strikers for damage or excessive wear. Buildup or replace as needed.	
Completely inspect rotor for cracking or excessive wear.	
Inspect grate and liner for damage or excessive wear. Replace as needed.	
Inspect upper hog box locking pins for proper operation and engagement.	
Inspect bottom roll for missing or damaged teeth. Teeth should not contact deck plate.	
Inspect shear pin block and keepers. Make sure fasteners are tight and secure.	
Inspect feed conveyor - belt condition, splice, head and tail pulley bearings.	
Check condition of feed conveyor Brevini gearbox and oil level. Check for leaks.	
Inspect and adjust discharge conveyor belt tracking and tension.	
Inspect belt splice and skirt rubber for damage and adjust as needed.	
Make sure conveyor belt maintains position under skirt rubber.	

Check belt scrapers for excessive wear and damage.	
Inspect regrind belt condition and splice. Check bearings for damage or excessive wear.	
Make sure regrind belt maintains position under skirt rubber.	
Inspect hydraulic oil level and condition.	
Change hydraulic oil tank breather filter.	
Inspect operation of hydraulic oil cooler fan. Clean and check for leaks.	
Inspect condition of all hardware on machine – replace as needed.	
Adjust track drive tension and check gearbox oil level. Check for leaks.	
Inspect track sprockets for damage and loose or worn fasteners.	
Inspect track grousers and fasteners for damage – ensure they are secure. Replace as needed.	
Inspect track motor and gearbox for leaking seals, fittings and hoses.	
Lubricate the machine in accordance with the Lubrication Schedule.	

(3) 250-Hour Maintenance Schedule Checklist

Before performing maintenance or service, follow the lockout/tagout procedure as described in this manual. Make sure that all maintenance personnel wear proper Personal Protection Equipment (PPE). Check that all safety and warning decals are in place and are legible. For more details, refer to the Safety section of this manual.

Checklist Item	
Remove drive belt guard, inspect and adjust belt tension as needed. Check sheave alignment and belts for any unusual wear or damage.	
Remove engine air filters. Replace elements if necessary and reset service indicators.	
Inspect alternator. Adjust Flexxaire fan belt tension.	
Inspect Flexxaire fan hub for leaks – ensure that fan blades rotate smoothly.	
Inspect Flexxaire fan blades for damage – replace as needed.	
Take sample of Flexxaire fan hub oil. Analyze oil for indications of wear to internal components.	
Inspect hydraulic hose routing and valve wire routing. Check for leaks or chafing.	
Inspect hydraulic motors, steel lines, and gearboxes for leaks – ensure connections and fasteners are secure.	
Inspect hydraulic oil tank level and condition – ensure there are no leaks. Check that tank breather is serviceable, replace as needed. Take hydraulic oil sample.	
Inspect hydraulic valves for leaks. Check solenoids and connectors for damage.	
Check engine coolant level – should be halfway up inner filler neck.	
Always keep spare water separator and several fuel filters on hand.	
Consult the CAT engine service manual or dealer for further service or maintenance instructions.	
Completely inspect rotor for cracking or excessive wear.	
Inspect strikers for damage or excessive wear. Buildup or replace as needed.	
Inspect grate and liner for damage or excessive wear. Replace as needed.	
Inspect upper hog box locking pins for proper operation and engagement.	
Inspect bottom roll for missing or damaged teeth. Teeth should not contact deck plate.	
Inspect shear pin block and keepers. Make sure fasteners are tight and secure.	
Inspect feed conveyor - belt condition, splice, head and tail pulley bearings.	
Check condition of feed conveyor Brevini gearbox and oil level. Check for leaks.	

Inspect and adjust discharge conveyor belt tracking and tension.	
Remove drive belt guard, inspect and adjust belt tension as needed. Check sheave alignment and belts for any unusual wear or damage.	
Inspect belt splice and skirt rubber for damage and adjust as needed.	
Make sure conveyor belt maintains position under skirt rubber.	
Check belt scrapers for excessive wear and damage.	
Inspect regrind belt condition and splice. Check bearings for damage or excessive wear.	
Make sure regrind belt maintains position under skirt rubber.	
Inspect hydraulic oil level and condition. Replace all hydraulic filters.	
Change all hydraulic pressure filters, charge filters, return filters, and the hydraulic tank breather.	
Inspect operation of hydraulic oil cooler fan. Clean and check for leaks.	
Inspect condition of all hardware on machine – replace as needed.	
Grease machine daily according to the Lubrication Schedule.	
Adjust track drive tension and check gearbox oil level. Also check for leaks.	
Inspect track sprockets for damage and loose or worn fasteners.	
Inspect track grousers and fasteners for damage – ensure they are secure. Replace as needed.	
Inspect track motor and gearbox for leaking seals, fittings and hoses.	
Change track gearbox oil.	
Inspect track front idler slide blocks for damage or excessive wear.	
Inspect track carrier idlers for leaks or damage.	
Lubricate the machine in accordance with the Lubrication Schedule.	

(4) 500-Hours Maintenance Schedule

Repeat maintenance schedule at 250 hours and every 750 hours thereafter.

(5) Hydraulic Oil Requirements

For temperatures over 15° F (-9º C), use Chevron 1000.
For temperatures under 15° F (-9º C), use Mobilfluid LT.
For temperatures outside of these ranges, consult Terex.
Change hydraulic oil at least every 1,000 hours or as necessary.
Replace hydraulic filters every 400-500 hours or as necessary.

6.3 Drive Belts

(1) Grinder Tension Specifications

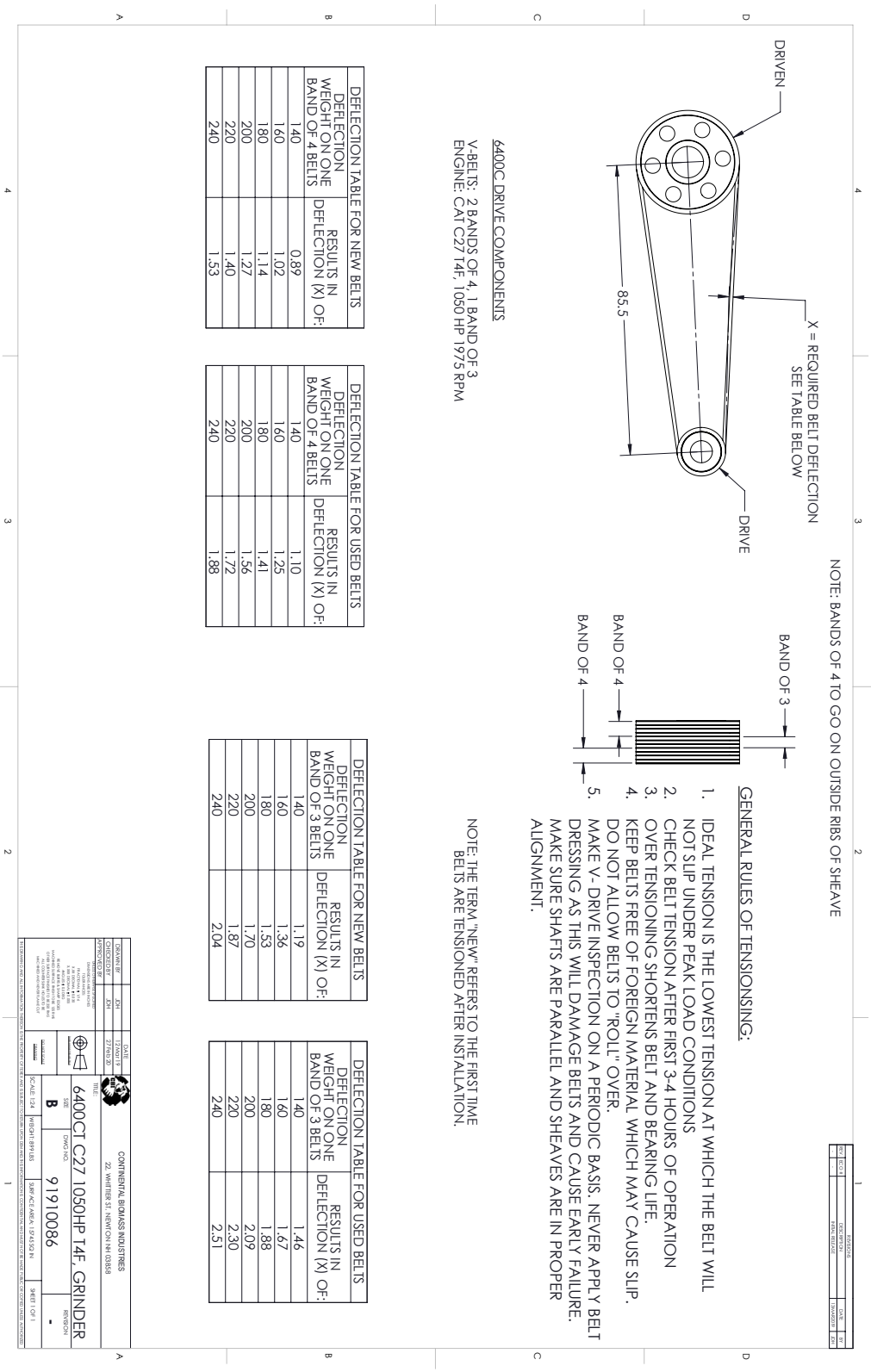


Figure 6.1 - Grinder Belt Tension Specifications

(2) Chipper Tension Specifications

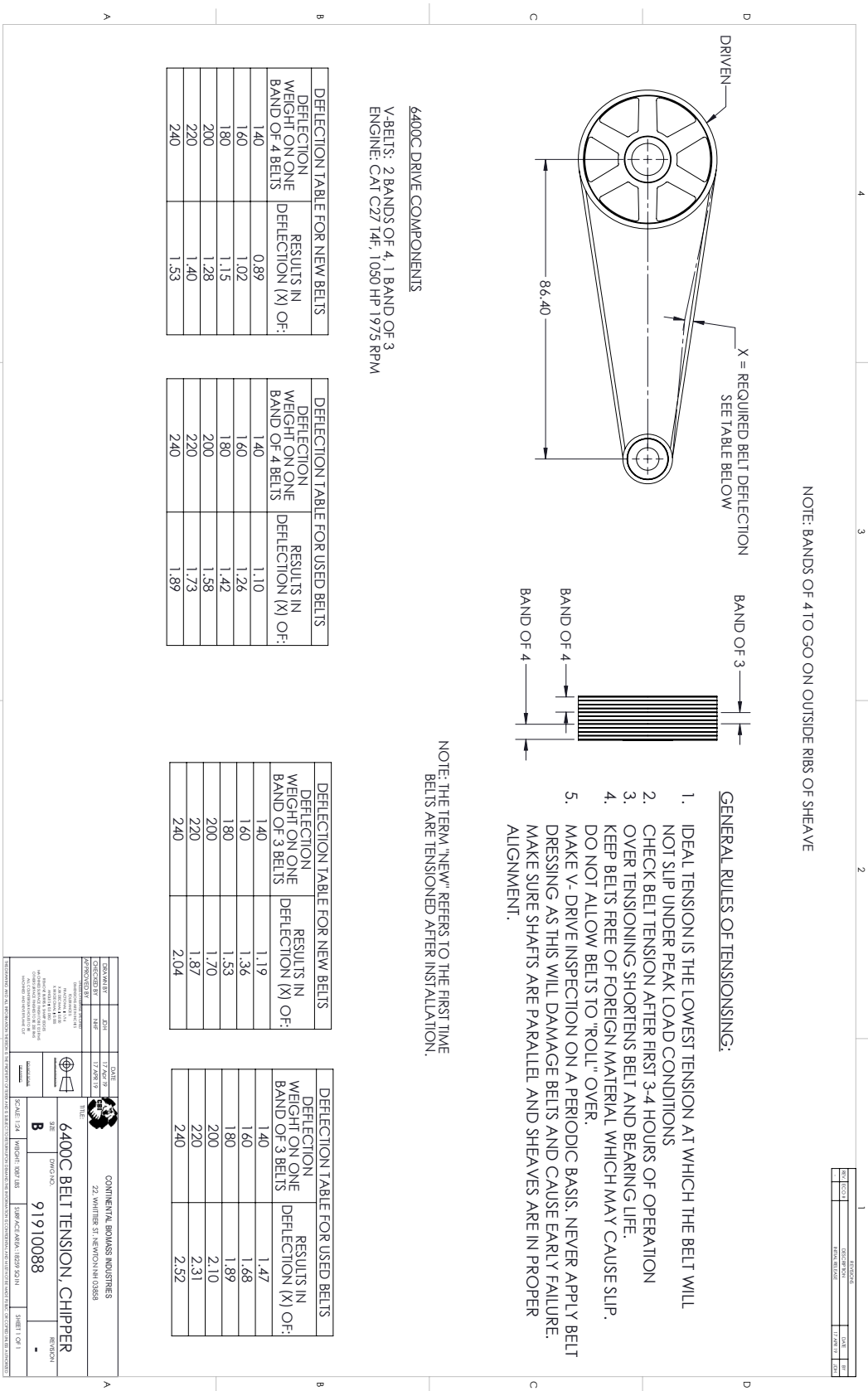


Figure 6.2 - Chipper Belt Tension Specifications

(3) Drive Belt Tension Adjustment

The rotor drive belts require their tension to be checked periodically. Improper belt tension will cause premature wear significantly increase operating costs. The purpose of this procedure is to familiarize operators with the technique for adjusting tension in the rotor drive belts.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
2. Remove Belt Cover - Remove the fasteners that secure the belt cover and use appropriate hoisting equipment to remove the cover from the machine.
3. Loosen Take-Up Rod Lock Nut - Loosen the lock nuts (Figure 6.3 / A) that secure the threaded rods that slide the engine back and forth.

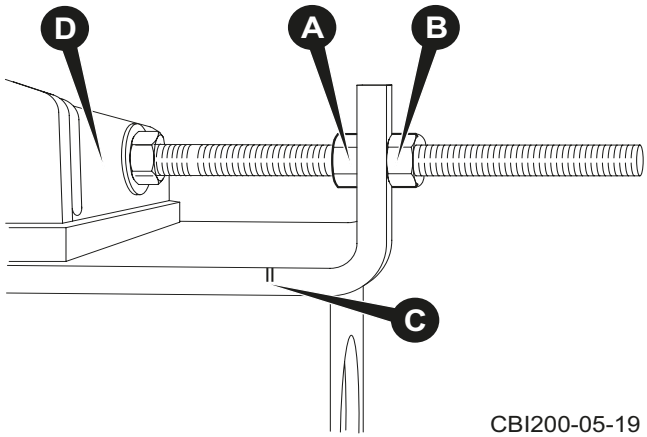


Figure 6.3 - Adjust Take-Up Rod Nuts

NOTICE

There are two adjustment screws; one located at the front and one located at the back of the engine.

4. Adjust Both Take-Up Rods - Adjust the take-up adjustment nuts (Figure 6.3 / A and B) to set the proper belt tension. If the measured belt sag is too low, the engine carriage (Figure 6.3 / D) must be moved away from the hash marks (Figure 6.3 / C). If there is too much sag, the belt must be tightened by moving the engine carriage (Figure 6.3 / D) toward the hash marks (Figure 6.3 / C).

NOTICE

Make sure that you turn both take-up rods (front and back) an equal amount to ensure proper alignment.

5. Ensure Sheave Alignment - The machine is supplied from the factory with stamped hash marks (Figure 6.3 / C) on the engine slides. These marks are provided as a reference point to ensure that the engine sheave is properly aligned with the drive sheave. Ensure the distance from the stamped mark (Figure 6.3 / C) to the engine frame (Figure 6.3 / D) is equal on both sides of the engine.

⚠ WARNING

Failure to properly align the two sheaves will result premature belt failure and additional component wear. Never operate a machine with the sheaves misaligned.

6. Retest Belt Tension - Retest the belt tension sag in accordance with the Belt Tension Specifications. Readjust the belt tension until the deflection is in the desirable range.
7. Retighten Engine Adjustment Lock Nuts - Retighten the lock nuts (Figure 6.3 / A and B) for both take-up rods in accordance with Torque Specifications.

6.4 Segmented Rotor

(1) Striker Plates

Replace as Sets	Should be handled as a set of 20 plates. This will help maintain rotor balance. When replacing a damaged or worn plate, select a replacement of nearly equal weight.
Safety	Always lockout/tagout the machine before performing rotor maintenance. Clearance between the striker plate and grate liner should be at least 1/4” (6.35 mm).
Torque Specifications	Torque requirements for striker bolt: Dry: 1820 ft/lbs (2468 Nm) Lubricated: 1450 ft/lbs (1966 Nm)
Fasteners	Lubricated torque value refers to bolts which are coated with oil or grease, as well as cadmium plated. Always use new bolts when fastening striker plates. Do not use previously torqued bolts.

(2) Clearance for Segmented Rotor, Short Strikers and Grate Liner

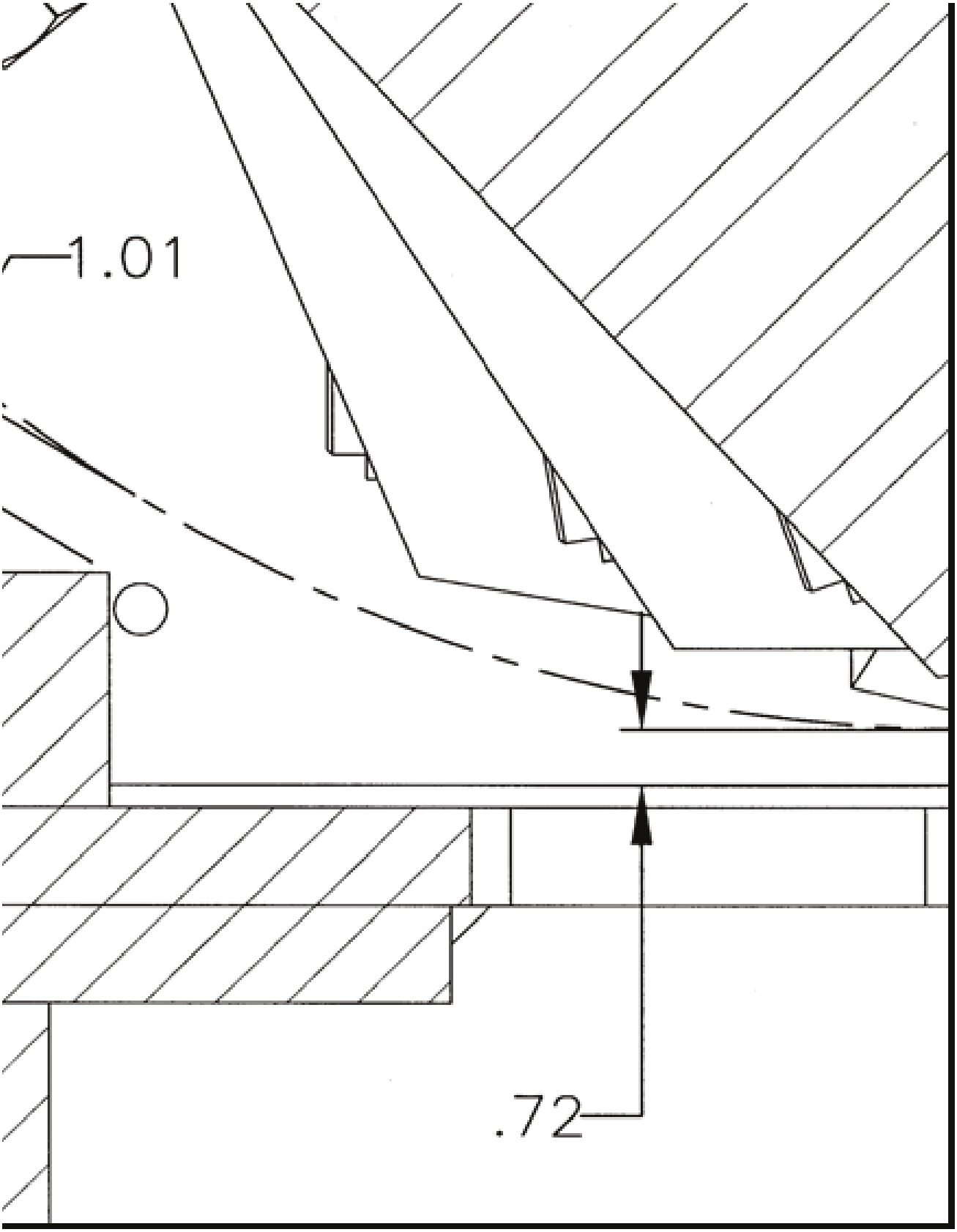


Figure 6.4 - Clearance for Segmented Rotor, Short Strikers and Grate Liner

(3) Clearance for Segmented Rotor, Tall Strikers and Grate Liner

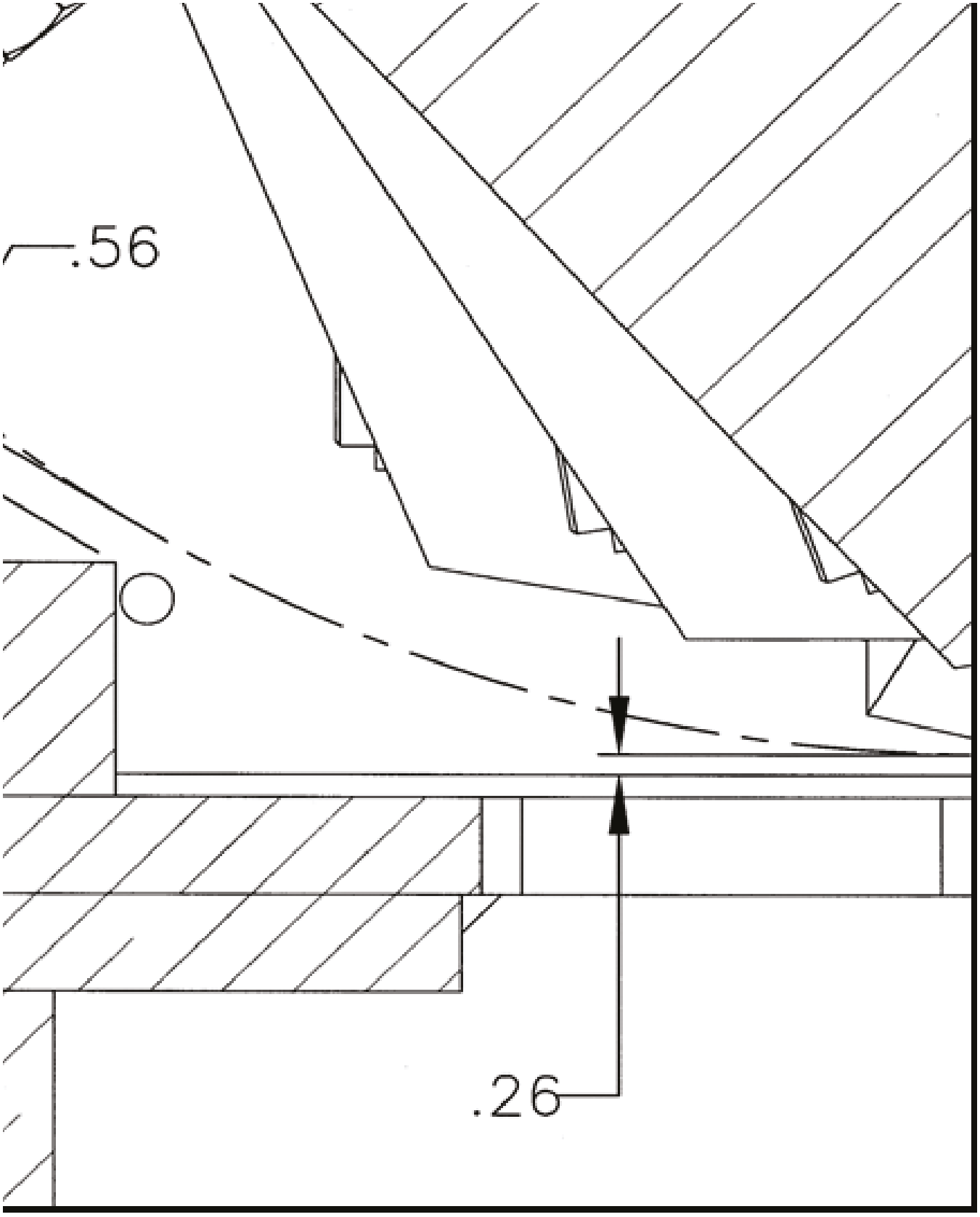
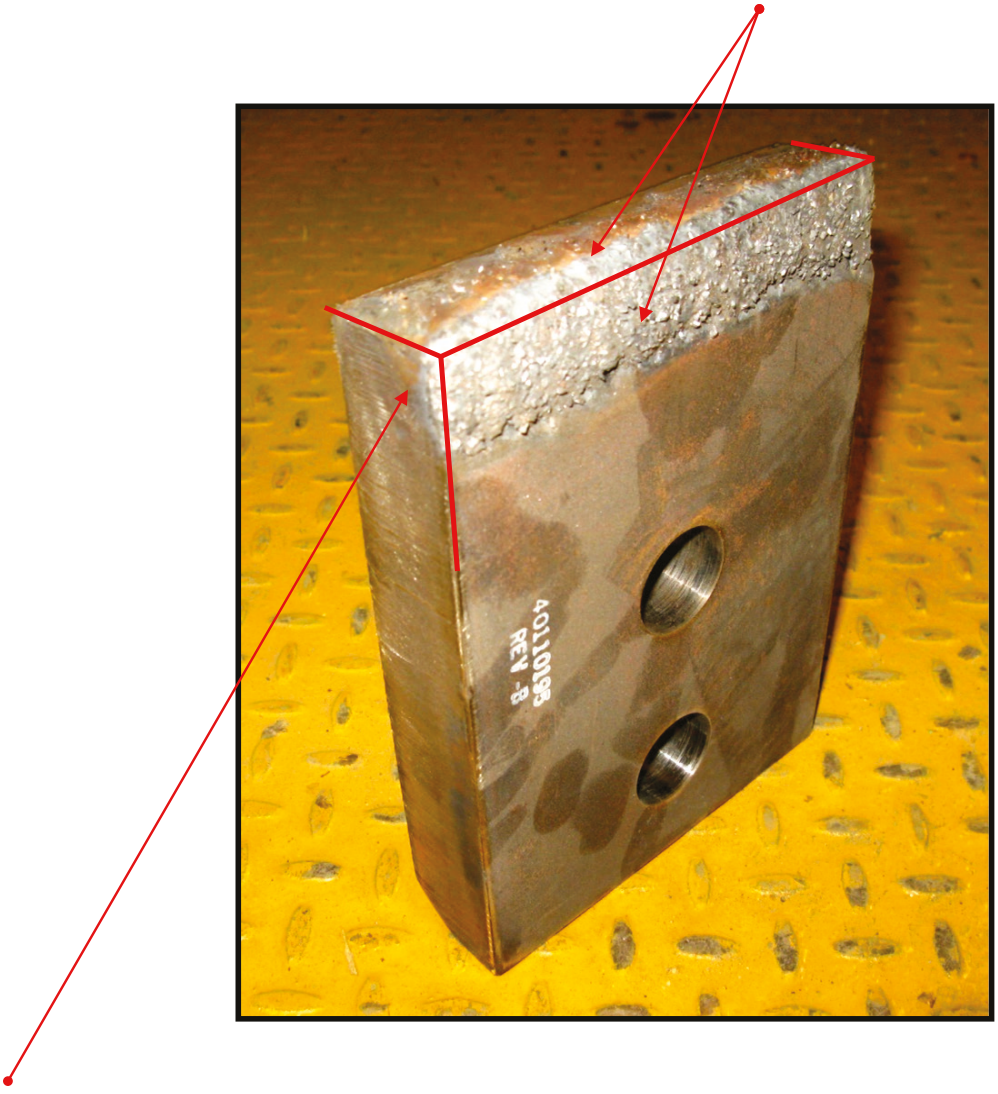


Figure 6.5 - Clearance for Segmented Rotor, Tall Strikers and Grate Liner

(4) Striker Plate Rebuilding and Hard Facing

When strikers become worn and unusable, they can be rebuilt and/or hard faced in the following manner. A welding fixture can be purchased to restore the original striker profile.

Hard face striker top and face by using 3/8" hard face rod, Terex part number 80010032. Do not apply more than two passes high on face, or one pass on top surface. Additional passes may crack and not hold. Do not hard face over tungsten carbide wear area.



Rebuild striker to original profile by using 3/16" buildup rod, Terex part number 80013148 when wear exceeds 1/4". Do not use hard face rod as buildup.

Figure 6.6 - Striker Plate Rebuilding and Hard Facing

6.5 Chipping Rotor

⚠ WARNING

Never operate the drum chipper until this instruction manual has been read and understood by all personnel.

Never work on the drum chipper until the main power source is locked and tagged out. The machine must remain locked at all times it is not in operation.

Never work on the drum chipper when the drum is rotating.

Never operate the drum chipper unless all drive equipment is properly guarded.

Never work on or near the drum chipper without proper PPE.

Never work inside the drum chipper without engaging the mechanical safety lock on top feed roll.

(1) Maintenance Schedule

The table below summarizes the instructions to be followed for the routine maintenance of your drum chipper. For further instructions, see the sections of this manual as indicated in the table below.

Interval	Maintenance Measures	Notes
Daily	Check knives	Knife change might be needed.
	Check bearing temperatures	Grease leakage can indicate damaged seals or overheating
	Check for unusual machine vibrations	
	Check all bolts and nuts.	Tighten as required
	Built up debris	Clean out daily
	Grease appropriate fittings	
Every 120 hours of operation	Check drive belts for wear	Re-mount guards
	Check tensions and alignment	
Every 2000 hours of operation	For all roller bearings, check, clean, change grease, and adjust play	Once a year. First grease change after 500 hours
	Change stud bolts and nuts for knife clamps	

(2) Knife Replacement

Maintaining knife sharpness on your CBI chipper is critical for producing a quality product. The drum is fitted with multiple knife sections that can be removed and re-sharpened. In order to maintain proper anvil clearances, care must be taken when installing new or re-sharpened knives. The purpose of this procedure is to familiarize operators with how to replace the knives on a CBI drum chipper.

⚠ WARNING

Knives are extremely sharp. When handling knives use extreme caution and utilize sufficient personal protective equipment.

PROCEDURE

1. Raise Upper Feed Roll - Raise the upper feed roll and pin it into place.
2. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to prepare the machine for service to safeguard personnel from the unexpected release of hazardous energy during service or maintenance activities. For more information, see the Safety section.
3. Rotate Rotor - Rotate the rotor so that the knife for the pocket being serviced is horizontal (Figure 6.7 / D). Lock the rotor in position. This is important so the knife does not accidentally slide out when the clamp is loosened.

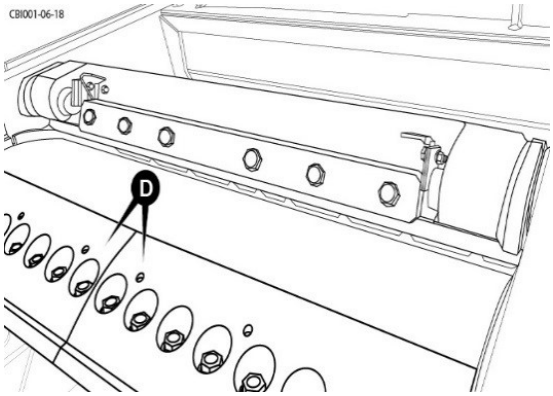


Figure 6.7 - Knife horizontal

NOTICE

The knives have a ten degree slope, so they won't lay perfectly flat, even when horizontal.

4. Clean Pocket and Clamp - Using compressed air and a scraping tool or pick, ensure the entire chip pocket and clamp is clean of debris. Ensuring cleanliness is important as any debris could become trapped in the knife system and may cause it to not seat or clamp properly. Pay special attention around the clamp bolt heads and around the knife.

5. Loosen Clamp Nuts - Using an impact wrench, loosen but do not fully remove the clamp nuts (Figure 6.8). Only loosen one clamp segment at a time.

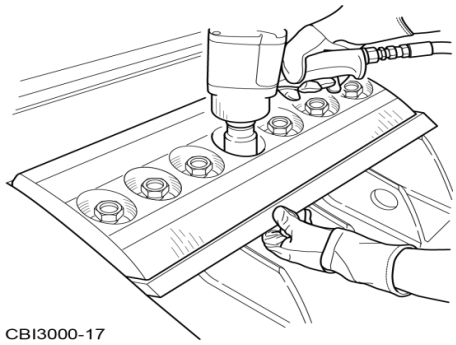


Figure 6.8 - Clamp nuts

NOTICE

Use caution when loosening the clamp nuts to ensure the studs do not loosen as well.

6. Loosen Clamp - Once the bolts are loosened, the clamp should “pop” up because it’s spring loaded. If it doesn’t, use the threaded holes in the top of the clamp to loosen it (Figure 6.8).
7. Remove Knives - Remove the old knives from the pocket (Figure 6.9). If the knives are tight, loosen them by hitting the clamp with a rubber mallet.

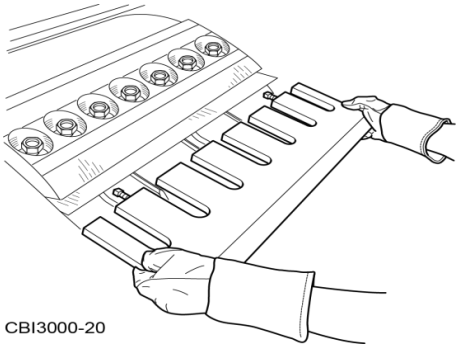


Figure 6.9 - Remove old knives

8. Thoroughly Clean Assembly - Use a scraper to clean any burnt on residue from the clamp or counter knife surfaces. Using compressed air, flush all debris from in between the clamp assembly.
9. Lubricate Stud Threads - Place one drop of light machine oil on the top of each of the studs by the threads to lubricate the nuts when they’re tightened (Figure 6.10).

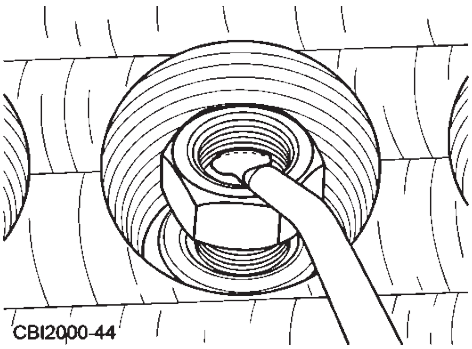


Figure 6.10 - Lubricate stud threads

10. Check Extension Settings - Check the knife extension adjustment screws on the new knives to ensure that they are set up for the proper knife extension. For more information, see Knife Extension Settings.
11. Install Knives - Place new knife in the clamp assembly.
12. Seat Assembly - Push the clamp down on the knife with one hand and wiggle the assembly with the other to ensure knife is properly seated against the back of the holder.
13. Tighten Clamp Nuts - With one hand, apply pressure to the knife to keep knife seated securely. With the other hand, tighten the nuts starting at the center and work outwards. The clamp threads are equipped with heli-coils, so Loctite Quickstix paste 248 must be used.
14. Torque Clamp Nuts - Torque the clamp nuts starting at the center and work outward. Torque the clamp nuts at 2/3 the value and then do a final pass at the full torque value. The final tightened value should be 600 ft/lbs (813 Nm).
15. Check Tip Alignment (If Applicable) - If applicable, check the tip alignment with the adjacent knife sections (Figure 6.11) to confirm proper seating and alignment. If the sections do not line up, repeat steps 4 through 10.

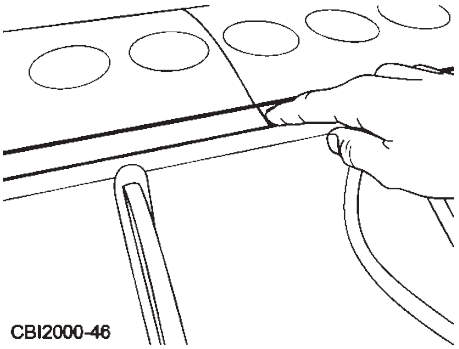


Figure 6.11 - Check tip alignment

NOTICE

Inspect the heights of the clamp studs; they should all be level to each other. If some studs are more exposed than others it is a sign that the stud had loosened and must be reassembled.

16. Repeat for Other Segments in Pocket (If Applicable) - Repeat steps 3 through 9 for the other segments in the pocket until all knives have been rotated or replaced. If rotating knife positions within the segment (i.e. inner to outer), steps 3 through 9 may need to be performed on multiple segments simultaneously.

17. Check Anvil Clearance - Rotate the rotor and check to ensure that there is sufficient clearance between the new knives and the anvil. For more information, see Anvil Clearance Inspection.
18. Rotate Rotor and Repeat - When all the segments in a pocket have been serviced, rotate the drum and repeat steps 3 through 11. Continue until all knives on the chipper have been serviced.

(3) Knife Back-Dressing

The usable service life of the knives on your CBI chipper can be extended by back-dressing. Back-dressing a knife is using a hand held sharpener to touch up the knives while they are still in the machine. Knives can only be back-dressed a limited amount of times before they must be replaced with new or re-ground components. The purpose of this procedure is to familiarize operators with how to back-dress knives on a CBI drum chipper.

⚠ WARNING

Knives are extremely sharp. When handling knives use extreme caution and utilize sufficient personal protective equipment.

PROCEDURE

1. Raise Upper Feed Roll - Raise the upper feed roll and pin it into place.
2. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to prepare the machine for service to safeguard personnel from the unexpected release of hazardous energy during service or maintenance activities.
3. Rotate Rotor - Rotate the rotor so that the knife for the pocket being serviced is easily accessible. You need full access to the knife to ensure the back-dressing is consistent across the full length of the blade.
4. Back-Dress Knife - Using a CBI back-dressing tool (10.8VDC battery powered, part number 81610005; 12VDC powered, part number 81610007; and 120VAC powered, part number 81610006) back-dress the back edge of the knife. Remove the minimum amount of material necessary to put a sharp edge on the knife. The knife should be back-ground at a 15° angle (Figure 6.12 / A). The maximum allowable amount of back-dressing is removing ≈7/64” (≈2.6 mm) off of the back edge of the knife (Figure 6.12 / B).

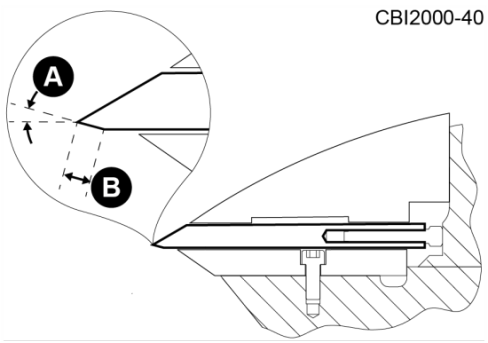


Figure 6.12 - Back-Dress knife

NOTICE

Consult the user’s manual included with the CBI back-dressing tool for detailed information on proper back-dressing techniques.

Maximum allowable back-dressing is typically achieved in three passes with the back-dressing tool. For a reference you may check against the CBI sharpness gauge (part number 81610003) as shown inFigure 6.13.

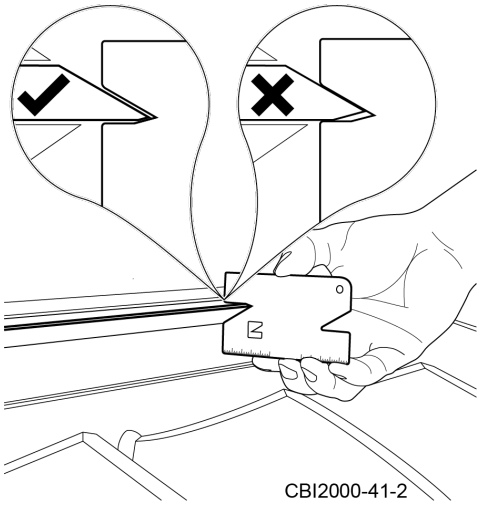


Figure 6.13 - CBI sharpness gauge

5. Repeat for all Knives - Repeat steps 3 and 4 until all knives on the drum have been back-dressed.

(4) Knife Sharpening

The knives on your CBI chipper need regular re-sharpening. In order for the re-sharpened knives to perform properly, they must be ground to CBI specifications. Knives should always be re-sharpened by competent knife grinding professionals. The purpose of this procedure is to familiarize professional knife grinding personnel with the specifics of re-sharpening CBI knives.

⚠ WARNING

Knives are extremely sharp. When handling knives use extreme caution and utilize sufficient personal protective equipment.

PROCEDURE

1. Inspect Knives for Damage - Inspect the knives for damage. Look for nicks, dings, cracks, or any other signs of damage. Never reuse a knife with a crack.
2. Grind Knives as a Set - CBI advises to always re-sharpening complete sets of knives at the same time. Doing so minimizes the variance in knife weight, which can lead to an imbalance in your rotor.

⚠ WARNING

Never use a set of knives that has greater than 3/8” variance in length between the longest and shortest knives in the set. Failure to comply may result in severe rotor unbalance.

3. Use Appropriate Grinding Equipment - Always use a coolant flooded industrial wet grinder. CBI knives are through-hardened for the full length of the blade. Coolant flooded grinding eliminates unnecessary heat buildup that can cause stress fractures and draw the temper out of the steel.

⚠ WARNING

Never dry grind CBI knives, as severe injury to personnel and component damage may result.

4. Use Appropriate Machine Settings - CBI knives are ground to a standard 30° angle (Figure 6.14 / A). This setting is chosen for optimal machine performance and part life. Always consult CBI before grinding to any other knife angle. For more information, contact CBI.

5. Dispose of Spent Knives - CBI knives can be ground only to a minimum useable length that varies depending on which rotor is used and what chip size is being made. There must be enough of the knife remaining so that there is at least ½" of clamp area between the tail of the knife and the front edge of the rear step in the knife clamp (Figure 6.14 / B).

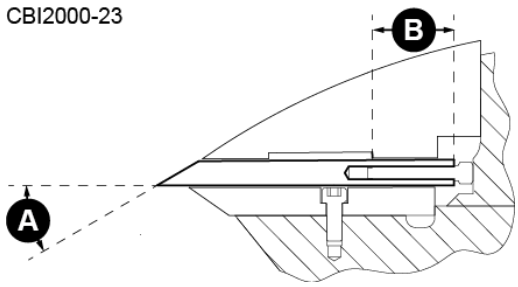


Figure 6.14 - Dispose of spent knives

6. Set Adjustment Screws - The knife extension adjustment screws should be removed, cleaned, lubricated with light machine oil, and reset to the proper extension settings every time a knife is re-ground. This ensures the screws do not bind and can be adjusted freely. For more information on the extension settings, see Knife Extension Settings.

⚠ WARNING

Never use CBI knives that have been ground past their minimum usable length. Failure to comply compromises the structural integrity of the knife and clamping mechanisms. Severe injury to personnel and component damage may result.

(5) Anvils

The knives on your CBI chipper need regular re-sharpening. In order for the re-sharpened knives to perform properly, they must be ground to CBI specifications. Knives should always be re-sharpened by competent knife grinding professionals. The purpose of this procedure is to familiarize professional knife grinding personnel with the specifics of re-sharpening CBI knives.

(6) Anvil Clearance Inspection

The anvil on your CBI drum chipper is a precision component that requires a specified clearance. Regular inspections of the anvil for proper anvil to knife clearance must be performed to maintain a high quality end product. The purpose of this procedure is to familiarize operators with how to inspect the anvil/knife clearance on a CBI drum chipper.

PROCEDURE

1. Raise Infeed Top Roll - Raise the infeed top roll and lock it into place.
2. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to prepare the machine for service to safeguard personnel from the unexpected release of hazardous energy during service or maintenance activities.
3. Enter Infeed - Climb onto the infeed of the chipper and walk over in front of the rotor.
4. Rotate Rotor - Rotate the rotor so that the tip of the knife being checked (Figure 6.15 / A) is normal to the anvil edge (Figure 6.15 / B). The knife must be aligned properly in order to check the clearance.

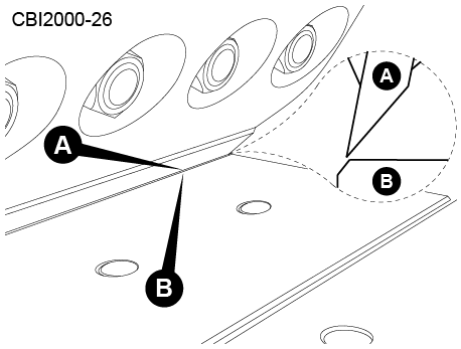


Figure 6.15 - Rotate Rotor

5. Check for Maximum Anvil Clearance - Insert a 3 mm feeler gauge in between the anvil and the knife tip. Hold the gauge parallel to the rotor and run it across the full length of the knife (Figure 6.16). If the gauge fits between the knife and the anvil at any point then the anvil clearance is too loose and it must be adjusted.
6. Check Clearances on all Knives - Rotate the rotor so that the tip of the next knife being checked is aligned (Figure 6.16). Repeat steps 4 through 6 until the anvil clearance has been checked for all knife sections.

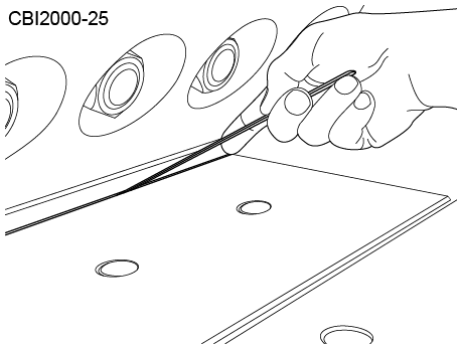


Figure 6.16 - Check clearances

(7) Knife Extension Settings

Chip size is changed by adjusting how far the knives stick out from the face of the rotor, which is known as knife extension. This is achieved by adjusting a set screw in the back of the knives. Each time the extension is adjusted the anvil clearance must be adjusted as well. The following is a list of knife and anvil settings needed for various target chip sizes. Always consult this list when making adjustments to chip size.

(a) 2-Pocket Rotor with Three Piece Grate Liner

Chip Size	Anvil Used	Extension Setting (Figure 6.17 / A)	Minimum Knife Length (Figure 6.17 / B)
19 mm	41910279	8.4937 inches	6.1848 inches
20 mm	41910053	8.5567 inches	6.2477 inches
21 mm	N/A	8.6194 inches	6.3105 inches
22 mm	41910477	8.6820 inches	6.3731 inches
23 mm	41910286	8.7444 inches	6.4355 inches
25 mm	41910055	8.8686 inches	6.5597 inches
26 mm	N/A	8.9305 inches	6.6215 inches
27 mm	N/A	8.9921 inches	6.6832 inches
30 mm	41910500	9.1761 inches	6.8672 inches

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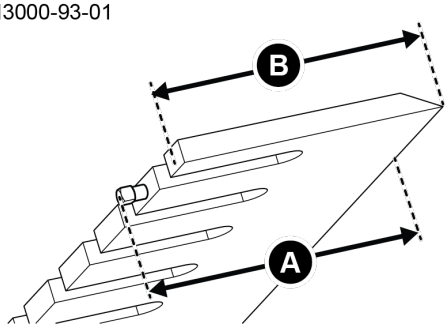


Figure 6.17 - Knife Extension

6.6 Grate Frame and Liners

(1) Grate Liner Removal

The grate liner on your machine helps determine the sizing of your final product. This may need to be replaced periodically due to wear or for making adjustments to product sizing. The liners can also be rotated periodically to help even out the wear. The purpose of this section is to familiarize operators a basic procedure for removing the grate liner on your machine.

PROCEDURE

1. Open Hog Box - Start the machine and raise the top feed roll. Insert the safety lock pin and secure it by turning counterclockwise. Retract the lock pins and raise the upper frame. Make sure that the safety brace is in place. For more detailed instructions, see Opening and Closing the Hog Box.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Remove Bar - Remove the bar (Figure 6.18 / B) that secures the grate liner in place.
4. Mount Chain - Position certified hoisting chain (10,000 lbs / 4,536 kg capacity) to the backside of the grate liner. Locate the point at center for the grate liner and attach chain.
5. Remove Grate Frame - Use a crane or excavator to lift the grate frame upwards (Figure 6.18 / A) until it is directly above the rotor Lift the grate frame until it is clear and out of the hog box.

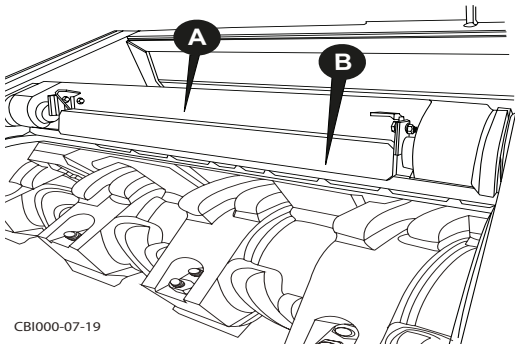


Figure 6.18 - Remove Grate Liner

6. Repeat - Readjust the chain mount location if necessary – until each of the three grate lines have been removed.

NOTICE

The chain may need to be repositioned multiple times during lifting in order to find the center of gravity. If so, please use the proper precautions and utilize PPE.

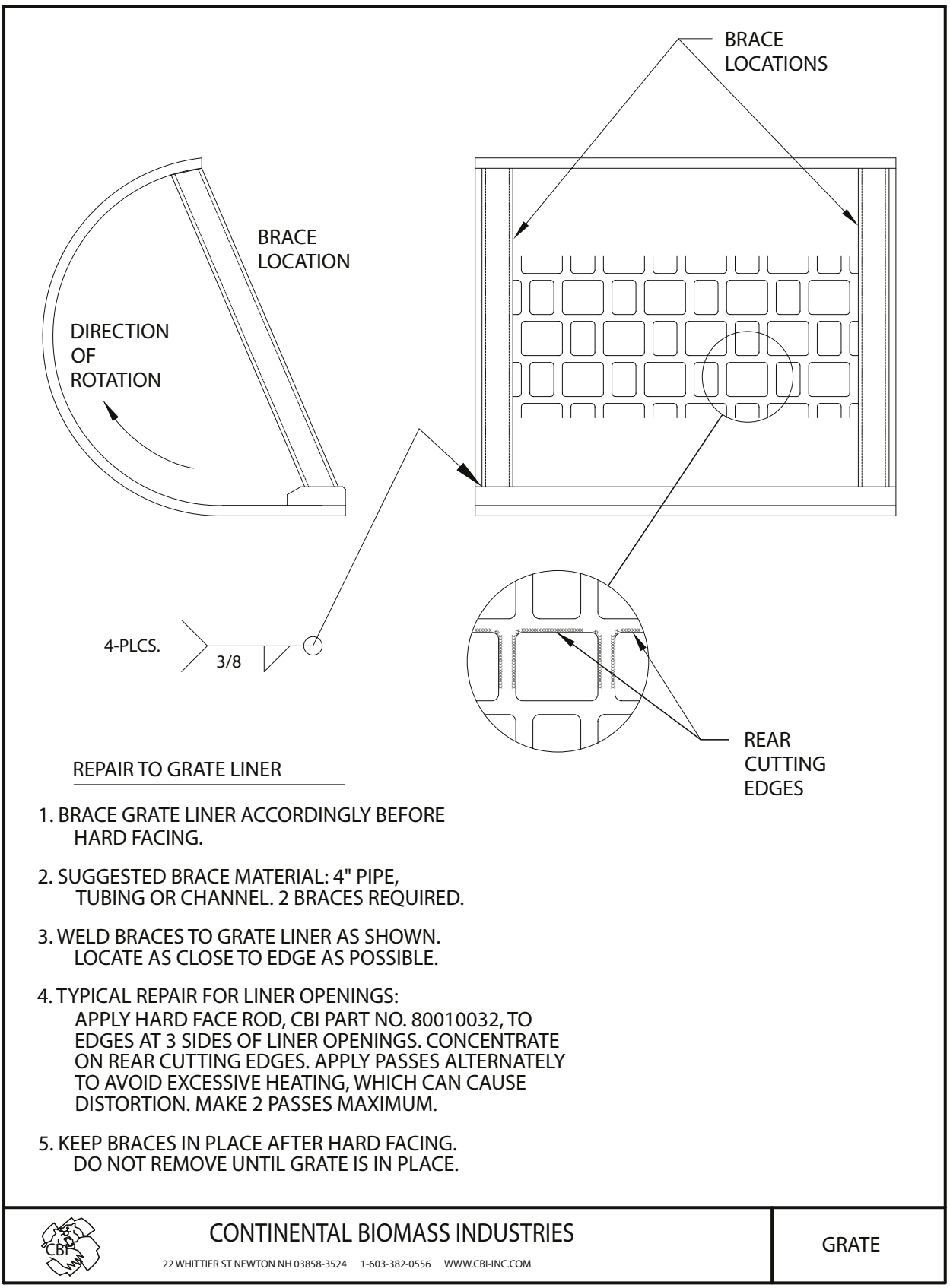
(2) Grate Buildup and Hard Surfacing

When grate liner has worn down approximately 1/2” (12.7 mm) it needs to be hard surfaced in the following manner (Figure 6.19).

PROCEDURE

Step	Description
1	Liner face may require buildup prior to hard surfacing. This is recommended as hard surfacing may not restore liner to original thickness.
2	If required, use a 3/16” buildup rod, Terex part number 80013148, 730 alloy. Buildup as needed while allowing room for hard surfacing operation.
3	To hard surface, use a 3/8” hard surface rod, Terex part number 80010032, Cronawear Eagle 7330. Apply directly to liner face. Apply weld beads continuously from left to right, perpendicular (90°) to direction of material travel. Prevent liner distortion by concentrating hard surface areas to side and rear cutting edges of liner openings. Restore to original thickness, while maintaining the inside clearance radius of grate liner.

(3) Grate Hard Surfacing Drawing



REPAIR TO GRATE LINER

1. BRACE GRATE LINER ACCORDINGLY BEFORE HARD FACING.

2. SUGGESTED BRACE MATERIAL: 4" PIPE, TUBING OR CHANNEL. 2 BRACES REQUIRED.

3. WELD BRACES TO GRATE LINER AS SHOWN. LOCATE AS CLOSE TO EDGE AS POSSIBLE.

4. TYPICAL REPAIR FOR LINER OPENINGS:
   APPLY HARD FACE ROD, CBI PART NO. 80010032, TO EDGES AT 3 SIDES OF LINER OPENINGS. CONCENTRATE ON REAR CUTTING EDGES. APPLY PASSES ALTERNATELY TO AVOID EXCESSIVE HEATING, WHICH CAN CAUSE DISTORTION. MAKE 2 PASSES MAXIMUM.

5. KEEP BRACES IN PLACE AFTER HARD FACING. DO NOT REMOVE UNTIL GRATE IS IN PLACE.

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GRATE

Figure 6.19 - Grate Hard Surfacing Drawing

6.7 Hog Box Liners

(1) Side, Upper and Lower

Minimum Thickness	When upper or lower side liners wear 1/4” (6.35 mm) from their original thickness of 1/2” (12.7 mm), they must be replaced or hard surfaced. Use a 3/8” hard surface rod, Terex part number 80010032, Cronawear Eagle 7330.
Hard Surfacing	All liners can be hard surfaced to prolong life. Do not hard surface any liner that has worn beyond 60% of its original thickness. This can cause liner to crack and should be replaced.
Thread-Locker	When replacing bolted side liners, use new fasteners and red Loctite.

6.8 Feed Conveyor

(1) Feed Conveyor Tension Adjustment

The feed conveyor tension must be adjusted periodically. If the conveyor is run too loose it risks skipping off the sprockets or drawing material between its selves and the rollers/sprockets. If the conveyor is run too tight it will cause premature wear in the chain and all its drive components. Improper tension will cause premature wear, significantly increasing operating costs. The purpose of this procedure is to familiarize operators with the technique for adjusting the infeed conveyor tension.

PROCEDURE

1. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to prepare the machine for service to safeguard personnel from the unexpected release of hazardous energy during service or maintenance activities. For more information, see the Safety section.
2. Loosen Lock Nuts - Loosen the adjustment rods lock nuts (Figure 6.20 / A).
3. Adjust Conveyor Tension - Turn the adjustment rod (Figure 6.20 / B) to change the tension in the conveyor. Although exact measurements will vary, a good rule of thumb is 1 1/2 turns in the adjustment rod will change the conveyor sag approximately one inch (25.4 mm).

NOTICE

Make sure that you turn the take-up rods on both sides of the infeed an equal amount to ensure proper alignment.

4. Check Tension - Recheck the tension in the conveyor to see if is in the desirable range.
5. Readjust as Necessary - Repeat steps 2 through 4 until the feed conveyors tension is within the desirable range.
6. Retighten Lock Nuts - Once the tension is properly adjusted, tighten the adjustment rods lock nuts (Figure 6.20 / A) in accordance with Torque Specifications.

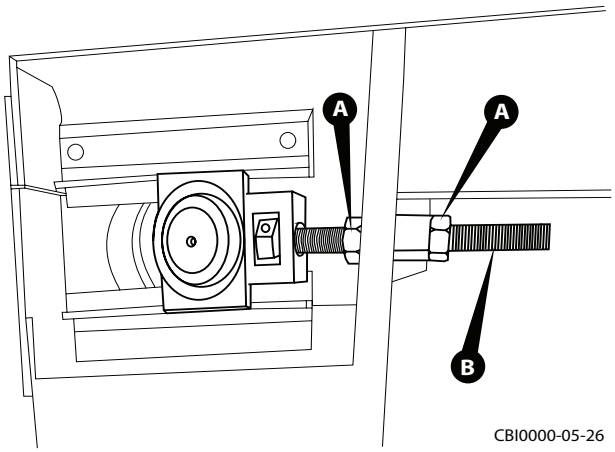


Figure 6.20 - Loosen Adjustment Rod Lock Nuts

6.9 Discharge Conveyor

(1) Maintenance Guidelines

Follow these guidelines when maintaining the discharge conveyor.

PROCEDURE

Step	Description
1	Check belt for proper tracking and adjust if necessary. See tracking instructions below. Adjust the belt tension just enough to run it efficiently.
2	Allow discharge conveyor to run prior to feeding material.
3	If the belt slips on the head pulley, make sure it is clear of debris.
4	Tighten the belt by equally adjusting both head pulley telescopers away from conveyor. Make sure the belt is tracking straight after this adjustment.
5	Check that the belt is not rubbing or contacting conveyor frame or sides.
6	If tears or separations occur in the belt, consult Terex immediately.
7	Grease bearings and idlers (if required) in accordance with the Lubrication Schedule.
8	Idlers must turn freely. Replace those that do not.

(2) Tracking Adjustments

Shut off and lockout the engine before making tracking adjustments. Do not turn the engine on or run the conveyor until tracking adjustments are completed. Do not alter head pulley position to adjust the belt tracking. Set head pulley equally distance to conveyor frame, then adjust return idlers. They can be adjusted by angling them in the following manner:

PROCEDURE

Step	Description
1	Use a telescoper to adjust the belt tension. Loosen the telescoper to tighten the belt tension; tighten the telescoper to loosen the belt tension.
2	Check side seals and adjust if necessary (Figure 6.21).

SIDE SEAL ADJUSTMENT DIAGRAM

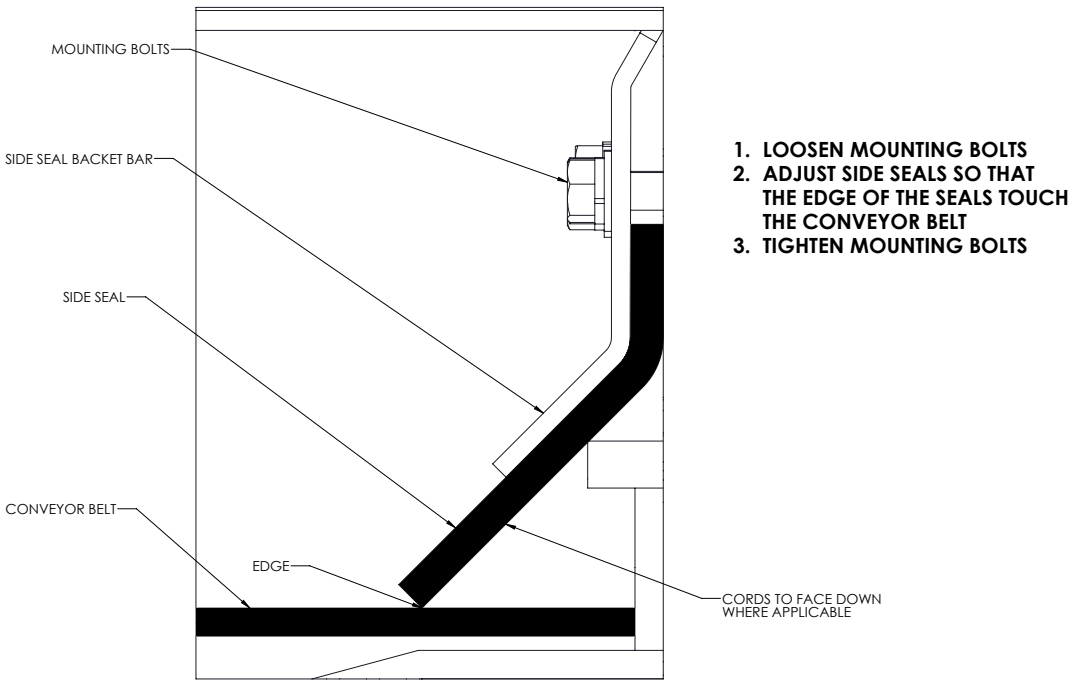


Figure 6.21 - Side Seal Adjustment Diagram

6.10 Lubrication

(1) General

Your equipment is a complex machine that requires precise lubrication to function properly. Terex lubrication specifications and schedules are developed to maintain the highest level of performance over the life of the machine. Failure to follow recommended lubrication practices will result in premature wear and unsatisfactory performance. Consult Terex for recommendations on severe duty applications.

(2) Safety

Used oil must be collected and disposed of in an environmentally friendly manner. Products that are used during the work have to be processed in such a way as to burden the environment as little as possible. Remove any excess grease and any oil spills with a cleaning cloth. Always utilize the appropriate PPE when dealing with used oil.

(3) Rotor Bearings and Labyrinth Seals

NOTICE

Use ONLY Mobilux EP 2 grease to lubricate rotor bearings.

Every 8 hours apply fifteen (15) pumps to each bearing and ten (10) pumps to each labyrinth seal with a handheld grease gun. A labyrinth seal greasing must be applied immediately upon shutdown. Use Mobilux EP 2 grease with an EP factor (extreme pressure additive) for shock loads. Grease types and temperature ranges are as follows:

NLGI Grade 2, Mobilux EP 2 for temperatures of 90° to 120°F (32° to 49°C)
NLGI Grade 1, Mobilux EP 2 for temperatures of 32° to 90°F (0° to 32°C)
NLGI Grade 0 or 00 for temperatures of -20° to 32°F (-29° to 0°C)
Use Arctic type greases for temperatures below -20°F (-29°C)

NOTICE

Do not use grease that contains Molybdenum Sulphide, which is harmful and detrimental to bearing surfaces.

(4) Hydraulic Tank

Check tank fluid level every day. See Lubrication Schedule for replacement intervals. Fluid types and temperature ranges are:

Chevron 1000 for temperatures over 15° F (-9° C)
Mobilfluid LT for temperatures under 15° F (-9° C)

(5) Additional Components

For extreme temperature applications, please consult the chart below:

Name	Temperature Range	Grade
Mobilgrease CM-S	-4°F to 293°F (-20°C to 145°C)	NLGI No. 2
Mobilgrease CM-W	-22°F to 293°F (-30°C to 145°C)	NLGI No. 1

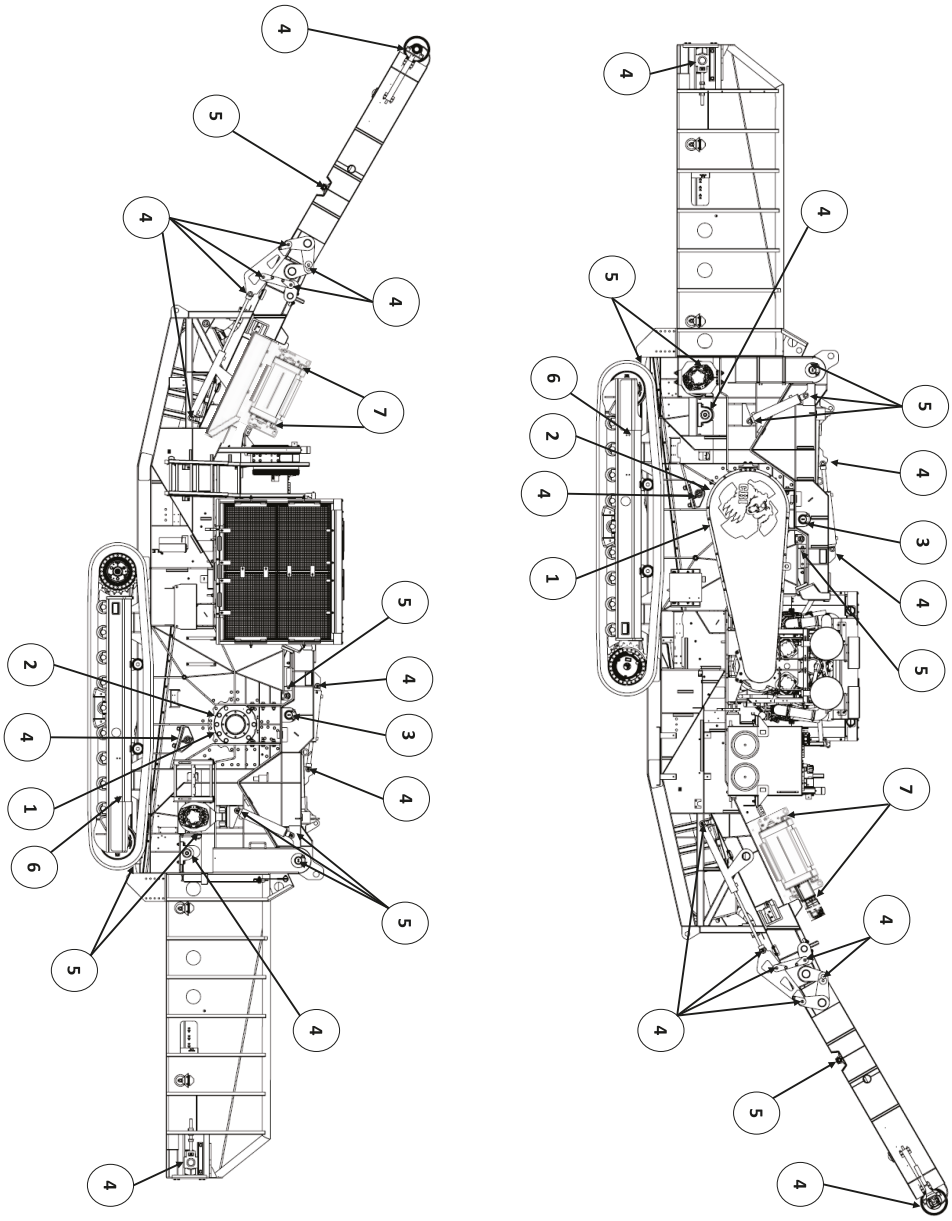
NOTICE

Shot amount based on hand held manually operated grease gun where 1 shot of grease approximately 1cc. Capacity varies with grease gun type and manufacturer.

Lubrication information not listed can be found in the manufacturer manuals for additional components. For more information, see the Supplemental Manuals.

Always consult the OEM manuals for specific maintenance procedures and interval.

(6) Lubrication Schedule



#	1	2	3	4	5	6	7
	15	10	4	2-3	2	2	2
	8 HRS	8 HRS	8 HRS	40 HRS	40 HRS	40 HRS	40 HRS

Figure 6.22 - Lubrication Schedule

6.11 General Maintenance

(1) Hydraulic Oil Level Inspection

It is important to inspect the hydraulic oil level of your machine on a regular basis. Operating with levels too high can lead to fluid loss and operating with levels too low can lead to severe damage and/or component failure. The purpose of this section is to familiarize operators with the technique for inspecting the hydraulic oil level.

NOTICE

Hydraulic oil level should be checked before operating the machine when the oil is cool. The machine must be level and components should be in their lowered state where applicable.

PROCEDURE

1. Park Machine on Level Ground - Oil levels should always be checked with the machine shut down and parked on level ground to ensure an accurate reading.
2. Prepare Machine for Service- Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Inspect Oil Level - Inspect the hydraulic oil level at the site gauge on the tank. The hydraulic oil should be visible ¾ of the way to the top of the sight glass (Figure 6.23).

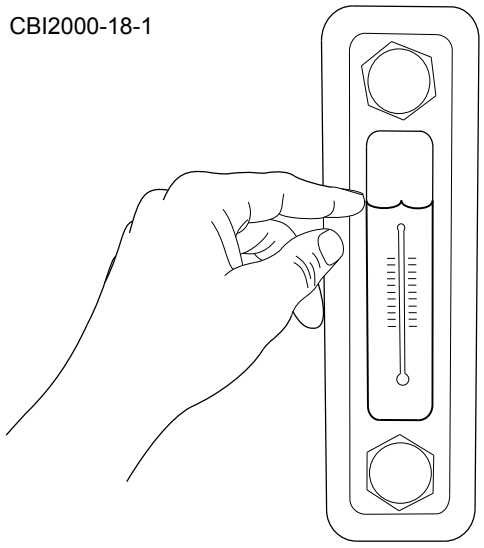


Figure 6.23 - Check Hydraulic Oil Level Site Gauge

4. Adjust Level as Necessary - Adjust the hydraulic oil level as necessary. Failure to use Terex approved fluids may result in severe machine damage.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

Record the quantity and date of any adjustments made to oil levels. Chronic variations in oil levels may be symptomatic of larger systemic problems. A record of level adjustments should be included with the oil analysis if applicable.

(2) Adding Hydraulic Oil

The hydraulic oil level on your machine may need to be adjusted periodically. Fluid loss due to system leaks can lead to dangerously low operating levels. The purpose of this procedure is to familiarize operators with the technique for adding hydraulic oil to the machine.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Park Machine on Level Ground - Oil levels should always be checked with the machine shut down and parked on level ground to ensure an accurate reading.
2. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to safeguard personnel from the unexpected release of hazardous energy. For more information, see the Safety section.
3. Clean Tank - Clean the area above and around the fill plug to ensure no contaminants are knocked into the tank when the cap is removed.
4. Remove Fill Plug - Unscrew the fill plug from the top of the hydraulic tank (Figure 6.24).

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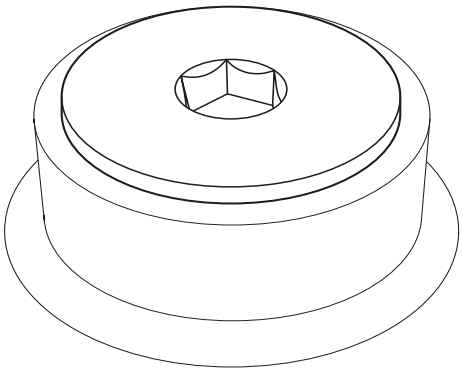

Figure 6.24 - Remove Fill Plug from Hydraulic Oil Tank

5. Add New Oil - Add new oil to the tank through the filler neck where the plug was installed. Use filtered oil, a filter cart, and 10 micron filter.

⚠ WARNING

Use extreme caution to ensure no contaminants enter the tank when filling it.

NOTICE

Failure to use Terex approved fluids may result in severe damage. For more information, see Lubrication Schedule.

6. Check Oil Level - Check the oil height to confirm the appropriate oil level. For more information, see Hydraulic Oil Level Inspection.

(3) Changing Hydraulic Oil

The hydraulic fluid on your machine needs to be changed periodically. If not replaced when required, contamination and break down of the oil can lead to premature component failure. The purpose of the following procedure is to familiarize operators with a technique for changing the hydraulic oil on their machine.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Park Machine on Level Ground -Oil levels should always be checked with the machine shut down and parked on level ground to ensure an accurate reading.
2. Prepare Machine for Service - Before performing maintenance on your machine, it is imperative to safeguard personnel from the unexpected release of hazardous energy. For more information, see the Safety section.
3. Clean Tank - Clean the area above and around the filler neck to ensure no contaminants are knocked into the tank when the cap is removed.
4. Remove Tank Plug - Remove the plug from the top of the hydraulic oil tank (Figure 6.25).

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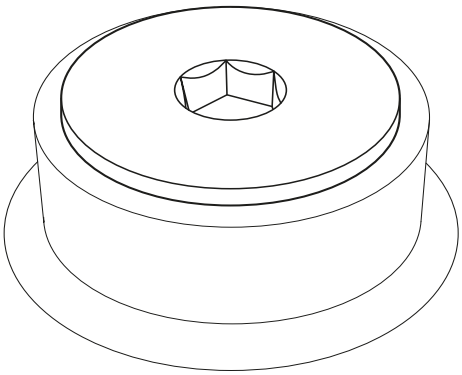

Figure 6.25 - Remove Fill Plug from Hydraulic Oil Tank

5. Drain Oil - Use a vacuum based fluid extraction device or transfer pump to suction the oil out from the filler neck. This technique is preferable because it allows more control over the used oil as its draining. If no tool is available the oil can be drained by removing one of the drain fittings at the bottom of the tank.

⚠ WARNING

Use extreme caution to ensure no contaminants enter the tank when draining it.

Use extreme caution to ensure no contaminants enter the tank when filling it.

Failure to use Terex approved fluids may result in severe damage. For more information, see Lubrication.

6. Refill Oil - Refill the tank through the filler neck with the new hydraulic oil. Use filtered oil, a filter cart, and 10 micron filter. For detailed information see, Adding Hydraulic Oil.
7. Check Oil Level - Check the oil height to confirm appropriate oil level. For more information see Hydraulic Oil Level Inspection.
8. Replace Tank Plug - Reinstall the tank plug back into the filler neck. The plug should be tightened hand tight.

(4) Engine Oil Level Inspection

It is important to inspect the engine oil level of your machine on a regular basis. Operating with levels too high may lead to oil foaming, oil consumption, loss of power, or component damage. Operating with levels too low can lead to severe damage and/or component failure. The purpose of this section is to familiarize operators with a technique for inspecting the engine oil level.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

⚠ WARNING

Engine oil level should be checked with the engine stopped. The machine must be level and a few minutes should be allowed after running to allow oil to return to the sump.

PROCEDURE

1. Park Machine on Level Ground - Oil levels should always be checked with the machine shut down and parked on level ground to ensure an accurate reading.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Remove Dipstick - Remove the engine oil dipstick from the side of the engine (Figure 6.26). Use caution to ensure no contaminants enter the dipstick tube during service.

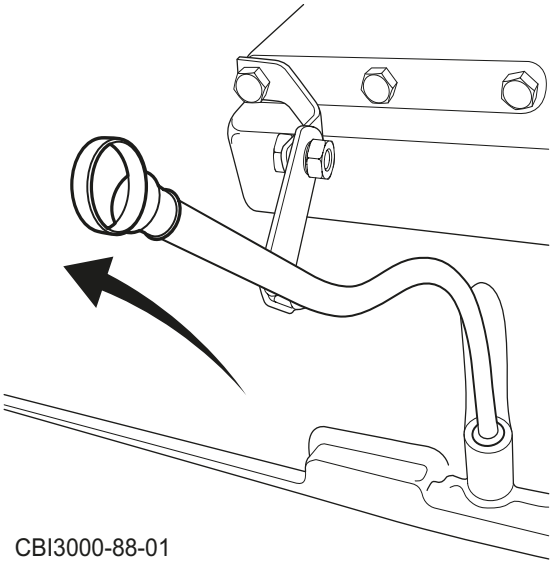

Figure 6.26 - Remove Engine Oil Dipstick

4. Inspect Engine Oil - Inspect the engine oil level on the dipstick gauge marks. The engine oil should be maintained between the full mark (Figure 6.27 / F) and the add mark (Figure 6.27 / L) for the entire operating temperature range.

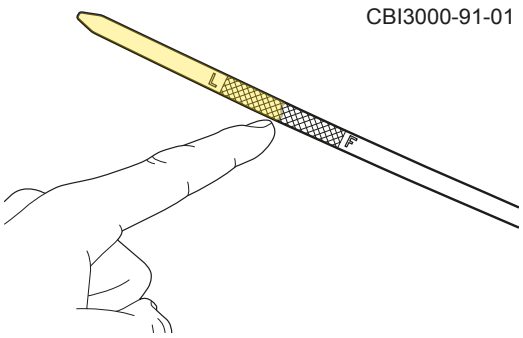

Figure 6.27 - Inspect Oil Level on Dipstick

5. Adjust Level as Necessary - Add or remove oil to adjust the engine oil level as necessary. Failure to use approved fluids may result in severe damage. For more information, see Lubrication Schedule.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handles in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

⚠ WARNING

Record the quantity and date of any adjustments made to oil levels. Chronic variations in oil level may be symptomatic of larger systemic problems. A record of level adjustments should be included with the oil analysis if applicable.

(5) Adding Engine Oil

Engine oil may need to be added to your machine due to regularly scheduled maintenance or periodic adjustments. Using the proper technique helps ensure the potential for fluid contamination is minimized. The purpose of this procedure is to familiarize operators with a technique for adding engine oil to the machine.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Park Machine on Level Ground - Oil levels should always be checked with the machine shut down and parked on level ground to ensure an accurate reading.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Clean Area - Clean the area above and around the filler neck (Figure 6.28) to ensure no contaminants enter the system when the plug is removed.

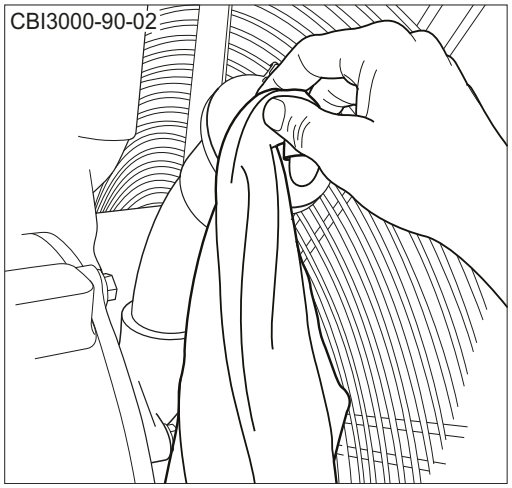

Figure 6.28 - Clean Filler Neck Area

4. Remove Fill Plug - Unscrew the plug from the filler neck on the side of the engine (Figure 6.29).

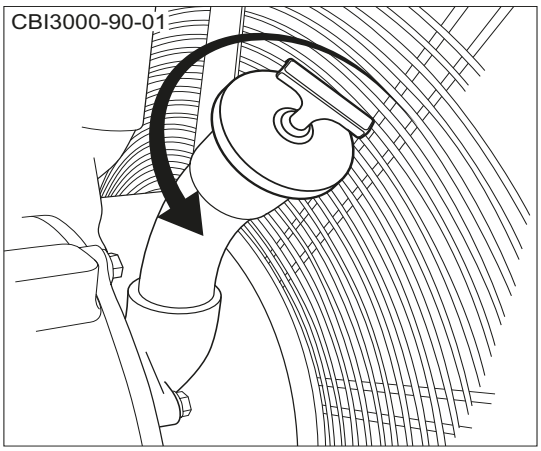

Figure 6.29 - Remove Fill Plug

5. Add New Oil - Add new oil to the engine through the filler neck (Figure 6.30). Always use oil from a new sealed container or sufficiently filtered bulk source. Ensure to avoid overfilling the engine. Use filtered oil, a filter cart, and 10 micron filter.

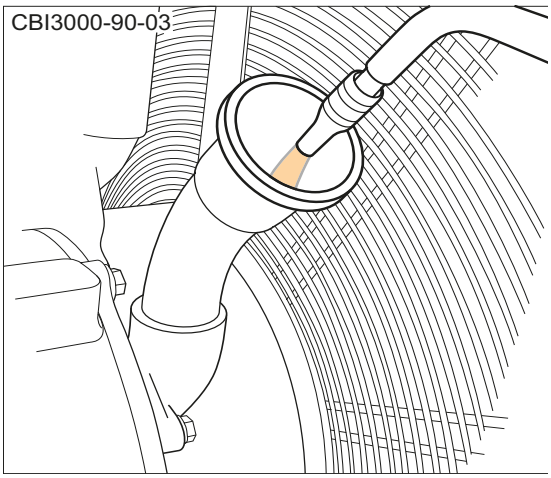

Figure 6.30 - Add Engine Oil

⚠ WARNING

Use extreme caution to ensure no contaminants enter the system.

Failure to use Terex approved fluids may result in severe machine damage. For more information, see Lubrication.

6. Check Oil Level - Check the oil height to confirm appropriate oil level. For more information, see Engine Oil Level Inspection.
7. Refit Fill Plug - Reinstall the plug on the fill neck. Ensure plug is fully installed and functions properly.

(6) Changing Engine Oil

The engine oil on your machine needs to be changed on a regular basis. If not replaced when required, contamination and break down of the oil can lead to premature component failure. The purpose of the following procedure is to familiarize operators with a technique for changing the engine oil on their machine using the drain valve.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Warm Up Oil - Start the engine and bring it up to operating temperature. This warms the oil which allows it to drain more completely. For more information, see Starting the Machine. The machine can be shut down once the engine has reached operating temperature.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.

⚠ WARNING

At operating temperature components and fluids may be extremely hot. Always use extreme caution and appropriate PPE to protect personnel from hot components and fluids. Failure to comply may result in severe injury.

3. Place Container Under Valve - Place a suitable container underneath the drain valve for collecting the used oil. If required, a hose may be fitted to the valve to facilitate remote draining.
4. Open Drain Valve - Turn the ball counterclockwise to open the drain valve (Figure 6.31).

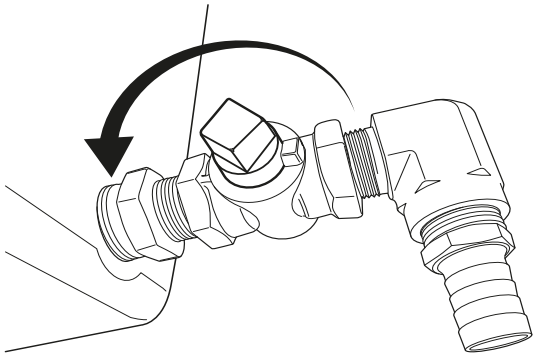

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Figure 6.31 - Open Engine Oil Drain Valve

5. Drain Oil - Allow enough time for the old oil to completely drain from the engine (Figure 6.32).

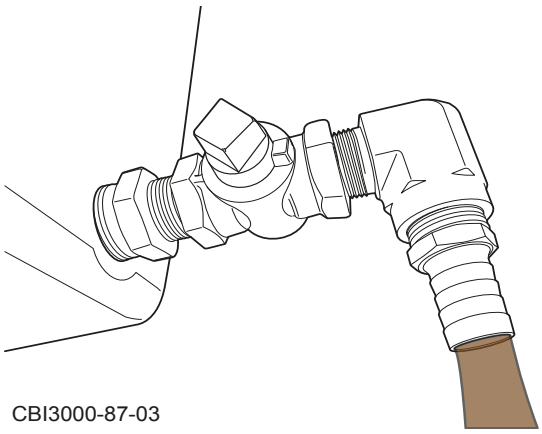

Figure 6.32 - Drain Engine Oil

6. Close Drain - Close the oil drain valve by turning the valve handle clockwise until it is fully shut (Figure 6.33).

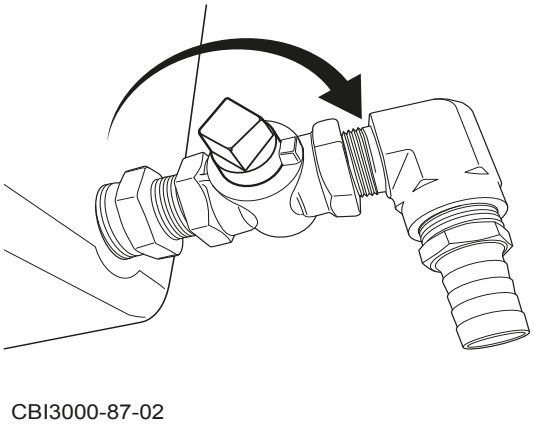

Figure 6.33 - Close Engine Oil Drain Valve

7. Refill Engine - Refill the engine with the appropriate oil. Use filtered oil, a filter cart, and 10 micron filter. Change the oil filter each time the oil is changed. For detailed information, see Adding Engine Oil.
8. Inspect Oil Level - Start and run the machine for four minutes, then shut it back down check the oil level and adjust if necessary. For more information, see Engine Oil Level Inspection.
9. Clean Area - Clean any oil or residue that was spilled while changing the oil. Oil buildup around the engine creates a severe fire hazard. For more information, see Cleaning the Machine.

(7) Track Drive Gearbox Oil Level Inspection

The oil level in the drive motor gearboxes on the tracks of your machine should be inspected on a regular basis. If the level is too low the components will not have sufficient lubrication and if it's too high it may lead to seal damage. The purpose of the following procedure is to familiarize operators with a technique for inspecting the track drive gearbox oil level on their machine.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

PROCEDURE

1. Position Machine - Position the machine so that the track gearbox is rotated with its drain plug (Figure 6.34 / A) in the lowermost position. The machine should be on level ground.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Remove Fill Plug - Remove the fill plug (Figure 6.34 / B) from the gearbox.

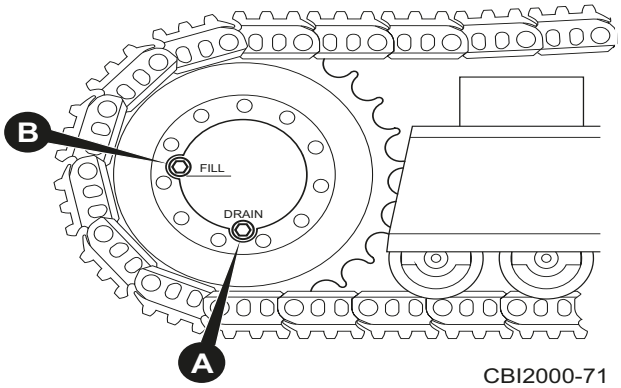

Figure 6.34 - Track Drain and Fill Plugs

4. Inspect Oil Level- Look inside the fill plug hole; the oil level should level with the bottom of the fill hole. Add oil if necessary.

NOTICE

Make note of any adjustments in your maintenance log, fluctuations in levels may be indicative of larger systemic problems.

5. Replace Cap - Ensure to inspect the fill cap seal for any signs of damage that could cause leaks and replace it if necessary. Reinstall the fill cap on to the gearbox and tighten in accordance with Torque Specifications.

(8) Changing Track Drive Gearbox Oil

The oil in the drive motor gearboxes on the tracks of your machine should be replaced periodically. If not replaced when required, contamination and break down of the oil can lead to premature component failure. The purpose of the following procedure is to familiarize operators with a technique for changing the track drive gearbox oil on their machine.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Position Machine - Position the machine so that the track gearbox is rotated with its drain plug (Figure 6.35 / A) in the lowermost position. The machine should be on level ground.
2. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy. For more information, see the Safety section.
3. Drain Old Oil - Remove the fill cap (Figure 6.35 / B) and the drain plug (Figure 6.35 / A) from the gearbox. Allow the used oil to fully drain into a suitable container.

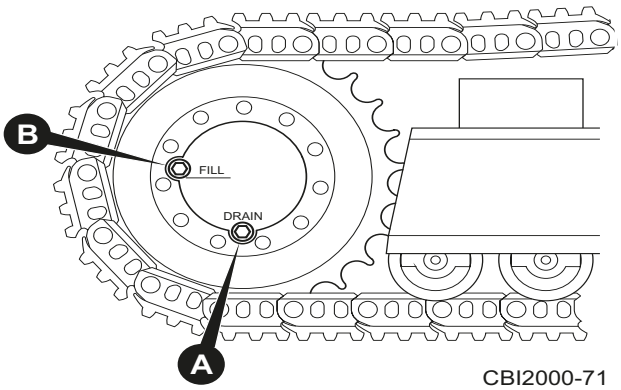

Figure 6.35 - Track Drain and Fill Plugs

4. Replace Plug - Ensure to inspect the drain plug seal for any signs of damage that could cause leaks and replace it if necessary. Reinstall the drain plug and tighten in accordance with Torque Specifications.
5. Add New Oil - Refill the gearbox with new oil through the fill hole (Figure 6.35 / B); it's full when the oil is level with the bottom of the fill hole.
6. Replace Cap - Ensure to inspect the fill cap seal for any signs of damage that could cause leaks and replace it if necessary. Reinstall the fill cap on to the gearbox and tighten in accordance with Torque Specifications.

(9) Oil Analysis

Terex's warranty policy for its equipment may stipulate that a hydraulic and/or engine oil analysis be performed by a certified testing laboratory (Mobil Oil test lab, Parker Par-test, or equivalent) a minimum of one time per month or every 250 operating hours, whichever comes first. If competent local testing services are not available, the Terex part number for ten Parker fluid test kits with prepaid laboratory analysis is 71011887. The following is a generic procedure for obtaining in-tank samples.

PROCEDURE

1. Warm Up Oil - Operate the system for at least ½ hour to warm the oil and distribute any contaminants for accurate sampling.
2. Sample Oil - Using a small hand held vacuum pump, bottle thief, or basting syringe, remove some sample fluid from the center portion of the tank. Do not let the sampling device come in contact with the sides of the tank.
3. Put Oil in Approved Sampling Container - Insert the oil sample into the pre-cleaned Terex approved sampling container (part number 71011887). Do not fill the bottle more than one inch (25 mm) from the top.
4. Seal Sample - Cap the sample bottle immediately to avoid contamination.
5. Tag Sample - Tag the sample bottle with pertinent data (i.e. machine serial number, machine hours, fluid type, fluid supplier, fluid part number, and elapsed time since last sample).

⚠ WARNING

If a sample test report indicates that an oil change is required, it is imperative that a complete fluid change, including replacement of all filter elements is performed. For detailed information, see Terex Authorized Service Assistance.

6. Submit Sample for Testing - Keep records of all pertinent data and submit oil sample to an approved test lab for testing. Ensure that proper techniques are used for transportation of hazardous materials if applicable.

NOTICE

Any and all equipment used in the fluid sampling procedure must be washed and rinsed with a filtered solvent. This includes vacuum pumps, syringes, and tubing, as the goal is to count only the particles in the system fluid. Non-representative samples will lead to erroneous conclusions.

(10) Engine Coolant Level Inspection

It is important to inspect the engine coolant levels for your machine on a regular basis. Operating with levels too high can lead to fluid loss and operating with levels too low can lead to severe damage and/or component failure. Sudden fluctuations in coolant levels may be indicative of larger systemic problems. The purpose of this section is to familiarize operators with the technique for inspecting the engine coolant level.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

The coolant level should be checked with the machine level and prior to operating the machine when the coolant is at ambient temperature.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Inspect Coolant Level - Inspect the coolant level at the site gauge on the top of the expansion tank. The coolant should be visible ¾ of the way to the top of the sight glass (Figure 6.36). The level should never be above the sight glass or lower than half way up the sight glass. Excessively low coolant levels may trip the low coolant level fault in the engine computer and disable the engine.

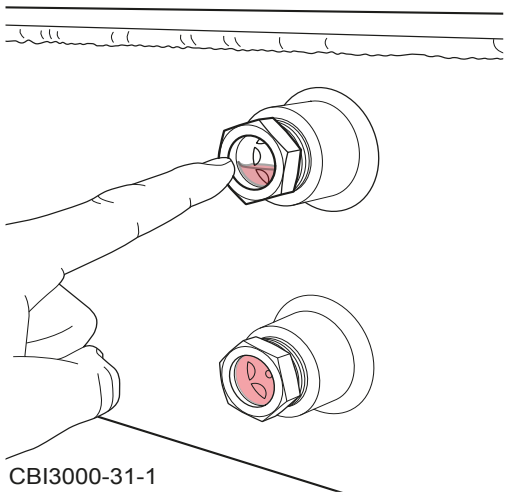

Figure 6.36 - Inspect Coolant Level

NOTICE

Make note of any adjustments in your maintenance log as fluctuations in levels may be indicative of larger systemic problems.

3. Adjust Level as Necessary - Adjust the coolant level as necessary. For more information, see Adding Engine Coolant.

⚠ WARNING

Failure to use Terex approved fluids may result in severe damage. For more information, see Lubrication.

(11) Adding Engine Coolant

Occasionally the engine's cooling system may need coolant added to it. Operating with levels too low may compromise the systems effectiveness. The purpose of this section is to familiarize operators with a technique for adding engine coolant.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.

⚠ WARNING

At operating temperature the engine coolant is hot and under pressure. Never remove the fill cap until it has cooled enough to touch with a bare hand.

2. Remove Fill Cap - Slowly remove the engine coolant fill cap from the top of the radiator (Figure 6.37). Ensure that no contaminants enter the cooling system once the cap is removed.

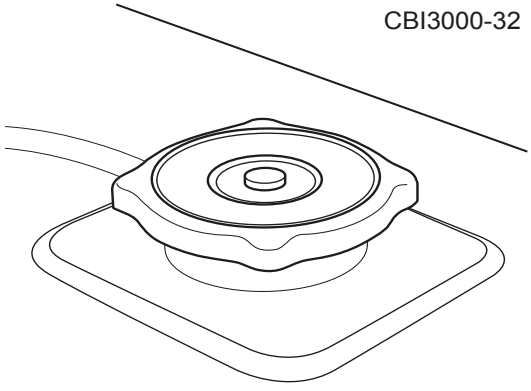

Figure 6.37 - Engine Coolant Fill Cap

3. Add Coolant - Use a filtered funnel to add coolant through the filler neck until the levels are in the desirable range. For more information, see Engine Coolant Level Inspection.

⚠ WARNING

Failure to use Terex approved fluids may result in severe machine damage. For more information, see Lubrication Schedule.

4. Replace Cap - Reinstall the fill cap on the radiator, ensuring the cap seals properly or it may compromise the effectiveness of the cooling system.

(12) Changing Engine Coolant

The engine's cooling system requires its coolant be changed periodically. Failure to change it as required may compromise the systems effectiveness and lead to premature component failure. The purpose of this section is to familiarize operators with a technique for changing engine coolant.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.

⚠ WARNING

At operating temperature the engine coolant is hot and under pressure. Never remove the fill cap until it has cooled enough to touch with a bare hand.

2. Remove Fill Cap - Slowly remove the engine coolant fill cap from the top of the radiator (Figure 6.38). This allows the coolant to flow freely once the drain is opened. Ensure no contaminants enter the cooling system.

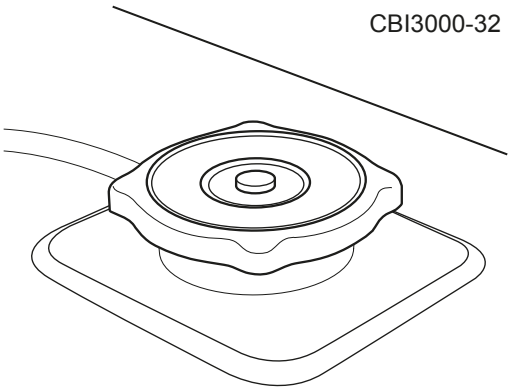

Figure 6.38 - Engine Coolant Fill Cap

3. Remove Drain Valve Plug - Remove the plug from the drain valve (Figure 6.39 / A).

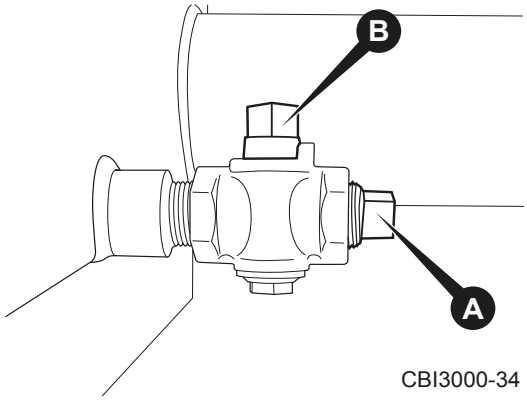

Figure 6.39 - Engine Coolant Drain Valve

4. Drain Coolant - Slowly open the drain by turning the valve handle (Figure 6.39 / B) and allow the coolant to drain into a suitable container.
5. Flush System - Flush the cooling system with clean water until the water coming out of the drain is transparent.
6. Close Drain - Close the coolant drain valve by turning the valve handle until it is fully shut (Figure 6.39 / B). Reinstall the plug into the end of the drain valve (Figure 6.39 / A).
7. Refill System - Refill the coolant system with the appropriate coolant. For detailed information, see Engine Coolant Level Inspection.
8. Purge System - Run the engine with the radiator cap loosened so that it is not sealed but is not fully removed either, until the water temperature regulator opens and the coolant level stabilizes.
9. Check Coolant Level - Check the coolant level. For more information, see Engine Coolant Level Inspection.
10. Reset Components - Stop the engine and reinstall the fill cap on the radiator. Ensure the cap seals properly or it may compromise the effectiveness of the cooling system.

(13) Track Tension Inspection

The tension in the tracks of your machine should be inspected on a regular basis. If the tension is too low the tracks could run off the guide rollers and if it's too high it may damage the drive motor or bearings. The purpose of this section is to familiarize operators with a technique for inspecting the track tension on their machine.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Create a Straight Line - Use a string or straight edge to create a straight line between the top of the track pads directly above the idler and the first upper roller (Figure 6.40 / A).

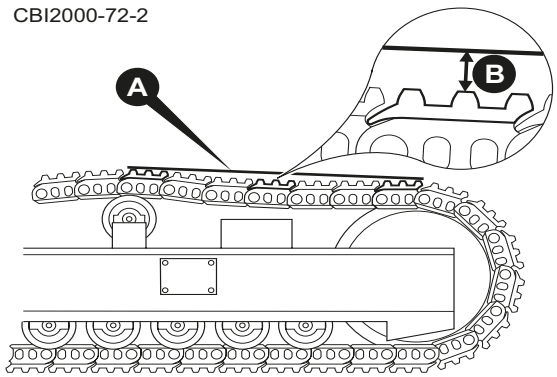

Figure 6.40 - Measure Track Sag

3. Measure Sag - Measure the distance between the straight line and the top of the track pad immediately between the idler and top roller (Figure 6.40 / B). This measurement should be between 3/16" and 5/8" (5mm and 15mm).
4. Adjust Tension if Necessary - Adjust the track tension if necessary. For more information, see Track Tension Adjustment.

(14) Track Tension Adjustment

The tension in the tracks of your machine may need periodic adjustment. The tension is adjusted by adding or removing grease from a cylinder inside the track frame that moves the idler relative to the drive sprocket. The purpose of this section re is to familiarize operators with a technique for adjusting the track tension on their machine.

NOTICE

Always consult the OEM manuals for specific component product information. For more information, see Supplemental Manuals.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Remove Access Cover - Remove the access cover on the side of the track frame (Figure 6.41 / A)..

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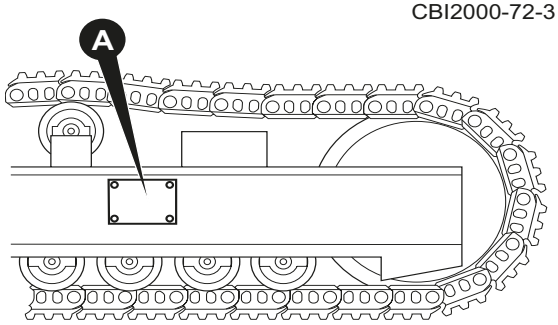

Figure 6.41 - Remove Access Cover

3. Add Tension (If Required) - To increase track tension (decrease sag), pump grease into the button head grease zerk inside the track frame (Figure 6.42 / B). Using a standard grease gun will require the Terex button head adaptor (part number: 50010945).
4. Release Tension (If Required) - To decrease track tension (increase sag), remove grease from the cylinder. Slowly loosen the button head zerk inside the track frame until grease starts seeping out (Figure 6.42 / B). The spring will move the idler back and push the grease out. Retighten the fitting when sufficient tension has been released.

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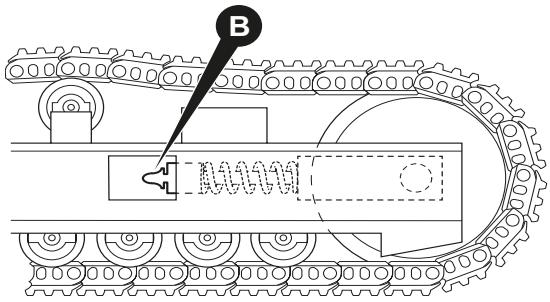


Figure 6.42 - Adjust Track Tension

5. Inspect Tension - Once the tension has been adjusted, recheck the sag measurement to confirm it is in the desired range. Continue to adjust if necessary. For more information, see Track Tension Inspection.
6. Refit Cover - Refit the access cover on the side of the track frame.

(15) Verifying Proper Fan Purge

Your equipment is fitted with a Flexxaire automatic hydraulically controlled reversing fan. It is important to verify that this fan functions properly or severe damage to the machine could result. The following procedure will familiarize the operator with how to verify proper fan purge operation.

PROCEDURE

1. Start Machine - Start the machine. For more information, see Normal Equipment Startup.
2. Enter Cooling System Menu - From the Startup Menu at the control panel, enter the Advanced Menu, then navigate to the Cooling System Menu. For detailed information, see Cooling System Menu.
3. Initiate a Momentary Purge Override - From the Flexxaire Fan Menu, initiate a momentary purge override.
4. Verify Proper Fan Purge Operation - Quickly head over to the radiator and hold a rag or piece of paper to the face of the fan (Figure 6.43). Verify that the fan direction changes when the purge cycle ends (typically ten seconds from when it was initiated).

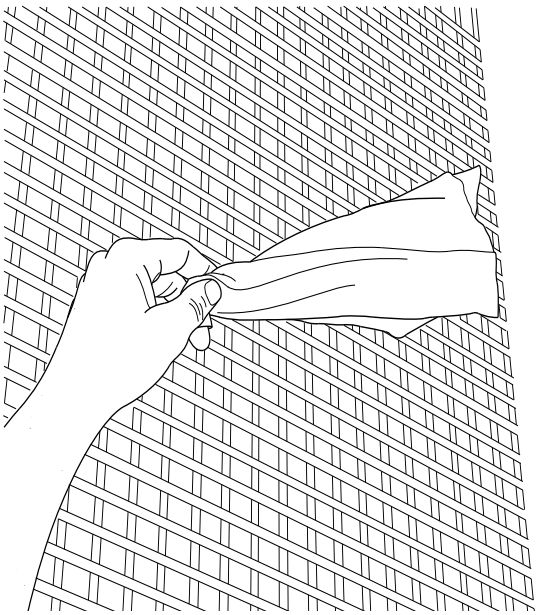


Figure 6.43 - Verify Fan Direction

⚠ WARNING

Use extreme caution around the fan; rotating blades and flying debris pose a severe hazard. Always adhere to the pertinent safety procedures when working on your equipment.

(16) Verifying Pre-Cleaner Operation

Your equipment is fitted with an engine air pre-cleaner. It is important to verify that this pre-cleaner functions properly. The following procedure will familiarize the operator with how to verify their pre-cleaner is functioning properly.

PROCEDURE

1. Start Machine - In order to inspect the pre-cleaner, the engine must be running. For more information, see Normal Equipment Startup.
2. Inspect Pre-Cleaner - Using a portable work light, look underneath the pre-cleaner; you should be able to see the turbine blades (Figure 6.44 / A) rotating freely in the pre-cleaner housing.

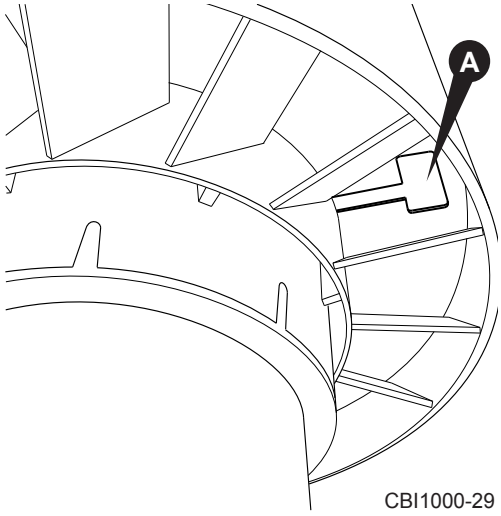


Figure 6.44 - Pre-Cleaner Turbine Blades

⚠ WARNING

Never stick insert anything into the pre-cleaner housing, injury to personnel or damage to the rotating fan blades may result. Use extreme caution when working around running equipment. Always adhere to the pertinent safety procedures when working on your equipment.

(17) Air Filter Service Indicator Inspection

Your equipment is fitted with a service indicator on the outlet side of the air filter housing(s). This indicator warns operators when there is an excessive restriction in the air filter, so it should be inspected on a regular basis. The purpose of the following procedure is to familiarize operators with a technique for inspecting the air filter service indicator(s) on their machine.

PROCEDURE

1. Turn Off Machine - In order to inspect the air filter service indicator the engine should not be running.
2. Inspect Indicator - Inspect the indicator (Figure 6.45) for signs of damage, cracks, or potential leaks; replace immediately if any are noted.
3. Read Indicator - Observe the yellow plunger inside the barrel of the filter indicator (Figure 6.45 / A). If the plunger is in the green zone (< 25” of H2O), then the filter is fine. If the plunger is in the red zone (> 25” of H2O), then the filter needs to be replaced.

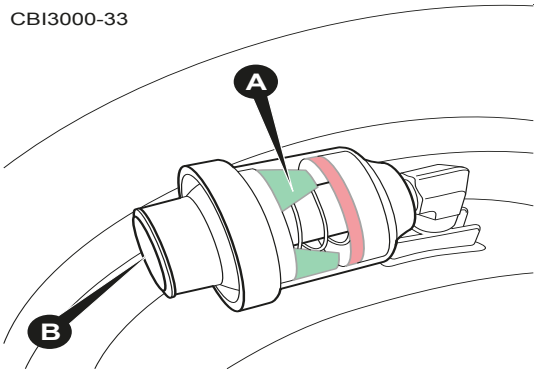


Figure 6.45 - Inspect Air Filter Indicator

4. Service Air Filter (If Required) - Service the air cleaner if required.
5. Reset Indicator - Depress the yellow button on the end of the indicator (Figure 6.45 / B) to reset the plunger.

(18) Air Filter Unloader Valve Inspection

Your equipment is fitted with an unloader valve on the bottom of the engine's air filter cover(s). This valve is used for releasing larger contaminants that make it through the pre-filter and should be inspected on a regular basis. The purpose of the following procedure is to familiarize operators with a technique for inspecting the air filter unloader valve(s) on their machine.

PROCEDURE

1. Turn Off Machine - In order to inspect the air filter unloader valve, the engine must be turned off.
2. Clean Valve - Squeeze the two sides of the valve together to release any of the larger contaminants that have been separated out (Figure 6.46).

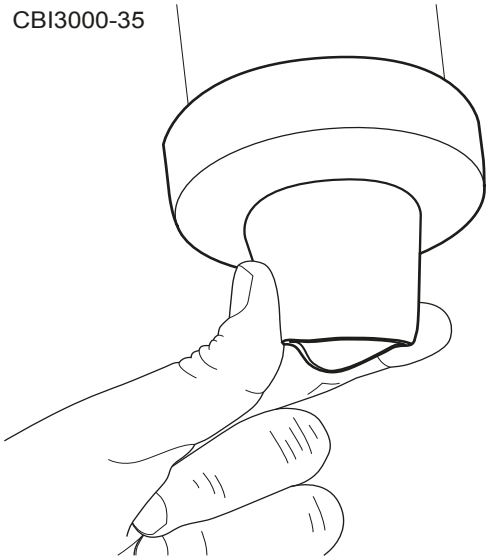


Figure 6.46 - Squeeze Air Filter Unloader Valve

3. Inspect Valve - Inspect the valve for signs of damage, cracks, or potential leaks.
4. Replace as Necessary - If the unloader valve shows signs of any conditions that may adversely affect its performance, replace it immediately.

(19) Hydraulic Tank Breather Inspection

The hydraulic tank on your machine is fitted with a replaceable breather element. This element allows the system to breathe as it expands and contracts with temperature changes without allowing contaminants into the system. Regular inspections of the hydraulic tank breather must be performed to ensure that it is able to function as intended. The purpose of this section is to familiarize operators with how to inspect a hydraulic tank breather on a machine.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Inspect for Blockage - Inspect the bottom of the element to ensure that no contaminants are blocking the breather's intake (Figure 6.47). If the element shows signs of blockage, it must be replaced.

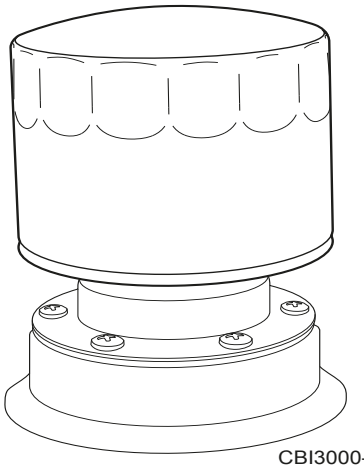


Figure 6.47 - Inspect Hydraulic Tank Breather

3. Inspect Breather for Damage - Inspect the body of the breather for damage (Figure 6.48). If the element shows signs of damage, it must be replaced. High humidity environments may force the breather to be changed more frequently than those in less humid environments. The breather may also need to be replaced if excess dirt builds up underneath the unit.

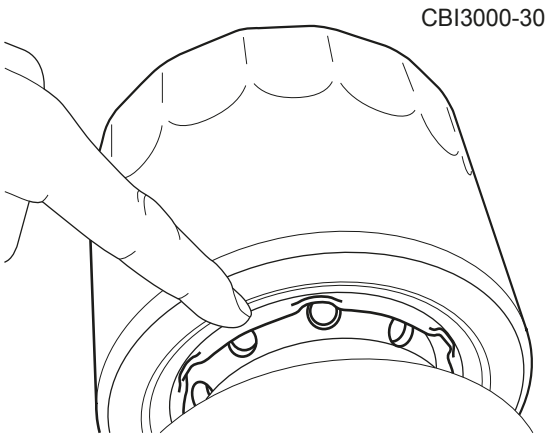


Figure 6.48 - Inspect Hydraulic Tank Breather

4. Replace Breather as Necessary - Replace the filter element immediately If the inspection shows it's needed. For more information, see Hydraulic Tank Breather Replacement.

NOTICE

Make a record of it in your maintenance log any time a filter requires replacement prior to its regularly scheduled maintenance.

(20) Hydraulic Tank Breather Replacement

The hydraulic tank on your machine is fitted with a breather element that requires periodic replacement. This is done to prevent contaminants from working their way into the hydraulic system. Failure to maintain the breather may result in severe system damage. The purpose of this procedure is to familiarize operators with how to replace a hydraulic tank breather on their machine.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Clean Area- Clean any debris off the filter element on top of the hydraulic tank (Figure 6.49). Clean the area above and around the breather also to ensure no debris enters the system during service.

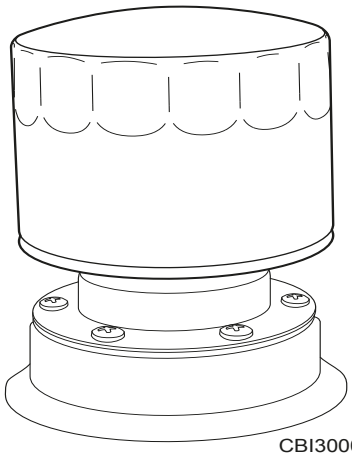


Figure 6.49 - Remove/Inspect Breather Element

3. Remove Old Element - Unscrew the old breather element and inspect it for abnormal debris or damage. Contact Terex if any abnormalities are noted. For more information, see Terex Authorized Service Assistance.

⚠ WARNING

Use extreme caution to ensure that no contamination enters the tank when the cap is removed.

4. Install New Element - Thread the new element onto the mounting neck. The breather should only be tightened hand-tight.

(21) Pressure Line Filter Inspection

The hydraulic filters on your machine are fitted with indicators to alert operators if the filters require replacement before their scheduled intervals. It is important to inspect the filters on a regular basis as increased filter consumption can be indicative of larger systemic problems. The purpose of this section is to familiarize operators with how to inspect a pressure line filter on your machine.

PROCEDURE

1. Start Machine - For the filter indicator to read properly, hydraulic oil must be flowing through the filter. For detailed information, see Normal Equipment Startup.
2. Inspect Indicator - Inspect the indicator on the top of the filter housing (Figure 6.50). If the indicator is green, the filter is fine. If the indicator is red, the filter needs to be replaced.

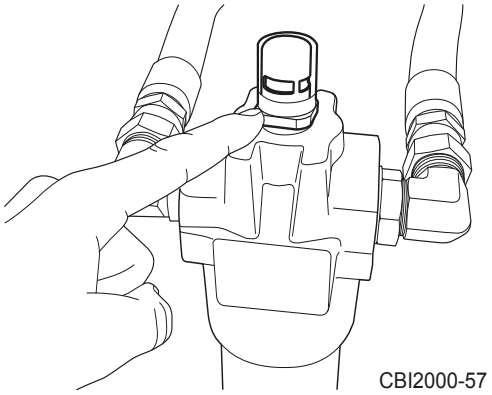


Figure 6.50 - Inspect Filter Indicator

⚠ WARNING

Cold oil temperatures may cause false restriction readings. In such cases, allow oil to reach operating temperature before inspecting indicator.

3. Replace Filter as Necessary - Replace the filter element immediately if the indicator shows it's needed. For more information, see Pressure Line Filter Replacement.

NOTICE

Make a record of it in your maintenance log any time a filter requires replacement prior to its regularly scheduled maintenance as it may be indicative of larger systemic problems.

(22) Pressure Line Filter Replacement

The hydraulic filters on your machine act as a barrier for protecting expensive components such as pumps, valves, and motors from contaminants. It is important to replace the filters on a regular basis to protect the hydraulic system. The purpose of this procedure is to familiarize operators with how to replace a pressure line filter element on your machine.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.

⚠ WARNING

Pressurized fluid can penetrate the skin causing severe injury or death. Always release residual pressure before disconnecting any hydraulic or fluid system components.

2. Clean Filter Housing - Thoroughly clean the outside of the filter housing to ensure no contaminants enter the system when performing service (Figure 6.51).

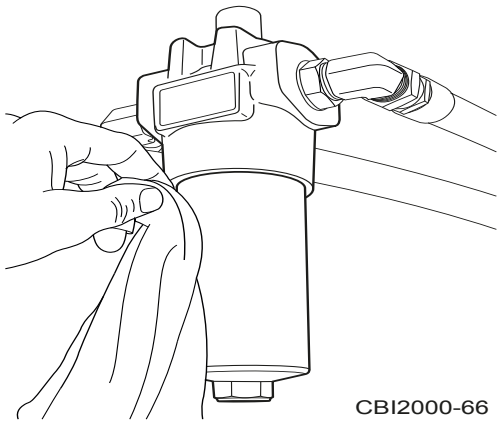


Figure 6.51 - Clean Filter Housing

3. Remove Bowl - Unscrew the bowl and remove it from the filter housing (Figure 6.52).

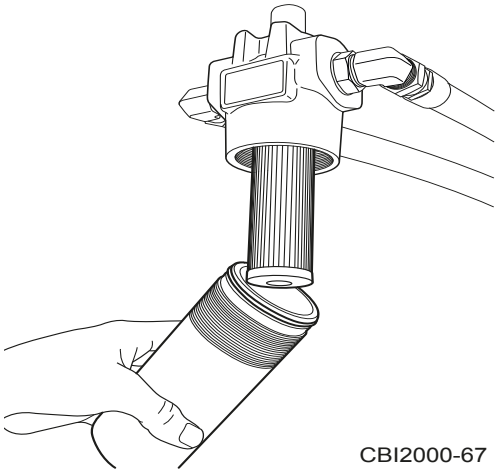


Figure 6.52 - Remove Filter from Bowl

4. Remove Old Element - Remove the old element from the housing and inspect for abnormal debris or damage. Contact Terex if any abnormalities are noted. For more information, see Terex Authorized Service Assistance.
5. Install New Element - Install the new filter element onto the housing. Ensure to lubricate the filters seal (Figure 6.53 / A) with hydraulic oil prior to installing.

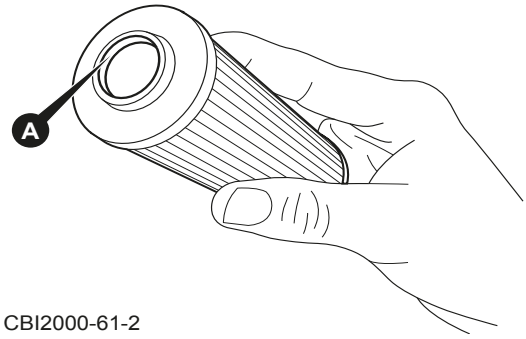


Figure 6.53 - Lubricate Filter Seal

6. Clean Bowl - Thoroughly clean the inside of the filter bowl of any debris or residue. Use caution around the seal if using solvent.
7. Inspect Bowl Seal - Inspect the bowl seal (Figure 6.54 / A) for cracks, nicks, compression set, or signs of damage. Replace if necessary.

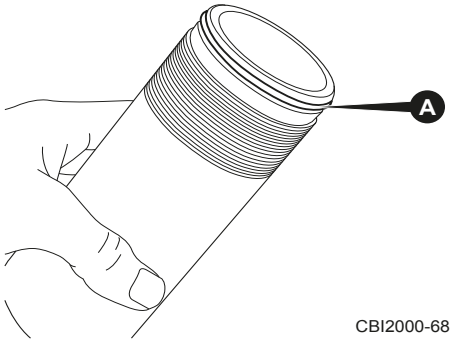


Figure 6.54 - Inspect Filter Housing Seal

8. Reinstall Bowl -Lubricate the threads and seal on the bowl with hydraulic oil and reinstall it. Torque the bowl following the specifications as noted on the filter canister.
9. Inspect for Leaks - Start the machine and inspect the assembly for signs of leaks. Use caution to protect yourself from exposure to high pressure fluids.

(23) Charge Circuit Filter Inspection

The hydraulic filters on your machine are fitted with indicators to alert operators if the filters require replacement before their scheduled intervals. It is important to inspect the filters on a regular basis as increased filter consumption can be indicative of larger systemic problems. The purpose of this procedure is to familiarize operators with how to inspect a charge circuit filter on your machine.

PROCEDURE

1. Start Machine - For the filter indicator to read properly, hydraulic oil must be flowing through the filter. For detailed information, see Starting the Machine.

⚠ WARNING

Cold oil temperatures may cause false restriction readings. In such cases, allow oil to reach operating temperature before inspecting indicator.

2. Reset Dial - Occasionally the inrush of hydraulic pressure at startup will cause a false restriction reading in the dial on the top of the filter housing (Figure 6.55 / A). Reset the dial by rotating it as far as it will easily go towards the green side of the scale.
3. Inspect Indicator - Inspect the dial on the top of the filter housing (Figure 6.55 / A). If the dial is pointing to the green side of the scale, the filter is fine. If the dial is in the red, the filter needs to be replaced.

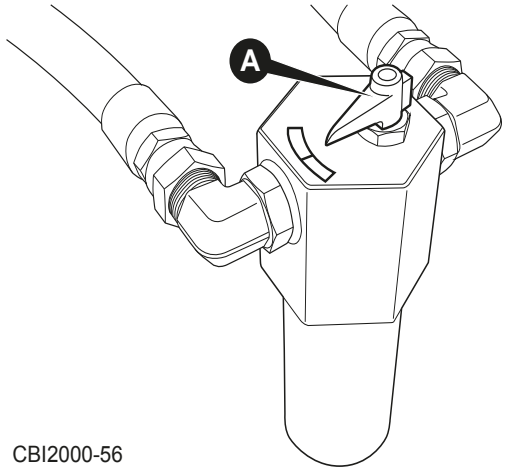


Figure 6.55 - Reset Filter Dial if Necessary

4. Replace Filter as Necessary - Replace the filter element immediately If the indicator shows it's needed. For more information, see Charge Filter Replacement.

NOTICE

Make a record of it in your maintenance log any time a filter requires replacement prior to its regularly scheduled maintenance as it may be indicative of larger systemic problems.

(24) Charge Circuit Filter Replacement

The hydraulic filters on your machine act as a barrier for protecting expensive components such as pumps, valves, and motors from contaminants. It is important to replace the filters on a regular basis to protect the hydraulic system. The purpose of this procedure is to familiarize operators with how to replace a charge circuit filter element on your machine.

NOTICE

Follow all applicable safety precautions when dealing with used oil or any chemicals. Ensure that chemicals are handled in an environmentally friendly manner. Always acquire and read the MSDS for any chemical prior to working with it.

PROCEDURE

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see the Safety section.
2. Release Residual Hydraulic Pressure - Release all residual pressure from the hydraulic system.

⚠ WARNING

Pressurized fluid can penetrate the skin causing severe injury or death. Always release residual pressure before disconnecting any hydraulic or fluid system components.

3. Clean Filter Housing - Thoroughly clean the outside of the filter housing to ensure no contaminants enter the system when performing service (Figure 6.56).

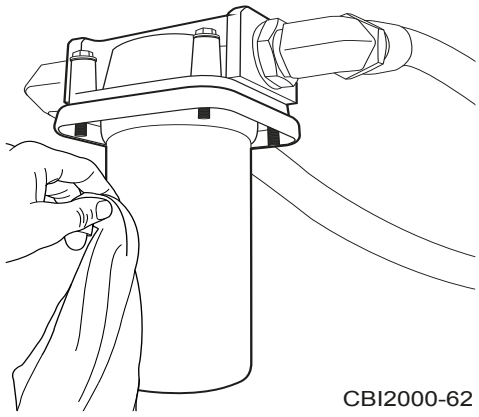


Figure 6.56 - Clean Filter Housing

4. Remove Bowl - Unscrew the bowl and remove it from the filter housing (Figure 6.57).

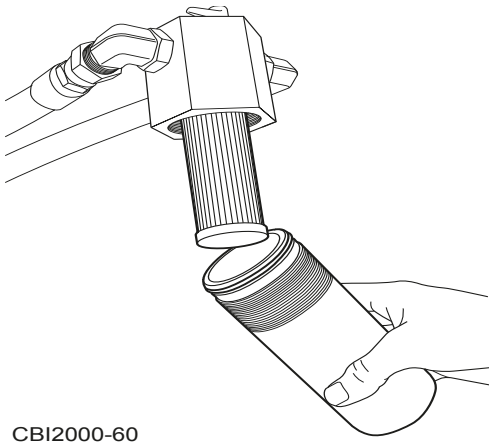


Figure 6.57 - Remove Bowl from Filter Housing

5. Remove Old Element - Remove the old element from the housing and inspect for abnormal debris or damage. Contact Terex if any abnormalities are noted. For more information, see Terex Authorized Service Assistance.
6. Install New Element - Install the new filter element onto the housing. Make sure to lubricate the filters seal with hydraulic oil prior to installing it (Figure 6.58 / A).

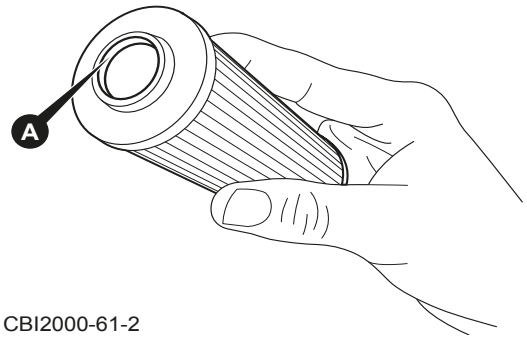


Figure 6.58 - Install Filter Element

7. Clean Bowl - Thoroughly clean the inside of the filter bowl of any debris or residue. Use caution around the seal if using solvent.
8. Inspect Bowl Seal - Inspect the bowl seal (Figure 6.59 / A) for cracks, nicks, compression set, or signs of damage. Replace if necessary.

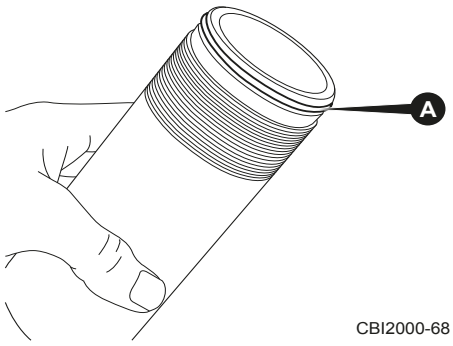


Figure 6.59 - Inspect Filter Housing

9. Reinstall Bowl - Lubricate the threads and seal on the bowl with hydraulic oil and install it. Torque the bowl following the specifications as noted on the filter canister.
10. Inspect for Leaks - Start the machine and inspect the assembly for signs of leaks. Use caution to protect yourself from exposure to high pressure fluids.

(25) Return Filter Replacement on 200 Gallon Tank

The return circuit hydraulic filter on your machine is located inside the hydraulic tank. The following drawing (Figure 6.60) outlines how to replace the return circuit filter on the 200 gallon hydraulic tank.

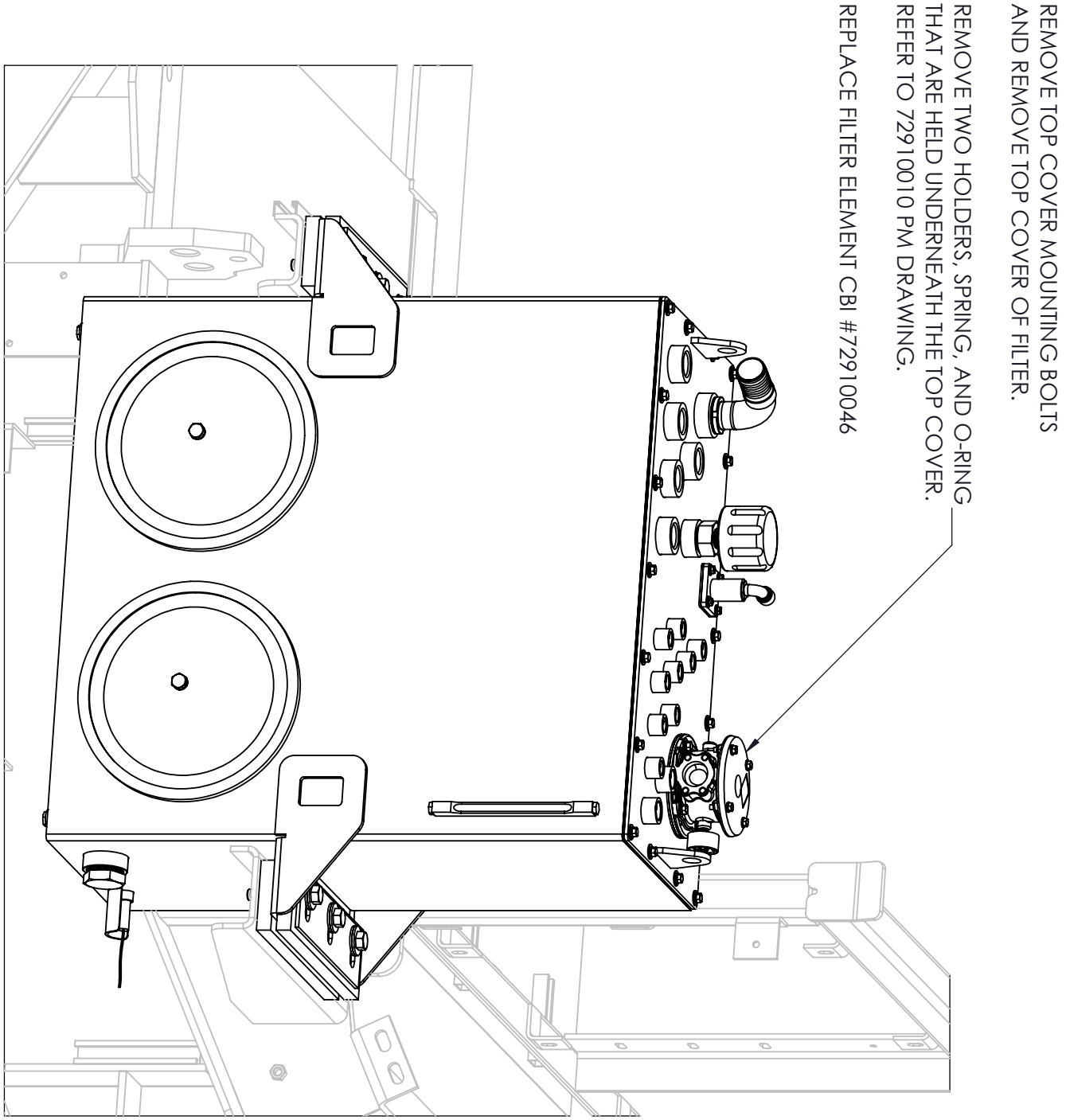


Figure 6.60 - Return Filter Replacement

(26) Welding on the Machine

Certain maintenance on your machine may require welding. There are sensitive electronic and precision mechanical components that may be damaged if proper precautions are not taken. The purpose of this section is to familiarize operators with the basic procedure for welding on Terex machines.

NOTICE

For complete welding precautions for all components, consult the OEM manuals.

⚠ WARNING

Always follow all applicable safety precautions and have sufficient fire suppression equipment present when welding.

1. Prepare Machine for Service - Perform a lockout/tagout procedure on the machine to ensure no unintentional machine movement or hazardous releases of energy occur. For more information, see Service Preparation.
2. Clean Area - Thoroughly clean the work area. Any built up trash, debris, or residue generates a serious fire hazard.
3. Disconnect ECM - Disconnect the J1/P1 and J2/P2 connectors from the ECM. Move the harness to a position that will not allow the harness to accidentally move back and make contact with any ECM pins. For more information, consult the engine manual.
4. Disconnect Link CAN Antenna (If Applicable) - If your machine is configured to wirelessly link with another Terex machine (a combo unit), disconnect the wireless CAN antenna (Figure 6.61) that they use for communication.

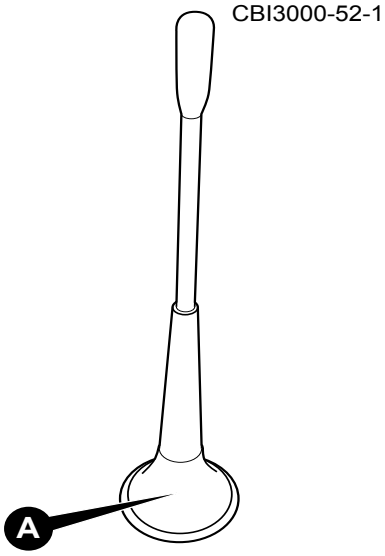


Figure 6.61 - Disconnect Wireless Antenna

5. Mount Safety Breaker - Mount the Terex safety breaker (part number 80013138) across the terminals on the back of the battery disconnect switch (Figure 6.62 / A). Mounting the breaker ensures the entire electrical system is protected by the suppressor while still ensuring the machine cannot be started.

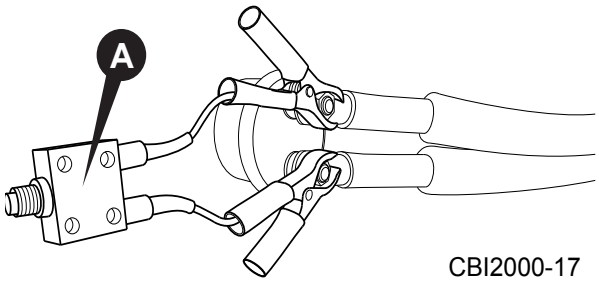


Figure 6.62 - Mount Safety Breaker Across Terminals

6. Mount Surge Suppressor - Mount the Terex surge protector (part number 81010086) across the battery terminals for both batteries (Figure 6.63 / A). If the surge protector is hooked up properly, the status LED will glow green.

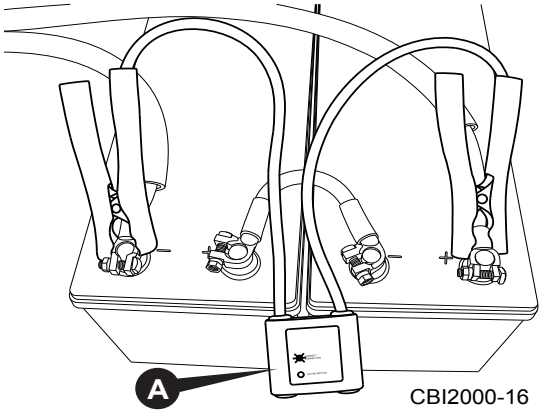


Figure 6.63 - Mount Surge Protector Across Battery Terminals

7. Mount Grounding Cable - Mount the welding ground cable in a secure fashion to ensure sufficient contact for the entire welding process.

NOTICE

Never mount the welding ground cable with a bearing or precision component in between the ground and electrode. Severe damage to the component will result. Always mount the welding ground as close to the area being welded as possible. This ensures components are not exposed to unnecessarily high electrical currents. Never mount the grounding cable to electronic components or with electronic components in the current path between the electrode and ground. Always ensure electronic components are isolated from direct or induced current from welding.

8. Perform Welding - The machine is now successfully prepared for safe welding using standard welding practices.
9. Ensure Work Area is Safe from Fire - When welding is complete, Terex advises to always wet down the entire work area with sufficient water to ensure no hot spots occur. It is also recommended that the machine be observed for a minimum of 30 minutes to ensure no fires start.
10. Reset Machine - Remove all electronic safety components fitted for weld preparation and refasten the ECM connectors.

⚠ WARNING

Use extreme caution when reconnecting the ECM to not strip the delicate fasteners on the ECM connectors. For more information, consult the engine OEM manuals.

6.12 Torque Specifications

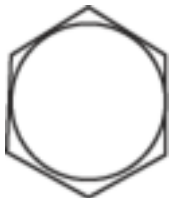
(1) General Torque Specifications

The purpose of this section is to familiarize the operator with standard torque settings for typical fasteners. Exceptions to these torque values may be given in the manual. For detailed information, please consult the appropriate Caterpillar user's guide.

(2) Fasteners

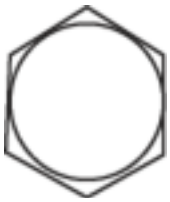
The following torque settings are typical for threaded machine screws, nuts, and bolts.

(a) Imperial (US Standard)

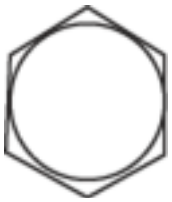
			
	GRADE 2 STEEL TENSILE **STRENGTH: 74,000 lbs 1/4" through 3/4" 60,000 lbs 7/8" through 1-1/2"**	**GRADE 5 STEEL TENSILE** **STRENGTH: 120,000 lbs 1/4" through 1" 105,000 lbs 1" through 1-1/2"**	**GRADE 8 STEEL TENSILE** **STRENGTH: 150,800 lbs 1/4" through 1-1/2" COARSE, NC, UNC, U.S.S. THREAD**

COARSE, NC, UNC, U.S.S. THREAD

Fastener Thread Size	Proof Load (Lbs.)	Torque (ft/lbs)			Proof Load (Lbs.)	Torque (ft/lbs)			Proof Load (Lbs.)	Torque (ft/lbs)		
		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated
1/4-20	1,750	7	5	4	2,700	11	8	7	3,810	16	12	10
5/16-18	2,880	15	11	9	4,450	23	17	14	6,290	33	25	20
3/8-15	4,426	27	20	16	6,680	41	31	25	9,290	58	44	35
7/16-14	5,840	43	32	26	9,030	66	49	40	12,750	93	70	56
½-13	7,800	65	49	39	12,060	101	75	60	17,020	142	106	85
9/16-12	10,000	94	70	56	15,460	145	109	87	21,830	205	153	123
5/8-11	12,430	129	97	78	19,200	200	150	120	27,120	283	212	170
¾-10	18,390	230	172	138	28,420	355	286	213	40,130	502	376	301
7/8-9	15,230	222	167	133	39,240	572	429	343	55,400	806	606	485
1-8	19,980	333	250	200	51,480	858	644	515	72,680	1,211	909	727
1-1/8-7	25,180	472	354	283	64,870	1,216	912	730	91,590	1,717	1,288	1,030
1-1/4-7	31,980	666	500	400	82,370	1,716	1,278	1,030	116,290	2,423	1,817	1,454
1-3/8-6	38,110	873	655	524	98,160	2,250	1,687	1,350	138,580	3,176	2,382	1,905
1-1/2-6	46,370	1,159	869	696	119,440	2,986	2,240	1,792	168,630	4,216	3,162	2,529

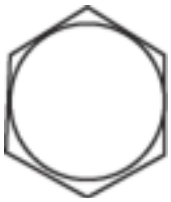
			
	GRADE 2 STEEL TENSILE **STRENGTH: 74,000 lbs 1/4" through 3/4" 60,000 lbs 7/8" through 1-1/2"**	**GRADE 5 STEEL TENSILE** **STRENGTH: 120,000 lbs 1/4" through 1" 105,000 lbs 1" through 1-1/2"**	**GRADE 8 STEEL TENSILE** **STRENGTH: 150,800 lbs 1/4" through 1-1/2"**

FINE, NF, S.A.E., UNF THREAD												
Fastener Thread Size	Proof Load (Lbs.)	Torque (ft/lbs)			Proof Load (Lbs.)	Torque (ft/lbs)			Proof Load (Lbs.)	Torque (ft/lbs)		
		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated
1/4-28	2,000	8	5	5	3,090	13	10	8	4,360	18	14	11
5/16-24	3,190	17	12	10	4,930	26	19	15	5,960	35	27	22
3/8-24	4,830	30	23	18	7,460	47	35	28	10,530	66	49	39
7/16-20	6,530	48	36	29	10,090	74	55	44	14,240	104	78	62
½-20	8,790	73	55	44	13,590	113	85	88	19,190	160	120	96
9/16-18	11,160	105	78	63	17,250	162	121	97	24,350	228	171	137
5/8-18	14,080	147	110	88	21,750	227	170	136	30,710	320	240	192
¾-16	20,510	256	192	154	31,700	395	297	238	44,750	559	420	336
7/8-14	16,810	245	184	147	43,300	631	474	379	61,130	891	669	535
1-12	21,880	365	274	219	56,350	939	704	564	79,560	1,325	995	796
1-1/8-12	28,230	529	397	318	72,730	1,364	1,023	818	102,680	1,925	1,444	1,155
1-1/4-12	35,400	738	553	443	91,190	1,900	1,425	1,140	128,750	2,682	2,012	1,609
1-3/8-12	43,380	994	746	596	111,740	2,561	1,921	1,536	157,760	3,615	2,712	2,169
1-1/2-12	52,170	1,304	978	783	134,380	3,360	2,520	2,016	189,720	4,743	3,557	2,846

			
	GRADE 2 STEEL TENSILE **STRENGTH: 33,566 kg 6.35 mm through 19.05 mm 29,937 kg 22.225 mm through 38.10 mm**	**GRADE 5 STEEL TENSILE** **STRENGTH: 54,431 kg 6.35 mm through 25.40 mm 47,627 kg 25.40 mm through 38.10 mm**	**GRADE 8 STEEL TENSILE** **STRENGTH: 68,402 kg 6.35 mm through 38.10 mm COARSE, NC, UNC, U.S.S. THREAD**

COARSE, NC, UNC, U.S.S. THREAD

Fastener Thread Size	Proof Load (kg)	Torque (Nm)			Proof Load (kg)	Torque (Nm)			Proof Load (kg)	Torque (Nm)		
		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated
1/4-20	794	9.49	6.78	5.42	1,225	14.91	10.85	9.49	1,728	21.69	16.27	13.56
5/16-18	1,307	20.34	14.91	12.20	2,018	31.18	23.05	18.98	2,853	44.74	33.90	27.12
3/8-15	2,008	36.61	27.12	21.69	3,030	55.59	42.03	33.90	4,214	78.64	59.66	47.45
7/16-14	2,649	58.30	43.39	35.25	4,096	89.48	66.44	54.23	5,783	126.09	94.91	75.93
½-13	3,538	88.13	66.44	52.88	5,470	136.94	101.69	81.35	7,720	192.53	143.72	115.24
9/16-12	4,536	127.45	94.91	75.93	7,013	196.59	147.78	117.96	9,902	277.94	207.44	166.77
5/8-11	5,638	174.90	131.51	105.75	8,709	271.16	203.37	162.70	12,301	383.70	287.43	230.49
¾-10	8,342	311.84	233.20	187.10	12,891	481.32	387.76	288.80	18,203	680.62	509.79	408.10
7/8-9	6,908	300.99	226.42	180.32	17,799	775.53	581.65	465.05	25,129	1,092.79	821.63	657.57
1-8	9,063	451.49	338.95	271.16	23,351	1,163.29	873.15	698.25	32,967	1,641.90	1,232.44	985.68
1-1/8-7	11,421	639.95	479.96	283.70	29,425	1,648.67	1,236.51	989.75	41,545	2,327.94	1,746.29	1,396.49
1-1/4-7	14,506	902.97	677.91	542.33	37,362	2,326.58	1,732.74	1,396.49	52,748	3,285.15	2,463.52	1,971.36
1-3/8-6	17,286	1,183.93	888.06	710.45	44,525	3,050.59	2,287.26	1,830.35	62,859	4,306.08	3,229.56	2,582.83
1-1/2-6	21,033	1,571.39	1,178.21	943.65	54,177	4,048.47	3,037.03	2,429.63	76,489	5,716.13	4,287.10	3,428.86

			
	GRADE 2 STEEL TENSILE **STRENGTH: 33,566 kg 6.35 mm through 19.05 mm 27,216 kg 22.225 mm through 38.10 mm**	**GRADE 5 STEEL TENSILE** **STRENGTH: 54,431 kg 6.35 mm through 25.40 mm 47,627 kg 25.40 mm through 38.10 mm**	**GRADE 8 STEEL TENSILE** **STRENGTH: 68,402 kg 6.35 mm through 38.10 mm**

FINE, NF, S.A.E., UNF THREAD

Fastener Thread Size	Proof Load (kg)	Torque (Nm)			Proof Load (kg)	Torque (Nm)			Proof Load (kg)	Torque (Nm)		
		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated		Unplated	Plated	Lubricated
1/4-28	907	10.85	6.78	6.78	1,402	17.63	13.56	10.85	1,978	24.40	18.98	14.91
5/16-24	1,447	23.05	16.27	13.56	2,236	35.25	25.76	20.34	2,703	47.45	36.61	29.83
3/8-24	2,191	40.67	31.18	24.40	3,384	63.72	47.45	37.96	4,776	89.48	66.44	52.88
7/16-20	2,962	65.08	48.81	39.32	4,577	100.33	74.57	59.66	6,459	141.01	105.75	84.06
½-20	3,987	98.97	74.57	59.66	6,164	153.21	115.24	119.31	8,704	216.93	162.70	130.16
9/16-18	5,062	142.36	105.75	85.42	7,824	219.64	164.05	131.51	11,045	309.13	231.84	185.75
5/8-18	6,387	199.31	149.14	119.31	9,866	307.77	230.49	184.39	13,930	433.86	325.40	260.32
¾-16	9,303	347.09	260.32	208.80	14,379	535.55	402.68	322.69	20,298	757.90	569.44	455.55
7/8-14	7,625	332.18	249.47	199.31	19,641	855.52	642.66	513.86	27,728	1,208.03	907.04	725.36
1-12	9,925	494.87	371.49	296.92	25,560	1,273.11	954.50	764.68	36,088	1,796.46	1,349.04	1,079.23
1-1/8-12	12,805	717.23	538.26	431.15	32,990	1,849.34	1,387.00	1,109.06	46,575	2,609.95	1,957.80	1,565.97
1-1/4-12	16,057	1,000.59	749.77	600.63	41,363	2,576.05	1,932.04	1,545.63	58,400	3,636.30	2,727.91	2,181.51
1-3/8-12	19,677	1,347.68	1,011.44	808.07	50,684	3,472.25	2,604.53	2,082.54	71,559	4,901.28	3,676.98	2,940.77
1-1/2-12	23,664	1,767.99	1,325.99	1,061.61	60,954	4,555.55	3,416.66	2,733.33	86,056	6,430.64	4,822.64	3,858.66

(3) Keyless Shaft Coupling Torque Values

Use the torque values shown below for tightening keyless locking rings. Torque may differ from manufacturer specification. Do not exceed or deviate. For any questions regarding Keyless Locking Device (KLD) issues, please contact Terex

Rotor	140 ft/lbs (190 Nm)
Drive Sheave	107 ft/lbs (145 Nm)
Driven Sheave	170 ft/lbs (230 Nm)

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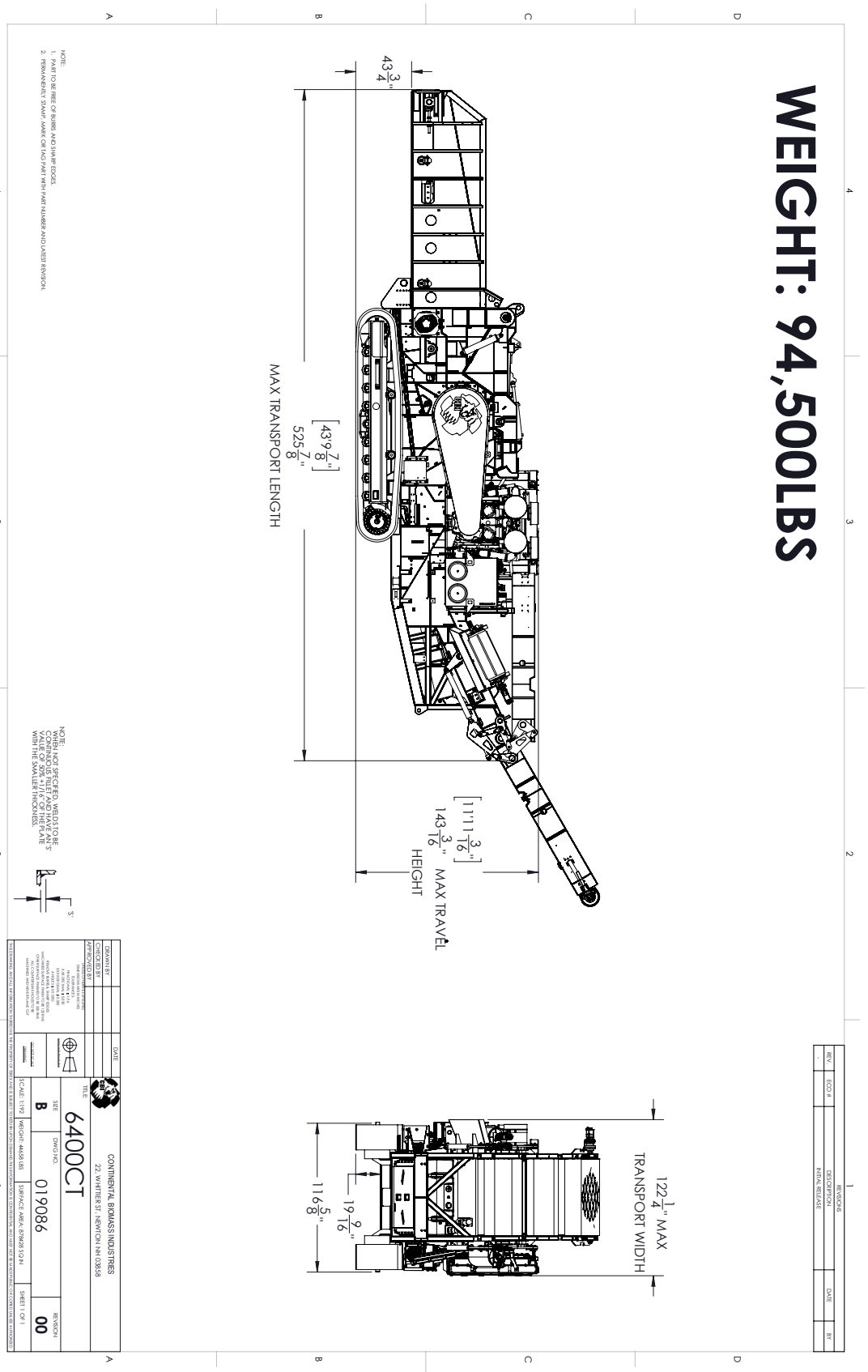
Table of Content

Appendix A Reference Drawings

(4) Introduction

The following section contains the reference drawings for your machine. This information is useful for general knowledge of the machine.

(5) Dimensional Outline



(6) Material Safety Data Sheets (MSDS)

(a) ExxonMobil Mobil Delvac 1300 Super 15W-40

ExxonMobil

Product Name: MOBIL DELVAC 1300 SUPER 15W-40
Revision Date: 02 Mar 2015
Page 1 of 11

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBIL DELVAC 1300 SUPER 15W-40**
Product Description: Base Oil and Additives
Product Code: 201520403560, 440693-00, 970529
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1900.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

ExxonMobil

Product Name: MOBIL DELVAC 1300 SUPER 15W-40
Revision Date: 02 Mar 2015

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	1 - < 5%	H304
TETRAPROPENYL PHENOL	74499-35-7	0.1 - < 1%	H315, H320(2B), H360(1B)(F), H400(M factor 10), H410(M factor 10)

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Sulfur oxides, Oxides of carbon, Incomplete combustion products, Smoke, Fume

FLAMMABILITY PROPERTIES

Flash Point [Method]: >236°C (457°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

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Product Name: MOBIL DELVAC 1300 SUPER 15W-40
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ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with used product. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard			NOTE	Source
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	Mist.	TWA	5 mg/m3		N/A	OSHA Z1
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	Mist.	TWA	5 mg/m3		N/A	ACGIH

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

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PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

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IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.874
Flammability (Solid, Gas): N/A
Flash Point [Method]: >236°C (457°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F)
Decomposition Temperature: N/D
Vapor Density (Air = 1): N/D
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 110 cSt (110 mm2/sec) at 40 °C | 15 cSt (15 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -27°C (-17°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for	Minimally Toxic. Based on assessment of the components.

material.	
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

For the product itself:

Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies.
Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.
Tetrapropenyl phenol (TPP). TPP was tested in a rat oral gavage one-generation reproductive toxicity study and a rat dietary two-generation reproductive toxicity study. Results from the one-generation study included reduced ovary weights and changes in male reproductive accessory organs. Results from the two-generation study included prolonged estrous cyclicity, reduced ovary weights, accelerated sexual maturation, decreased mean live litter size, decreased fertility rates, hypospermia, and reduced weights of male reproductive accessory organs. A Specific Concentration Limit (SCL) for reproductive effects of 1.5 wt% TPP was derived by the supplier based on the NOAEL (15 mg/kg/day) from the rat dietary two-generation study and was confirmed in supporting studies with other substances containing TPP as an impurity.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

NOTE: One or more components of this material contain an impurity (branched alkylphenol) that is highly toxic to aquatic organisms. The components containing the impurity were tested by the supplier and found to be no more than minimally toxic to aquatic organisms.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics:

TCLP (BENZENE)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: DSL, KECI, PICCS, TSCA

Special Cases:

Inventory	Status
AICS	Restrictions Apply
IECSC	Restrictions Apply

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

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Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	15, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
H360(1B)(F): May damage fertility; Repro Tox, Cat 1B (Fertility)
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only
MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2003305XUS (1012124)

(b) ExxonMobil Mobilgrease CM-S

Product Name: MOBILGREASE CM-S
Revision Date: 21 Oct 2015
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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBILGREASE CM-S**
Product Description: Base Oil and Additives
Product Code: 2015A0106060, 530121-00, 971843
Intended Use: Grease

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX. 77253 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary

from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
BENZENAMINE, N-PHENYL-, REACTION PRODUCTS WITH 2,4,4-TRIMETHYLPENTENE	68411-46-1	1 - < 5%	H402, H412
OLEFIN SULFIDE	68937-96-2	0.1 - < 1%	H227, H317, H413
PHOSPHORIC ACID ESTERS, AMINE SALT		0.1 - < 1%	H226, H302, H317, H318, H401, H411
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%	H315, H318, H401, H411
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	0.1 - < 1%	H315, H319(2A), H317

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Scrape up spilled material with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ExxonMobil

Product Name: MOBILGREASE CM-S
Revision Date: 21 Oct 2015

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material

include:
No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Solid
Form: Semi-fluid
Color: Orange
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.908
Flammability (Solid, Gas): N/A
Flash Point [Method]: >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F)
Decomposition Temperature: N/D
Vapor Density (Air = 1): N/D
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 320 cSt (320 mm2/sec) at 40 °C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D

Melting Point: 260°C (500°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

NOTE: Most physical properties above are for the oil component in the material.

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.

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Product Name: MOBILGREASE CM-S
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Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components or similar formulations.

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

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Product Name: MOBILGREASE CM-S
Revision Date: 21 Oct 2015

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: TSCA

ExxonMobil

Product Name: MOBILGREASE CM-S
Revision Date: 21 Oct 2015

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	13, 15, 17, 19
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H226: Flammable liquid and vapor; Flammable Liquid, Cat 3
H227: Combustible liquid; Flammable Liquid, Cat 4
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H317: May cause allergic skin reaction; Skin Sensitization, Cat 1
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H402: Harmful to aquatic life; Acute Env Tox, Cat 3
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3
H413: May cause long lasting harmful effects to aquatic life; Chronic Env Tox, Cat 4

(c) ExxonMobil Mobilfluid 424

ExxonMobil

Product Name: MOBILFLUID 424
Revision Date: 17 Mar 2015
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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBILFLUID 424**
Product Description: Base Oil and Additives
Product Code: 201520508030, 522334-00, 971955
Intended Use: Hydraulic fluid

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX. 77389 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

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Product Name: MOBILFLUID 424
Revision Date: 17 Mar 2015

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
CALCIUM SULFONATE		1 - < 5%	H413
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	64742-46-7	1 - < 5%	H304
SEVERELY HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	20 - < 30%	H304
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	20 - < 30%	H304
ZINC ALKYLDITHIOPHOSPHATE	68649-42-3	1 - < 2.5%	H318, H401, H411

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Pressurized mists may form a flammable mixture.

Hazardous Combustion Products: Aldehydes, Incomplete combustion products, Smoke, Fume, Oxides of carbon, Sulfur oxides

FLAMMABILITY PROPERTIES

Flash Point [Method]: >198°C (389°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and

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No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.884
Flammability (Solid, Gas): N/A
Flash Point [Method]: >198°C (389°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F) [Estimated]
Decomposition Temperature: N/D
Vapor Density (Air = 1): > 2 at 101 kPa [Estimated]
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
Solubility in Water: Negligible
Viscosity: 55 cSt (55 mm2/sec) at 40 °C | 9.6 cSt (9.6 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -36°C (-33°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

ExxonMobil

Product Name: MOBILFLUID 424
Revision Date: 17 Mar 2015

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ZINC ALKYLDITHIOPHOSPHATE	Dermal Lethality: LD50 > 2000 mg/kg (Rabbit); Oral Lethality: LD50 > 2000 mg/kg (Rat)

OTHER INFORMATION

Contains:
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.
Middle distillates: Carcinogenic in animal tests. Lifetime skin painting tests produced tumors, but the mechanism is due to repeated cycles of skin damage and restorative hyperplasia. This mechanism is considered unlikely in humans where such prolonged skin irritation would not be tolerated. Did not cause mutations In Vitro. Inhalation of vapors did not result in reproductive or developmental effects in laboratory animals. Inhalation of high concentrations in animals resulted in respiratory tract irritation, lung changes and some reduction in lung function. Non-sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It

does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ZINC ALKYLDITHIOPHOSPHATE	68649-42-3	1 - < 2.5%

The following ingredients are cited on the lists below:

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Product Name: MOBILFLUID 424
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Chemical Name	CAS Number	List Citations
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	64742-46-7	1, 4, 17, 18
TOLUENE	108-88-3	15
ZINC ALKYLDITHIOPHOSPHATE	68649-42-3	13, 15, 17, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H413: May cause long lasting harmful effects to aquatic life; Chronic Env Tox, Cat 4

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

Internal Use Only
MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2005922XUS (538859)

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(d) ExxonMobil Mobilgear 600 XP 150

ExxonMobil

Product Name: MOBILGEAR 600 XP 150
Revision Date: 20 Mar 2015
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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBILGEAR 600 XP 150**
Product Description: Base Oil and Additives
Product Code: 201560401215, 613620-00, 97AE98
Intended Use: Gear oil

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX. 77389 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

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Product Name: MOBILGEAR 600 XP 150
Revision Date: 20 Mar 2015

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
LONG-CHAIN ALKYL AMINE		0.1 - < 0.25%	H302, H311, H317, H330(2), H314(1B), H373, H400(M factor 1), H410(M factor 1)

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Oxides of carbon, Aldehydes, Sulfur oxides, Smoke, Fume, Incomplete combustion products

FLAMMABILITY PROPERTIES

Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.888
Flammability (Solid, Gas): N/A
Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F)
Decomposition Temperature: N/D
Vapor Density (Air = 1): > 2 at 101 kPa
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C

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Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 150 cSt (150 mm2/sec) at 40 °C | 14.7 cSt (14.7 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -9°C (16°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.

Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

For the product itself:

Repeated and/or prolonged exposure may cause irritation to the skin, eyes, or respiratory tract.
Contains:
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

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Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

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SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H311: Toxic in contact with skin; Acute Tox Dermal, Cat 3
H314(1B): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1B
H317: May cause allergic skin reaction; Skin Sensitization, Cat 1
H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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Internal Use Only
MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 7077871XUS (1012016)

(e) CAT Extended Life Coolant

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

CAT ® ELC (Extended Life Coolant)

Product Use: Antifreeze/Coolant
Product Number(s): 226387
Company Identification
Chevron Products Company
Global Lubricants
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
email : lubemsds@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Target organ toxicant (repeated exposure): Category 2. Reproductive toxicant (developmental): Category 2.

Signal Word: Warning

Health Hazards: Suspected of damaging the unborn child.

Target Organs: May cause damage to organs (Kidney) through prolonged or repeated exposure.

PRECAUTIONARY STATEMENTS:
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapours/spray. Use personal protective equipment as required.
Response: Get medical advice/attention if you feel unwell. IF exposed or concerned: Get medical advice/attention.
Storage: Store locked up.
Disposal: Dispose of contents/container in accordance with applicable

local/regional/national/international regulations.

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Ethylene Glycol	107-21-1	30 - 60 %weight
Sodium 2-ethylhexanoate	19766-89-3	1 - 5 %weight
Molybdic acid, disodium salt, dihydrate	10102-40-6	0.1 - 1 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Toxic; may be harmful or fatal if swallowed.
Inhalation: Not expected to be harmful if inhaled. Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: Contains material that may cause adverse reproductive effects if swallowed based on animal data. Contains material that may cause harm to the unborn child if swallowed based on animal data.
Target Organs: Contains material that may cause damage to the following organ(s) following repeated inhalation at concentrations above the recommended exposure limit:Kidney Risk depends on duration and level of exposure. See Section 11 for additional information.

Indication of any immediate medical attention and special treatment needed Not Applicable

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish

flames. Dry Chemical, CO2, AFFF Foam or alcohol resistant foam.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Do not taste or swallow antifreeze or solution. Keep out of the reach of children and animals.
Precautionary Measures: Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling. Keep out of the reach of children.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

General Storage Information: Do not store in open or unlabeled containers.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits. Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Natural rubber, Neoprene, Nitrile Rubber, Polyvinyl Chloride (PVC or Vinyl).
Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: No respiratory protection is normally required. Air-Purifying Respirator for Organic Vapors, Dusts and Mists.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
Ethylene Glycol	ACGIH	--	--	100 mg/m3	--
Sodium 2-ethylhexanoate	Not Applicable	--	--	--	--
Molybdic acid, disodium salt, dihydrate	ACGIH	.5 mg/m3	--	--	A3 A3

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Red
Physical State: Liquid
Odor: Faint or Mild
Odor Threshold: No data available
pH: 8.1 - 8.5
Vapor Pressure: 0.12 mmHg (Typical) @ 20 °C (68 °F)
Vapor Density (Air = 1): 2.1
Initial Boiling Point: 108.9°C (228°F)
Solubility: Miscible
Freezing Point: -37°C (-34.6°F)
Specific Gravity: 1.08 @ 15.6°C (60.1°F) / 15.6°C (60.1°F)
Viscosity: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 160 °C (320 °F) (Typical)
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: Ketones (Elevated temperatures), Aldehydes (Elevated temperatures)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for product components.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for similar materials.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:
This product contains ethylene glycol (EG). The toxicity of EG via inhalation or skin contact is expected to be slight at room temperature. The estimated oral lethal dose is about 100 cc (3.3 oz.) for an adult human. Ethylene glycol is oxidized to oxalic acid which results in the deposition of calcium oxalate crystals mainly in the brain and kidneys. Early signs and symptoms of EG poisoning may resemble those of alcohol intoxication. Later, the victim may experience nausea, vomiting, weakness, abdominal and muscle pain, difficulty in breathing and decreased urine output. When EG was heated above the boiling point of water, vapors formed which reportedly caused unconsciousness, increased lymphocyte count, and a rapid, jerky movement of the eyes in persons chronically exposed. When EG was administered orally to pregnant rats and mice, there was an increase in fetal deaths and birth defects. Some of these effects occurred at doses that had no toxic effects on the mothers. We are not aware of

any reports that EG causes reproductive toxicity in human beings.

2-Ethylhexanoic acid (2-EXA) caused an increase in liver size and enzyme levels when repeatedly administered to rats via the diet. When administered to pregnant rats by gavage or in drinking water, 2-EXA caused teratogenicity (birth defects) and delayed postnatal development of the pups. Additionally, 2-EXA impaired female fertility in rats. Birth defects were seen in the offspring of mice who were administered sodium 2-ethylhexanoate via intraperitoneal injection during pregnancy.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.
The product has not been tested. The statement has been derived from products of a similar structure and composition.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material.
The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by international, country, or local laws and regulations.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: PROPRIETARY ANTIFREEZE PREPARATION IN NON-BULK PACKAGING; NOT REGULATED FOR TRANSPORT UNDER 49 CFR
Additional Information: Bulk shipments containing a reportable quantity (RQ, 5000 pounds or more) of ethylene glycol in a single packaging are transported as hazardous material. The shipping description is: UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (ETHYLENE GLYCOL CONTAINS BITTERANT), 9, III, RQ (ETHYLENE GLYCOL)

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: Anti-freeze Preparations, Proprietary; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:

1.	Immediate (Acute) Health Effects:	YES	
2.	Delayed (Chronic) Health Effects:	YES	
3.	Fire Hazard:		NO
4.	Sudden Release of Pressure Hazard:	NO	
5.	Reactivity Hazard:		NO

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

The following components of this material are found on the regulatory lists indicated.

Ethylene Glycol	03, 05, 06, 07

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

NEW JERSEY RTK CLASSIFICATION:
Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: Refer to components listed in Section 3.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 2 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 2* Flammability: 1 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

LABEL RECOMMENDATION:
Label Category : ANTIFREEZE/COOLANT 13 - AFC13

REVISION STATEMENT: This revision updates the following sections of this Safety Data Sheet: 1-16
Revision Date: APRIL 29, 2015

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Energy Technology Company, 6001 Bollinger Canyon Road San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

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Appendix B Warranty

(1) Warranty

The following pages show an example of the warranty information.

STANDARD LIMITED NEW PRODUCT WARRANTY — TEREX ENVIRONMENTAL EQUIPMENT

Terex GB Ltd. (hereafter referred as "Seller") warrants its new Equipment, to be free of defects in material or workmanship for a period of (i) 12 months from the date the Equipment is first placed into service, whether such Equipment is sold, rented (except for TAC and TSG Equipment) or leased or (ii) 2,000 hours of use, whichever first occurs, provided that in no event shall this warranty extend beyond a period of 24 months from the date of shipment from the factory; provided that (1) the Buyer or the end-user sends Seller written notice of the defect within sixty (60) days of its discovery and establishes to the Seller's satisfaction that: (i) the Equipment has been maintained and operated within the limits of rated and normal usage, and that there have been no alterations to it; and (ii) the defect did not result in any manner from the intentional or negligent action or inaction by Buyer or the end-user or any of their respective agents or employees or any person using it and (2) a new machine registration certificate or the commissioning documents have been completed, signed and delivered to Seller within thirty (30) days of the equipment's "in-service" date. If requested by Seller, Buyer must return the defective equipment to Seller's manufacturing facility, or other location designated by Seller, for inspection, and if Buyer cannot establish that conditions (1) (i) and (1) (ii) above have been met, then this warranty shall not cover the alleged defect. For the purposes of this warranty, a demonstration of the Equipment in excess of 100 hours will constitute the place of the Equipment into service. Notwithstanding the foregoing, for TAC and TSG Equipment, if the Equipment is rented, the warranty period shall be ninety (90) days from the date the Equipment is first placed into service.

Subject to the Buyer establishing that conditions (1)(i) and 1(ii) above have been met, Seller warrants all Critical Components (as defined herein) to be free, under normal use and service, of any defects in manufacture or materials for a period of: (1) twenty four (24) months from the date of commissioning, (2) 4000 hours of use, or (3) Thirty Six (36) months the date of shipment from the factory, whichever occurs first. For the purposes of this warranty, Critical Components shall mean:

- TBG - Main Rotor & Shaft, Grinder Chamber Body
- TBC - Drum, main shaft and chipping chamber
- TTS & Phoenix - Screen weld assembly unless it is a wear part
- TRS - Screen Box Welded Assembly, Screen Box Sub frame, Main Shaft
- TAC - Drum & main shaft assembly

Seller's obligation and liability under this warranty is expressly limited to, at Seller's sole option, repairing or replacing, with new or remanufactured parts or components, any part, which appears to Seller upon inspection to have been defective in material or workmanship. Such parts shall be provided at no cost to the owner. If requested by Seller, components or parts for which a warranty claim is made shall be returned to Seller at a location designated by Seller. All components and parts replaced under this limited product warranty become the property of Seller.

The Equipment is intended for industrial/commercial use by professional contractors and their trained employees and are not intended for use by consumers.

This warranty shall be null and void if parts (including wear parts) other than genuine OEM Seller parts are used in the equipment.

Accessories, assemblies and components included in the Seller equipment, which are not manufactured by Seller, are subject to the warranty of their respective manufacturers. Normal maintenance, adjustments, or maintenance/wear parts, including without limitation, friction plates, glass, clutch, proper tightening of bolts, nuts and brake linings pipe fittings, adding or replacing of fluids, filters, wire rope, belts, screening media, rubber skirting, chute linings and paint, are not covered by this warranty and are the sole maintenance responsibility of Buyer.

Seller makes no other warranty, express or implied, and makes no warranty of merchantabilityor fitness for any particular purpose.

No employee or representative is authorized to modify this warranty unless such modification is made in writing and signed by an authorized officer of Seller.

Seller's obligation under this warranty shall not include duty, taxes, environmental fees, including without limitation, disposal or handling of tires, batteries, petrochemical items, or any other charges whatsoever, or any liability for direct, indirect, incidental, or consequential damages.

Improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, accident, sabotage or alteration or repair of the equipment by persons not authorized by Seller shall render this warranty null and void. Seller reserves the right to inspect the installation of the product and review maintenance procedures to determine if the failure was due to improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, or alteration or repair of the equipment by persons not authorized by Seller.

Parts Warranty: Seller warrants the parts ordered from the Seller's parts department to be free of defect in material or workmanship for either (1) a period of 12 months after date of shipment from the factory or (2) 2000 hrs of use or (3) the balance of the remaining new equipment warranty, whichever occurs first. With respect to parts ordered from the Seller's parts department for Equipment that is no longer covered under this limited product warranty due to lapse of time or usage in excess of 4,000 hours of Critical Components, Seller warrants such parts to be free of defect in material or workmanship for a period of either 12 months after date of shipment from the factory or 2000 hrs of use, whichever occurs first.

NO TRANSFERABILITY OF WARRANTY: This warranty is limited to the original purchaser or original end-user if sold to a distributor, and is not assignable or otherwise transferable without the written agreement of Seller. Please contact your local distributor for additional details if needed.

ITEMS NOT COVERED BY SELLER WARRANTY

The following items are NOT covered under the Seller Warranty (the following list is not exhaustive):

1. Items sold by any individual, corporation, partnership or any other organization or legal entity that is not an authorized Seller distributor.

2. Components which are not manufactured by Seller are not covered by Seller's warranty. Such components are covered only by the warranty that is provided by the manufacturer of such components. Such components may include, but are not limited to, chassis, air compressors, batteries, tires engines, engine components, and customer supplied products.

3. Replacement of assemblies: Seller has the option to repair or replace any defective part or assembly. It is Seller's policy to refuse claims for the replacement of a complete assembly that is field repairable by the replacement or repair of defective part(s) within the assembly.

4. Normal Operational Maintenance Services and Wear Parts: Maintenance services and wear parts are excluded from warranty claims. Maintenance services and wear parts not covered include, but are not limited to, such items as: seals, gaskets, hoses, friction plates, glass, clutch and brake linings, filters, wire rope, exterior coatings, proper tightening of bolts, nuts and pipe fittings, adding or replacing of fluids, filters, belts, screening media, rubber skirting, chute linings and paint, services supplies such as hand cleaners, towels and lubricants, and inspections, diagnostic time and travel time.

5. Transportation cost and/ or damage: Any damage caused by carrier handling is a transportation claim and should be filed immediately with the respective carrier.

6. Deterioration: Repairs, work required or parts exposed as the result of age, storage, weathering, lack of use, demonstration use, or use for transportation of corrosive chemicals.

7. Secondary Failures: Should the owner or operator continue to operate a machine after it hasbeen noted that a failure has occurred, Seller will not be responsible under the warranty for resultant damage to other parts due to that continued operation.

8. Workmanship of Others: Seller does not accept responsibility for improper installation or labor costs or costs of any kind from personnel other than authorized Seller distributor personnel.

9. Stop and Go Warranty: Seller does not recognize “Stop and Go” warranties.

10. Incidental or Consequential Damage: Seller shall not be liable for any incidental or consequential damages of any kind, including, but not limited to, lost profits, loss of production, increased overhead, loss of business opportunity, delays in production, costs of replacement components and increased costs of operation that may arise from the breach of this warranty. Customer’s sole remedy shall be limited to (at Seller’s sole option) repair or replacement of the defective part.

11. Labor: Terex shall not be responsible for diagnostic, overtime, premium or any other labor charges; travel costs including without limitation meals and lodging, and travel time and/or mileage charges.

12. Customer Responsibilities: Terex shall not be responsible for loaner machines, rental, downtime, transportation or inconvenience costs directly or indirectly resulting from the failure of its Products or parts

THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, REPRESENTATIONS AND CONDITIONS, EXPRESS OR IMPLIED AND ALL OTHER STATUTORY, CONTRACTUAL, TORTIOUS AND COMMON LAW OBLIGATIONS OR LIABILITY ON SELLER’S PART ARE HEREBY EXPRESSLY EXCLUDED TO THE MAXIMUM EXTENT PERMITTED BY LAW. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY CONTAINED HEREIN. Seller neither assumes nor authorizes any other person to assume for Seller any other liability in connection with the sale of Seller’s equipment. This warranty shall not apply to any of Seller’s equipment or any part thereof which has been subject to misuse, alteration, abuse, negligence, accident, acts of God or sabotage. No action by any party shall operate to extend or revive this limited warranty without the prior written consent of Seller. In the event that any provision of this warranty is held unenforceable for any reason, the remaining provisions shall remain in full force and effect.

IN THE EVENT OF ANY BREACH OF THE WARRANTY BY SELLER, SELLER’S LIABILITY SHALL BE LIMITED EXCLUSIVELY TO THE REMEDIES (AT SELLER’S SOLE OPTION) OF REPAIR OR REPLACEMENT OF ANY DEFECTIVE EQUIPMENT COVERED BY THE WARRANTY. IN NO EVENT SHALL SELLER, OR ANY SUBSIDIARY OR DIVISION THEREOF BE LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OR LOSSES RESULTING FROM ANY BREACH OF WARRANTY, REPRESENTATION OR CONDITION, EXPRESS OR IMPLIED, OR ANY OTHER TERMS OF THIS WARRANTY, OR ANY BREACH OF ANY DUTY OR OBLIGATION IMPOSED BY STATUTE, CONTRACT, TORT ORCOMMON LAW OR OTHERWISE (WHETHER OR NOT CAUSED BY THE NEGLIGENCE OF THE SELLER, ITS EMPLOYEES, AGENTS OR OTHERWISE), INCLUDING, WITHOUT LIMITATION, LOSS OF USE, LOST PROFITS OR REVENUES, LABOUR OR EMPLOYMENT COSTS, LOSS OF USE OF OTHER EQUIPMENT, DOWNTIME OR HIRE CHARGES, THIRD PARTY REPAIRS, IMPROPER PERFORMANCE OR WORK, LOSS OF SERVICE OF PERSONNEL, LOSS OF CONTRACT OR OPPORTUNITY AND PENALTIES OF ANY KIND, OR FAILURE OF EQUIPMENT TO COMPLY WITH ANY APPLICABLE LAWS. THE SELLER’S LIABILITY TO THE BUYER SHALL NOT IN ANY EVENT EXCEED THE PURCHASE PRICE OF THE EQUIPMENT, PROVIDED THAT NOTHING CONTAINED IN THIS LIMITED PRODUCT WARRANTY SHALL OPERATE TO EXCLUDE THE SELLER’S LIABILITY FOR DEATH OR PERSONAL INJURY.

STANDARD LIMITED NEW PRODUCT WARRANTY — TEREX ENVIRONMENTAL EQUIPMENT

Terex USA, LLC d/b/a Terex Ecotec (hereafter referred to collectively as "Seller") warrants its new Equipment, to be free of defects in material or workmanship for a period of (i) 12 months from the date the Equipment is first placed into service, whether such Equipment is sold, rented (except for TAC and TSG Equipment) or leased or (ii) 2,000 hours of use, whichever first occurs, provided that in no event shall this warranty extend beyond a period of 24 months from the date of shipment from the factory; provided that (1) the Buyer or the end-user sends Seller written notice of the defect within sixty (60) days of its discovery and establishes to the Seller's satisfaction that: (i) the Equipment has been maintained and operated within the limits of rated and normal usage, and that there have been no alterations to it; and (ii) the defect did not result in any manner from the intentional or negligent action or inaction by Buyer or the end-user or any of their respective agents or employees or any person using it and (2) a new machine registration certificate or the commissioning documents have been completed, signed and delivered to Seller within thirty (30) days of the equipment's "in-service" date. If requested by Seller, Buyer must return the defective equipment to Seller's manufacturing facility, or other location designated by Seller, for inspection, and if Buyer cannot establish that conditions (1) (i) and (1) (ii) above have been met, then this warranty shall not cover the alleged defect. For the purposes of this warranty, a demonstration of the Equipment in excess of 100 hours will constitute the place of the Equipment into service. Notwithstanding the foregoing, for TAC and TSG Equipment, if the Equipment is rented, the warranty period shall be ninety (90) days from the date the Equipment is first placed into service. Subject to the Buyer establishing that conditions (1) (i) and 1(ii) above have been met, Seller warrants all Critical Components (as defined herein) to be free, under normal use and service, of any defects in manufacture or materials for a period of: (1) twenty four (24) months from the date of commissioning, (2) 4000 hours of use, or (3) Thirty Six (36) months the date of shipment from the factory, whichever occurs first. For the purposes of this warranty, Critical Components shall mean:

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Such parts shall be provided at no cost to the owner. If requested by Seller, components or parts for which a warranty claim is made shall be returned to Seller at a location designated by Seller. All components and parts replaced under this limited product warranty become the property of Seller.

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This warranty shall be null and void if parts (including wear parts) other than genuine OEM Seller parts are used in the equipment.

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Seller makes no other warranty, express or implied, and makes no warranty of merchantabilityor fitness for any particular purpose.

No employee or representative is authorized to modify this warranty unless such modification is made in writing and signed by an authorized officer of Seller.

Seller's obligation under this warranty shall not include duty, taxes, environmental fees, including without limitation, disposal or handling of tires, batteries, petrochemical items, or any other charges whatsoever, or any liability for direct, indirect, incidental, or consequential damages.

Improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, accident, sabotage or alteration or repair of the equipment by persons not authorized by Seller shall render this warranty null and void. Seller reserves the right to inspect the installation of the product and review maintenance procedures to determine if the failure was due to improper maintenance, improper use, abuse, improper storage, operation beyond rated capacity, operation after discovery of defective or worn parts, or alteration or repair of the equipment by persons not authorized by Seller.

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NO TRANSFERABILITY OF WARRANTY: This warranty is limited to the original purchaser or original end-user if sold to a distributor, and is not assignable or otherwise transferable without the written agreement of Seller. Please contact your local distributor for additional details if needed.

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2. Components which are not manufactured by Seller are not covered by Seller's warranty. Such components are covered only by the warranty that is provided by the manufacturer of such components. Such components may include, but are not limited to, chassis, air compressors, batteries, tires engines, engine components, and customer supplied products.

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5. Transportation cost and/ or damage: Any damage caused by carrier handling is a transportation claim and should be filed immediately with the respective carrier.

6. Deterioration: Repairs, work required or parts exposed as the result of age, storage, weathering, lack of use, demonstration use, or use for transportation of corrosive chemicals.

7. Secondary Failures: Should the owner or operator continue to operate a machine after it hasbeen noted that a failure has occurred, Seller will not be responsible under the warranty forresultant damage to other parts due to that continued operation.

8. Workmanship of Others: Seller does not accept responsibility for improper installation or labor costs or costs of any kind from personnel other than authorized Seller distributor personnel.

9. Stop and Go Warranty: Seller does not recognize “Stop and Go” warranties.

10. Incidental or Consequential Damage: Seller shall not be liable for any incidental or consequential damages of any kind, including, but not limited to, lost profits, loss of production, increased overhead, loss of business opportunity, delays in production, costs of replacement components and increased costs of operation that may arise from the breach of this warranty. Customer’s sole remedy shall be limited to (at Seller’s sole option) repair or replacement of the defective part.

11. Labor: Terex shall not be responsible for diagnostic, overtime, premium or any other labor charges; travel costs including without limitation meals and lodging, and travel time and/or mileage charges.

12. Customer Responsibilities: Terex shall not be responsible for loaner machines, rental, downtime, transportation or inconvenience costs directly or indirectly resulting from the failure of its Products or parts.

THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) AND ALL OTHER OBLIGATIONS OR LIABILITY ON SELLER’S PART. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY CONTAINED HEREIN. Seller neither assumes nor authorizes any other person to assume for Seller any other liability in connection with the sale of Seller’s equipment. This warranty shall not apply to any of Seller’s equipment or any part thereof which has been subject to misuse, alteration, abuse, negligence, accident, acts of God or sabotage. No action by any party shall operate to extend or revive this limited warranty without the prior written consent of Seller. In the event that any provision of this warranty is held unenforceable for any reason, the remaining provisions shall remain in full force and effect.

IN THE EVENT OF ANY BREACH OF THE WARRANTY BY SELLER, SELLER’S LIABILITY SHALL BE LIMITED EXCLUSIVELY TO THE REMEDIES (AT SELLER’S SOLE OPTION) OF REPAIR OR REPLACEMENT OF ANY DEFECTIVE EQUIPMENT COVERED BY THE WARRANTY. IN NO EVENT SHALL SELLER, OR ANY SUBSIDIARY OR DIVISION THEREOF BE LIABLE FOR INCIDENTAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OR LOSSES RESULTING FROM A BREACH OF WARRANTY INCLUDING, WITHOUT LIMITATION, LABOR COSTS, LOSS OF USE OF OTHER EQUIPMENT, THIRD PARTY REPAIRS, LOST PROFITS, LOST TIME, TOWING OR HAULING OF EQUIPMENT, RENTAL COSTS, PERSONAL INJURY, EMOTIONAL OR MENTAL DISTRESS, IMPROPER PERFORMANCE OR WORK, PENALTIES OF ANY KIND, LOSS OF SERVICE OF PERSONNEL, OR FAILURE OF EQUIPMENT TO COMPLY WITH ANY FEDERAL, STATE OR LOCAL LAWS.

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Table of Content

Appendix C Schematics

(1) Electrical Schematics

The following are schematics for the electrical system of your machine. Their purpose is to familiarize operators with the functions of their electrical system. For specific requests or detailed information, please contact Terex.

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Table of Contents

Sheet	Description	Note
00	OVERVIEW	
01	POWER WIRING	MAIN
02	BATTERY POWERED DEVICES	
03	POWER DISTRIBUTION	PANEL
04	POWER DISTRIBUTION CNT'D	PANEL
05	INTERIOR PANEL COMPONENTS	PANEL
06	– SPARE	
07	MD40700 WIRING	IQAN TAG 0/T
08	XA20801 WIRING	IQAN TAG 1/T
09	XA20901 WIRING	IQAN TAG 2/T
10	XA21001 WIRING	IQAN TAG 3/T
11	– RESERVED	IQAN TAG 4/T
12	– RESERVED	IQAN TAG 5/T
13	– RESERVED	IQAN TAG 6/T
14	– RESERVED	IQAN TAG 7T

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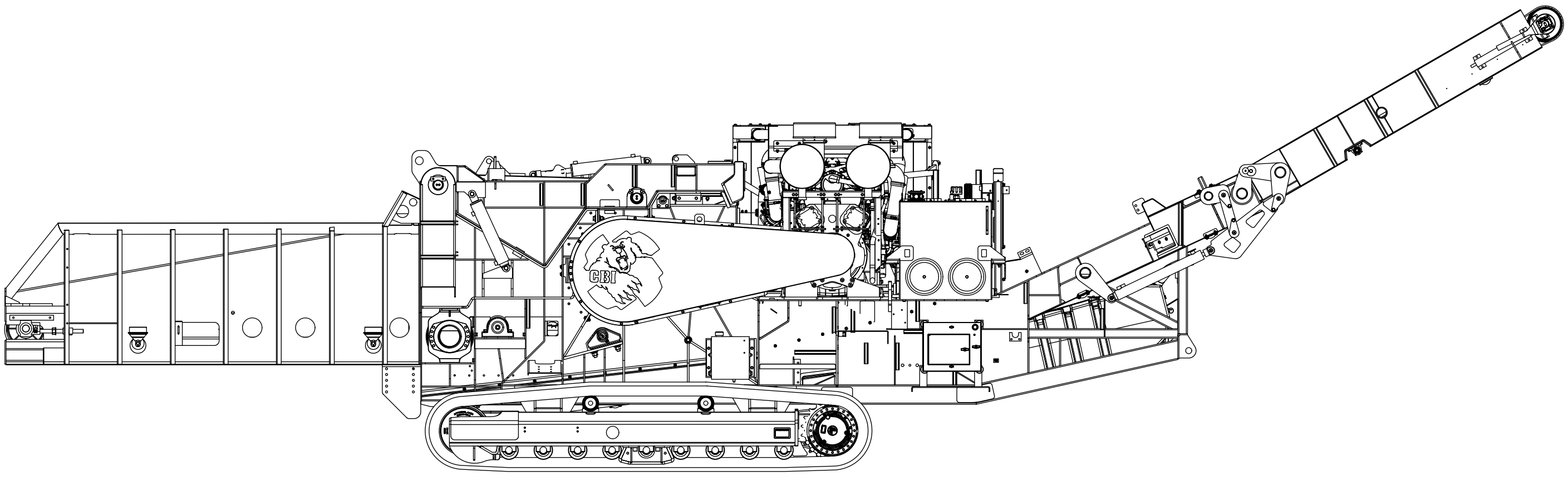
Sheet	Description	Note
15	ON-MACHINE GENERAL	
16	ON-MACHINE SENSORS	
17	ON-MACHINE SENSORS CNT'D	
18	ON-MACHINE HYDRAULIC	
19	ON-MACHINE HYDRAULIC CNT'D	
20	ON-MACHINE HYDRAULIC CNT'D	
21	– RESERVED	ON-MACHINE HYDRAULIC
22	CLUTCH PANEL WIRING	
23	CLUTCH WIRING	
24	ECM WIRING	
25	– RESERVED	ECM WIRING
26	– SPARE	
27	– SPARE	
28	– SPARE	
29	– SPARE	

REV#	ECO#	DESCRIPTION	ENGINEER	DATE
–		INITIAL RELEASE	LARS BOLDUC	07/15/2020
A	21-0486	ELEC CLUTCH CLR REPLACED WITH HYDR, REMOVED ASSOC. PARTS, MOVED PTs AROUND ON PAGE, MOVED PRIMER SW PAGE	LARS BOLDUC	01/05/2021



NOTE (A):
MANY AVAILABLE MACHINE OPTIONS AND CONFIGURATIONS ARE REPRESENTED HEREIN THIS PACKAGE. ACTUAL MACHINE MAY VARY.

TEREX
Environmental Equipment

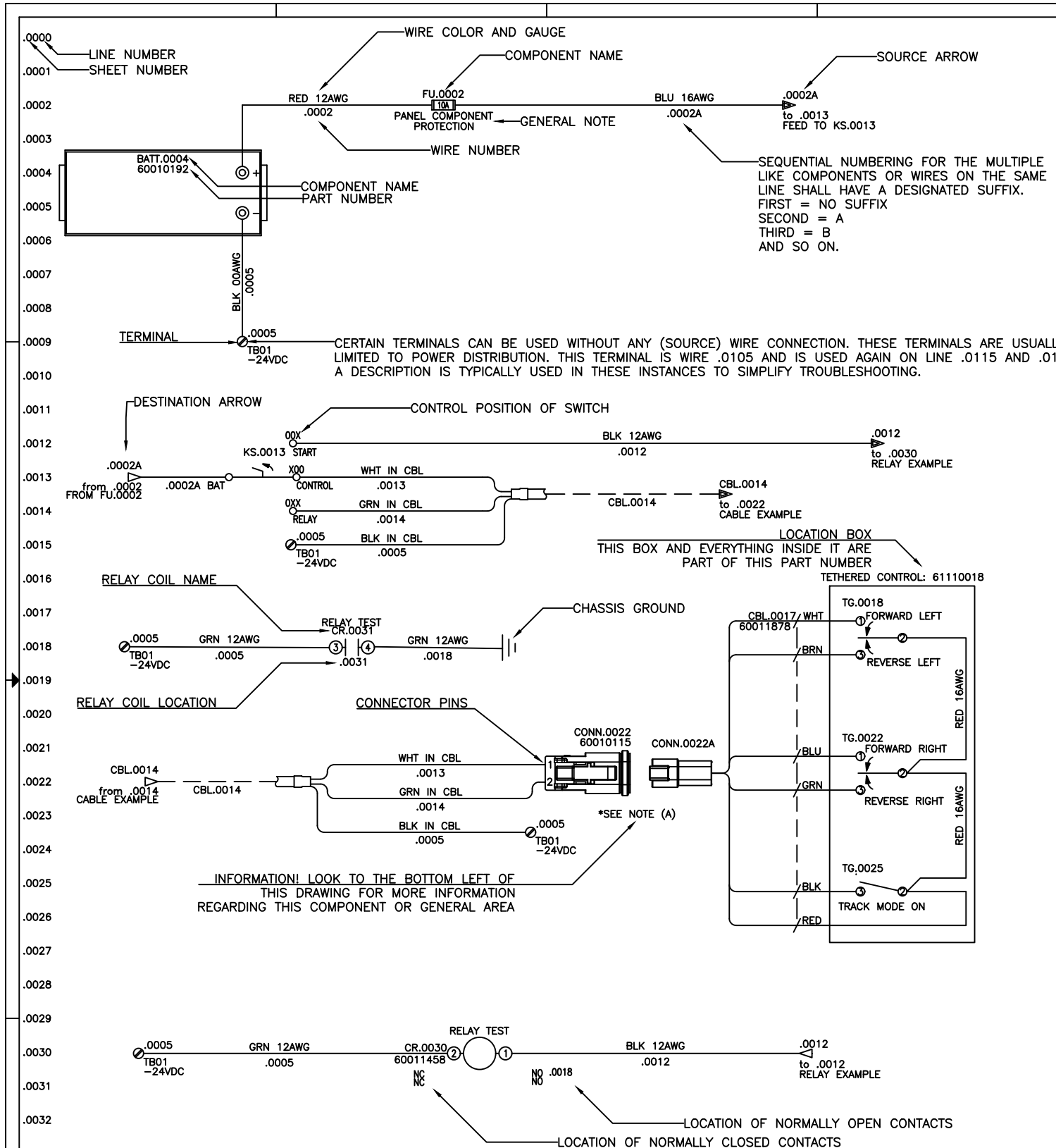
DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
OVERVIEW

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	00	29



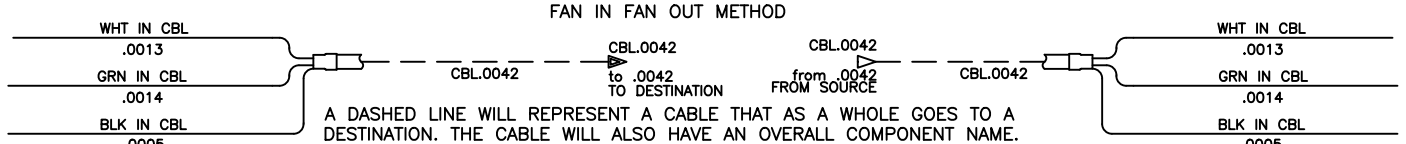
NOTE (A):
THIS DRAWING IS FOR GENERAL INFORMATIONAL PURPOSES REGARDING THIS DRAWING PACKAGE ONLY. DO NOT WIRE TO, OR USE, FOR ANY WIRING INFORMATION AND TROUBLESHOOTING. DOING SO MAY CAUSE INJURY OR DEATH.
NOTE (B):
THROUGHOUT THIS DRAWING PACKAGE, 0115A MAY BE CALLED OUT. EITHER LAND THIS ON A 0115A TERMINAL OR A 'GND' TERMINAL.

SOURCE AND DESTINATION ARROWS

SOURCE AND DESTINATION ARROWS ARE USED TO SEND WIRES TO DIFFERENT LOCATIONS WITHIN A DRAWING PACKAGE. THE WIRE#, COLOR, AND GAUGE WILL ALWAYS BE THE SAME ON BOTH ENDS. THE INFORMATION IS NOT ALWAYS SHOWN AT THE DESTINATION, IN THIS CASE THE INFORMATION IS IMPLIED. ARROWS CAN FACE IN ANY DIRECTION. GENERAL NOTES ARE NOT REQUIRED.

CABLES

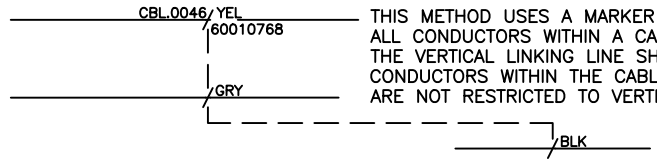
FAN IN FAN OUT METHOD



EACH WIRE WILL HAVE ITS OWN NUMBER AND COLOR WHICH WILL CARRY THROUGH TO THE DESTINATION

A DASHED LINE WILL REPRESENT A CABLE THAT AS A WHOLE GOES TO A DESTINATION. THE CABLE WILL ALSO HAVE AN OVERALL COMPONENT NAME. (CBL = CABLE)(.01 = SHEET #)(42 = LINE NUMBER)

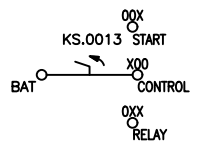
CABLE MARKER METHOD



THIS METHOD USES A MARKER (/) TO SHOW ALL CONDUCTORS WITHIN A CABLE ASSEMBLY. THE VERTICAL LINKING LINE SHOWS ALL CONDUCTORS WITHIN THE CABLE. LINK LINES ARE NOT RESTRICTED TO VERTICAL RUNS.

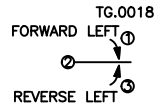
SWITCHES

KEY SWITCH



IN THIS EXAMPLE THIS IS A 3 POSITION SWITCH. EACH OF THE CONTROL POSITIONS ARE REPRESENTED WITH AN X OR 0. X = ACTIVE, 0 = NOT ACTIVE
00X = IN THIS POSITION "BAT" TO "START" HAS LITTLE TO NO RESISTANCE, BUT THE OTHER 2 POSITIONS ARE OPEN, OR HAVE INFINITE RESISTANCE
X00 = IN THIS POSITION "BAT" TO "CONTROL" HAS LITTLE TO NO RESISTANCE, BUT THE OTHER 2 POSITIONS ARE OPEN, OR HAVE INFINITE RESISTANCE
0XX = IN THIS POSITION "BAT" TO "START" AND "RELAY" HAVE LITTLE TO NO RESISTANCE, BUT THE CONTROL POSITION IS OPEN, OR HAS INFINITE RESISTANCE
THE ARROW REPRESENTS SPRING RETURN TO CENTER IN THE RIGHT POSITION.

TOGGLE SWITCH



IN THIS EXAMPLE, THIS SWITCH HAS INFINITE RESISTANCE IN ITS NORMAL RESTING POSITION. THE DOUBLE ARROWS SHOW THAT IT IS SPRING RETURN TO CENTER IN BOTH DIRECTIONS SO THIS SWITCH WILL REQUIRE A USER TO HOLD TO ACTIVATE. THIS SWITCH IS EITHER INFINITE ON ALL TERMINALS, OR LITTLE TO NO RESISTANCE BETWEEK 2+1 OR 2+3, BUT NOT 2+1+3.

TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
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UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
SCHEMATIC READING GUIDE

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	.00	29

COMPONENT NAME ABBREVIATION DEFINITIONS

Prefix	Component
AH	ALARM HORN
ANT	ANTENNA
ALT	ALTERNATOR
BATT	BATTERY
CB	CIRCUIT BREAKER
CBL	CABLE
CONN	CONNECTOR
CR	CONTROL RELAY
CYL	CYLINDER
D	DIODE
DCU	DIGITAL CONTROL UNIT

DCS	DISCONNECT SWITCH
ECM	ENGINE CONTROL MODULE
FAN	FAN
FLT	FLOAT SWITCH
FLTR	FILTER
FU	FUSE
GAU	GAUGE
HRNS	HARNESS
ID	IDENTIFICATION TAG
KS	KEY SWITCH
KY	KEY
LB	LABEL

LS	LEVEL SWITCH
LT	LIGHT
MAN	MANIFOLD
MD4	PARKER MD4 CONTROL UNIT
MDS	METAL DETECTION SENSOR
MOT	MOTOR
PB	PUSHBUTTON
PT	PRESSURE TRANSDUCER
R	RESISTOR
RT	RECEIVER TRANSMITTER
RTD	RESISTANCE TEMP. DETECTOR
SC	SIGNAL CONDITIONER

SNSR	SENSOR
SOL	SOLENOID
SS	SELECTOR SWITCH
STRTR	STARTER
TG	TOGGLE SWITCH
VLV	VALVE
XA2	PARKER IO MODULE

GENERAL NOTE ABBREVIATION DEFINITIONS

Abbreviated	Full Meaning
ACCEL	ACCELEROMETER
BFR	BOTTOM FEED ROLL
CAN	CAN BUS
CHK	CHECK
CLR	COOLER
CNT'D	CONTINUED
CYL(S)	CYLINDER(S)
DC	DISCHARGE CONVEYOR
DS	DRIVE SIDE OF MACHINE
E-STOP	EMERGENCY STOP
ECM	ENGINE CONTROL MODULE
FC	FEED CONVEYOR
FWD	FORWARD

GND	GROUND
HB	HOG BOX
HRNS	HARNESS ASSEMBLY
HYDR	HYDRAULIC
KS	KEY SWITCH
LH	LEFT-HAND
MCR	MASTER CONTROL RELAY
MDS	CBI METAL DETECTION SYSTEM
MOT	MOTOR
NC	NORMALLY CLOSED
NDS	NON-DRIVE SIDE OF MACHINE
NO	NORMALLY OPEN
PB	PUSHBUTTON
POS	POSITION

PROP	PROPORTIONAL
PRESS	PRESSURE
PWR	POWER
REV	REVERSE
RH	RIGHT-HAND
SAT	SATELLITE (SEPARATE ENCLOSURE)
SERV	SERVICE
SW	SWITCH
SW'D	SWITCHED
TEMP	TEMPERATURE
TFR	TOP FEED ROLL
VLV	VALVE

TEREX
Environmental Equipment

CBI

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TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

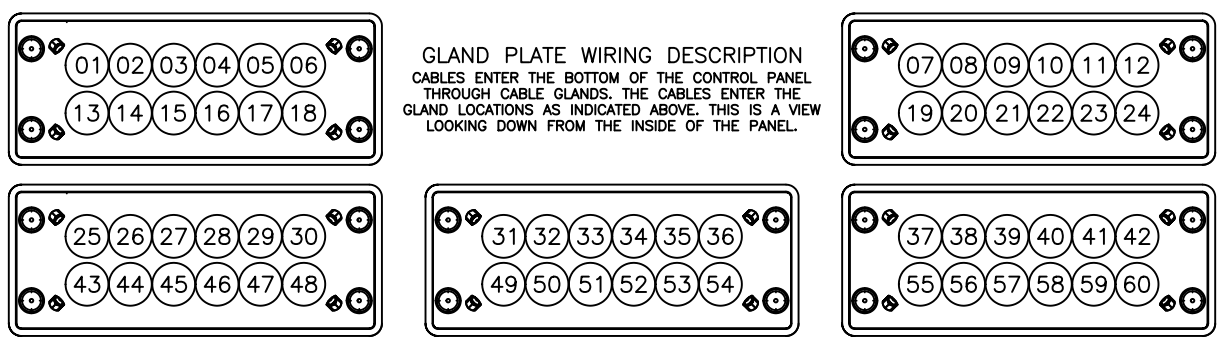
TITLE:
6400CT HETRONIC SCHEMATICS
SCHEMATIC READING GUIDE CONT'D

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	.01	29

Hole #	Cable #	Description	Wiring Notes
01	CBL1523	TELEMATICS – DOUT	FUTURE
02	CBL1523	TELEMATICS – DIN	FUTURE
03	CBL1523	TELEMATICS – COM	RED:TB07:0716 BLK:TB07:0714 SHLD:TB01:0115A OTHERS:SPARE
04	CBL1523	TELEMATICS – PWR	RED:TB01:0302 GRN:TB08:0402 BLK:TB01:0103A OTHERS:SPARE
05	CBL1762	BFR SPEED SENSOR	WHT:TB10:0402 GRN:TB10:1021 BLK:TB10:0115A
06	CBL0866	BFR REV	WHT:TB08:0867 BLK:TB08:0866 GRN:SPARE
07	CBL1036	DC FOLD CYLS	WHT:TB10:1036 RED:TB10:1037 GRN:TB10:0115A BLK:TB10:0115A
08	CBL1509 CBL1515	FUEL GAUGE (CAPACITIVE SENDER) FUEL GAUGE (RESISTIVE SENDER)	WHT:TB01:0302 GRN:TB09:0915 BLK:TB09:0115A RED:TB09:0402 WHT:TB01:R1515:0302 GRN:TB01:1630 BLK:TB01:0103A RED:SPARE
09	CBL1623 CBL1629	FUEL LEVEL SIGNAL (CAPACITIVE SENDER) FUEL LEVEL SIGNAL (RESISTIVE SENDER)	WHT:TB01:0302 GRN:TB09:0915 BLK:TB09:0115A WHT:TB01:1630 BLK:TB01:0103A GRN:SPARE
10	–	–	–
11	–	–	–
12	*	REGRIND DOOR*	WHT:TB09:0949* RED:TB09:0953* GRN:TB09:0115A* BLK:TB09:0115A*
13	CBL0213	SAT CLUTCH BRAKE RELEASE SW	WHT:TB01:0302 GRN:TB04:0216 BLK:TB01:0103A
14	CBL0221	CLUTCH BRAKE RELEASE PWR	WHT:TB01:0302 BLK:TB04:0216 GRN:SPARE
15	–	–	–
16	–	–	–
17	CBL1636	BFR FWD PRESS	WHT:TB08:0402 GRN:TB08:0823 BLK:SPARE
18	CBL0865	BFR FWD	WHT:TB08:0868 BLK:TB08:0866 GRN:SPARE
19	–	–	–
20	CBL1731	HB PIN PROXIMITY SENSOR	WHT:TB10:0402 GRN:TB10:1056 BLK:TB10:0115A
21	CBL1641	DC PRESS	WHT:TB10:0402 GRN:TB10:1025 BLK:SPARE
22	CBL1046	DC FWD	WHT:TB10:1046 BLK:TB10:1048 GRN:SPARE
23	CBL1042	HB LIFT CYLS	WHT:TB10:1042 RED:TB10:1043 GRN:TB10:0115A BLK:TB10:0115A
24	CBL1039	HB LOCK PIN	WHT:TB10:1040 RED:TB10:1039 GRN:TB10:0115A BLK:TB10:0115A
25	CBL0112	24V START	WHT:FU0302 GRN:CR0745:4 BLK:TB01:0115A
26	CBL0454	PWR CLUTCH	WHT:TB04:0402 GRN:CR0446:34 BLK:TB01:0115A
27	CBL0553	MDS ACCEL	RED:SC0552:13 BLK:SC0552:14 SHLD:SC0552:15
28	CBL0133	ISOLATED GND	RED:TB01:0103A BLK:TB01:0103A
29	CBL0436	SAT E–STOP	BLK:TB04:0436 WHT:TB04:0438 GRN:SPARE
30	CBL0536	HYDR TANK RTD	WHT:SC0537:1 BLK:SC0537:4 GRN:SPARE

Hole #	Cable #	Description	Wiring Notes
31	CBL1601	TFR LIFT DS CYL POS SENSOR	WHT:TB08:0402 GRN:TB08:0817 BLK:TB08:0115A
32	CBL1609	TFR LIFT NDS CYL POS SENSOR	WHT:TB08:0402 GRN:TB08:0819 BLK:TB08:0115A
33	CBL0836	TFR LIFT CYL RETRACT	WHT:TB08:0836 BLK:TB08:0115A GRN:SPARE
34	CBL0837	TFR LIFT CYL EXTEND	WHT:TB08:0837 BLK:TB08:0115A GRN:SPARE
35	CBL0854	FC RH TRACK REV	WHT:TB08:0855 BLK:TB08:0854 GRN:SPARE
36	CBL0853	FC RH TRACK FWD	WHT:TB08:0856 BLK:TB08:0854 GRN:SPARE
37	CBL0862	FLEXXAIRE FAN REV	WHT:TB08:0863 BLK:TB08:0862 GRN:SPARE
38	CBL0861	FLEXXAIRE FAN FWD	WHT:TB08:0864 BLK:TB08:0862 GRN:SPARE
39	CBL1646	TRACK BRAKE PRESS	WHT:TB04:0402 GRN:TB09:0913 BLK:SPARE
40	CBL1750	TFR SPEED SENSOR	WHT:TB09:0402 GRN:TB09:0921 BLK:TB09:0115A
41	CBL0936	TRACK BRAKE	WHT:TB09:0936 BLK:TB09:0115A GRN:SPARE
42	CBL1504	DS SMART ALARM	WHT:TB09:0939 BLK:TB09:0115A GRN:SPARE
43	CBL2404	KEYSWITCH & SHUTDOWN	GRN:CR0446:62 BLK:TB03:0336 WHT:SPARE
44	CBL0717	J1939 CLUTCH	RED:TB07:0716 BLK:TB07:0714 SHLD:TB01:0115A
45	CBL0714	J1939 ECM	RED:TB07:0716 BLK:TB07:0714 SHLD:TB01:0115A
46	CBL0541	NDS BEARING RTD	WHT:SC0542:1 BLK:SC0542:4 GRN:SPARE
47	CBL0546	DS BEARING RTD	WHT:SC0547:1 BLK:SC0547:4 GRN:SPARE
48	CBL1656	TFR FWD PRESS	WHT:TB08:0402 GRN:TB08:0813 BLK:SPARE
49	CBL1651	FC FWD PRESS	WHT:TB08:0402 GRN:TB08:0815 BLK:SPARE
50	CBL1616	LIQUID LEVEL SENSOR	WHT:TB08:0402 BLK:TB08:0821 GRN:SPARE
51	CBL0839	TFR SERV ROLL CHK VLV	WHT:TB08:0839 BLK:TB08:0115A GRN:SPARE
52	CBL0846	TFR PROP RELIEF VLV	WHT:TB08:0848 BLK:TB08:0846 GRN:SPARE
53	CBL0850	TFR LH TRACK REV	WHT:TB08:0851 BLK:TB08:0850 GRN:SPARE
54	CBL0849	TFR LH TRACK FWD	WHT:TB08:0852 BLK:TB08:0850 GRN:SPARE
55	CBL0857	HYDR CLR MOT	WHT:TB08:0858 RED:TB08:0858 GRN:TB08:0859 BLK:TB08:0860
56	CBL1758	FC SPEED SENSOR	WHT:TB09:0402 GRN:TB09:0925 BLK:TB09:0115A
57	CBL0937	TRACK 2 SPEED	WHT:TB09:0937 BLK:TB09:0115A GRN:SPARE
58	CBL0940	TRACK ENABLE	WHT:TB09:0940 BLK:TB09:0115A GRN:SPARE
59	CBL1501	NDS SMART ALARM	WHT:TB09:0939 BLK:TB09:0115A GRN:SPARE
60	CBL1013	HB CONTROL BOX	RED:TB10:0402 ORG:TB10:1013 ORG/BLK:TB10:1015 GRN:TB10:1017 YEL:TB10:1019 YEL/BLK:TB10:1023 OTHERS:SPARE



GLAND PLATE WIRING DESCRIPTION

CABLES ENTER THE BOTTOM OF THE CONTROL PANEL THROUGH CABLE GLANDS. THE CABLES ENTER THE GLAND LOCATIONS AS INDICATED ABOVE. THIS IS A VIEW LOOKING DOWN FROM THE INSIDE OF THE PANEL.

NOTE (A):
* MEANS THAT THIS IS OPTIONAL EQUIPMENT

TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
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APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

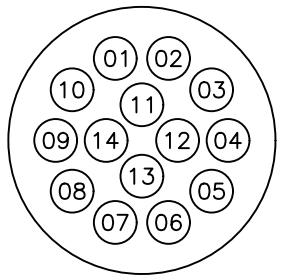
TITLE:
6400CT HETRONIC SCHEMATICS
WIRING LIST
PANEL

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	.02	29

Hole #	Cable #	Description	Wiring Notes
01	–	–	–
02	–	–	–
03	–	–	–
04	CBL2237	SPEED SENSOR (OUTPUT)	RED:2237 BLK:2239 SHLD:2239
05	CBL2247	PRESS SENSOR	BLK:2247 RED:2249 WHT:2251 GRN:SPARE
06	CBL0717	J1939	RED:2255 BLK:2253 SHLD:SPARE
07	CBL2210	TEMP SW.	WHT:0402 BLK:2210 GRN:SPARE
08	CBL2208	ON/OFF COIL	WHT:2208 BLK:0115A GRN:SPARE
09	CBL0454	PWR FROM PANEL	WHT:0402 GRN:2216 BLK:0115A
10	–	–	–
11	–	–	–
12	CBL2222	SPEED SENSOR (INPUT)	RED:2222 BLK:2224 SHLD:2224
13	CBL2212	FILTER SW.	–
14	CBL2206	PWM COIL	–

THE ROUND GLAND IS ROTATED IN RELATION TO THIS LINE. THIS LINE IS THE BACK OF THE PANEL WHERE THE CLUTCH CONTROLLER IS.



GLAND PLATE WIRING DESCRIPTION

CABLES ENTER THE BOTTOM OF THE CLUTCH PANEL THROUGH CABLE GLANDS. THE CABLES ENTER THE GLAND LOCATIONS AS INDICATED ABOVE. THIS IS A VIEW LOOKING DOWN FROM THE INSIDE OF THE PANEL.

TEREX
Environmental Equipment

CBI

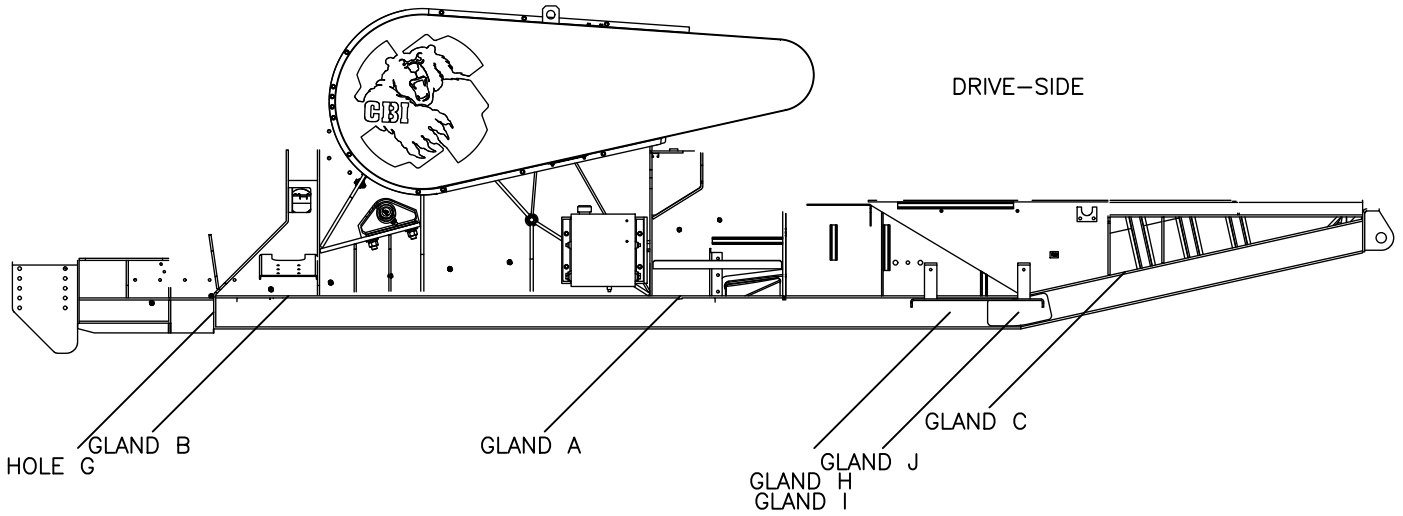
DRAWN BY	LARS BOLDUC 01/05/21	
CHECKED BY	-- --	
APPROVED BY	-- --	

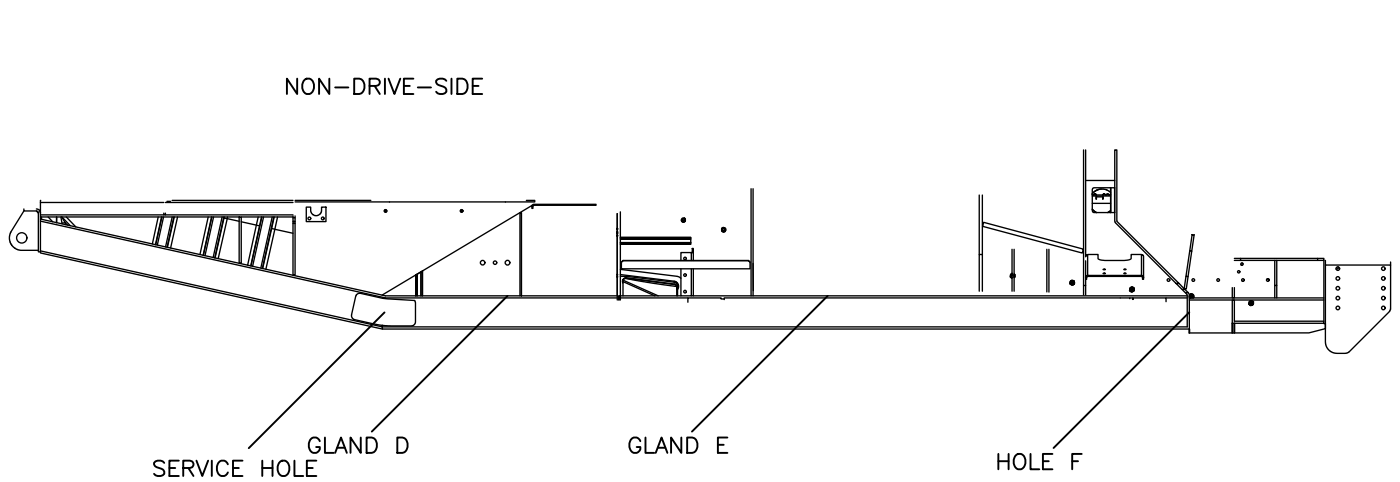
UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
WIRING LIST
CLUTCH PANEL

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET .03 OF 29





TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
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APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
WIRING LIST
FRAME GLAND IDENTIFICATION

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET .04 OF 29

Hole #	Cable #	Description
H–01	CBL0133	ISOLATED GND
H–02	CBL0436	SAT E–STOP
H–03	CBL0553	MDS ACCEL
H–04	CBL1756	BFR SPEED SENSOR
H–05	CBL1517	FUEL GAUGE
H–06	CBL0213	SAT CLUTCH BRAKE RELEASE SW
H–07	CBL0541	NDS BEARING RTD
H–08	CBL0546	DS BEARING RTD
H–09	CBL1636	TFR FWD PRESS
H–10	CBL1639	FC FWD PRESS
H–11	CBL1648	BFR FWD PRESS
H–12	CBL0842	CLUTCH CLR
I–01	CBL1601	TFR LIFT DS CYL POS SENSOR
I–02	CBL1609	TFR LIFT NDS CYL POS SENSOR
I–03	CBL0836	TFR LIFT CYL RETRACT
I–04	CBL0837	TFR LIFT CYL EXTEND
I–05	CBL0839	TFR SERV ROLL CHK VLV
I–06	–	–
I–07	CBL0846	TFR PROP RELIEF VLV
I–08	CBL0857	HYDR CLR MOT
I–09	CBL1744	TFR SPEED SENSOR
I–10	–	–
I–11	CBL0940	TRACK ENABLE
I–12	–	–

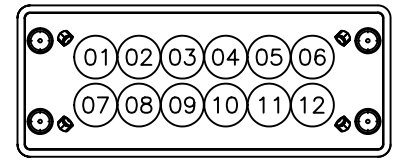
Hole #	Cable #	Description
J–01	CBL1036	DC FOLD CYLS
J–02	CBL1752	FC SPEED SENSOR
J–03	CBL0937	TRACK 2 SPEED
J–04	CBL1642	TRACK BRAKE PRESS
J–05	CBL1501	NDS SMART ALARM
J–06	CBL1039	HB LOCK PIN
J–07	CBL0936	TRACK BRAKE
J–08	CBL1731	HB PIN PROXIMITY SENSOR
J–09	CBL1645	DC PRESS
J–10	CBL1046	DC FWD
J–11	CBL1042	HB LIFT CYLS
J–12	CBL1013	HB CONTROL BOX

Hole #	Cable #	Description
A–01	CBL0940	TRACK ENABLE
A–02	–	–
A–03	CBL0862	FLEXXAIRE FAN REV
A–04	–	–
A–05	CBL1036	DC FOLD CYLS EXTEND/RETRACT
A–06	CBL1042	HB LIFT CYLS EXTEND/RETRACT
A–07	CBL0936	TRACK BRAKE
A–08	CBL0937	TRACK 2 SPEED
A–09	CBL0861	FLEXXAIRE FAN FWD
A–10	CBL1046	DC FWD
A–11	CBL0857	HYDR CLR MOT PUSH/PULL
A–12	CBL1039	HB LOCK PIN EXTEND/RETRACT

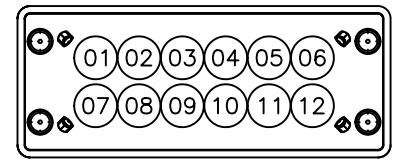
Hole #	Cable #	Description
B–01	CBL1744	TFR SPEED SENSOR
B–02	CBL1601	TFR LIFT DS CYL POS SENSOR
B–03	CBL1609	TFR LIFT NDS CYL POS SENSOR
B–04	CBL0213	SAT CLUTCH BRAKE RELEASE SW
B–05	CBL0836	TFR LIFT CYL RETRACT
B–06	CBL0546	DS BEARING RTD
B–07	–	–
B–08	–	–
B–09	CBL1752	FC SPEED SENSOR
B–10	CBL0846	TFR PROP RELIEF VLV
B–11	CBL0837	TFR LIFT CYL EXTEND
B–12	CBL0839	TFR SERV ROLL CHK VLV

Hole #	Cable #	Description
C–01	CBL1504	DS SMART ALARM
C–02	CBL1629	FUEL SENDING UNIT
C–03	–	–
C–04	–	–
C–05	–	–
C–06	–	–
C–07	–	–
C–08	–	–
C–09	–	–
C–10	–	–
C–11	–	–
C–12	–	–

GLAND A



GLAND B



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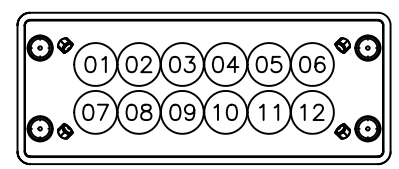
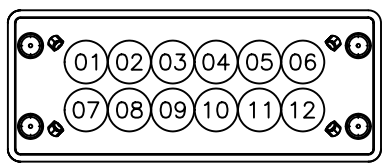
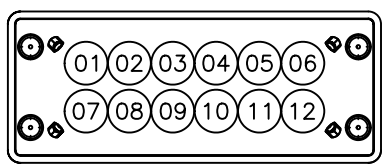


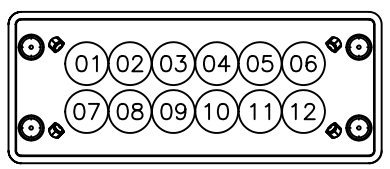
GLAND H



GLAND I



GLAND J



GLAND PLATE WIRING DESCRIPTION

CABLES LEAVE THE FRAME UNDERNEATH THE PANEL THROUGH CABLE GLANDS. THE CABLES EXIT THE GLAND LOCATIONS AS INDICATED ABOVE. THIS IS A VIEW FROM THE EXTERIOR OF THE FRAME.

TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	––	––
APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

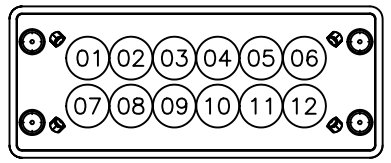
TITLE:
6400CT HETRONIC SCHEMATICS
WIRING LIST
FRAME GLANDS A, B, C, H, I, J

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	.05	29

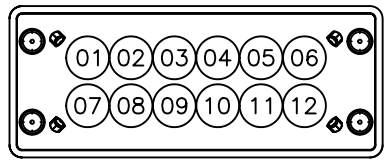
Hole #	Cable #	Description
D–01	–	–
D–02	–	–
D–03	–	–
D–04	CBL0436	SAT E–STOP
D–05	CBL1517	FUEL GAUGE
D–06	CBL0842	CLUTCH CLR
D–07	–	–
D–08	–	–
D–09	–	–
D–10	–	–
D–11	–	–
D–12	CBL0133	ISOLATED GND

GLAND D



Hole #	Cable #	Description
E–01	CBL1501	NDS SMART ALARM
E–02	CBL0553	MDS ACCEL
E–03	–	–
E–04	–	–
E–05	–	–
E–06	CBL0541	NDS BEARING RTD
E–07	–	–
E–08	–	–
E–09	–	–
E–10	–	–
E–11	–	–
E–12	–	–

GLAND E



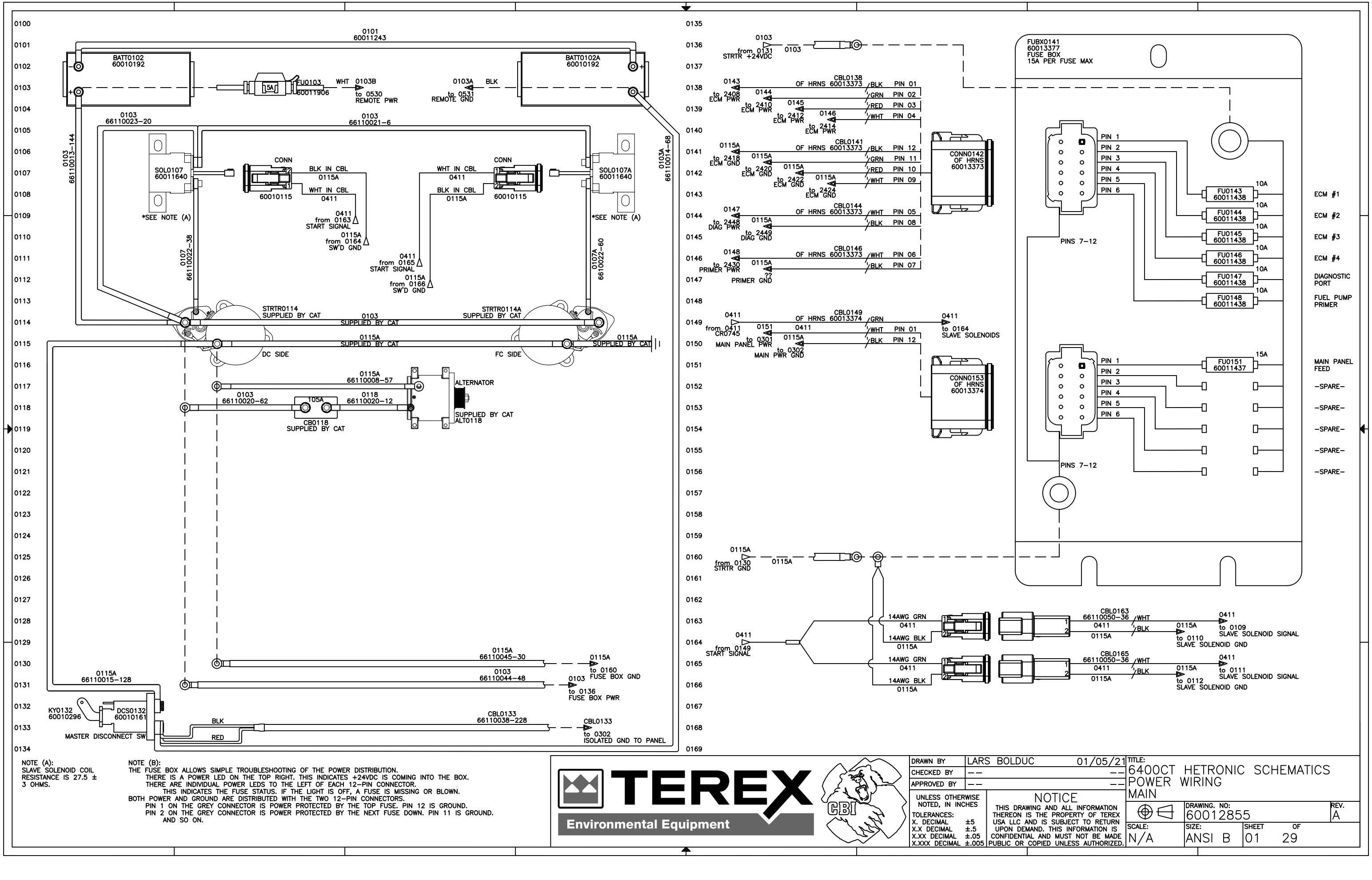
TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	––	––
APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
WIRING LIST
FRAME GLANDS D, E

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET .06 OF 29



NOTE (A):
SLAVE SOLENOID COIL RESISTANCE IS 27.5 ± 3 OHMS.

NOTE (B):
THE FUSE BOX ALLOWS SIMPLE TROUBLESHOOTING OF THE POWER DISTRIBUTION.
THERE IS A POWER LED ON THE TOP RIGHT. THIS INDICATES +24VDC IS COMING INTO THE BOX.
THERE ARE INDIVIDUAL POWER LEDS TO THE LEFT OF EACH 12-PIN CONNECTOR.
THIS INDICATES THE FUSE STATUS. IF THE LIGHT IS OFF, A FUSE IS MISSING OR BLOWN.
BOTH POWER AND GROUND ARE DISTRIBUTED WITH THE TWO 12-PIN CONNECTORS.
PIN 1 ON THE GREY CONNECTOR IS POWER PROTECTED BY THE TOP FUSE. PIN 12 IS GROUND.
PIN 2 ON THE GREY CONNECTOR IS POWER PROTECTED BY THE NEXT FUSE DOWN. PIN 11 IS GROUND.
AND SO ON.

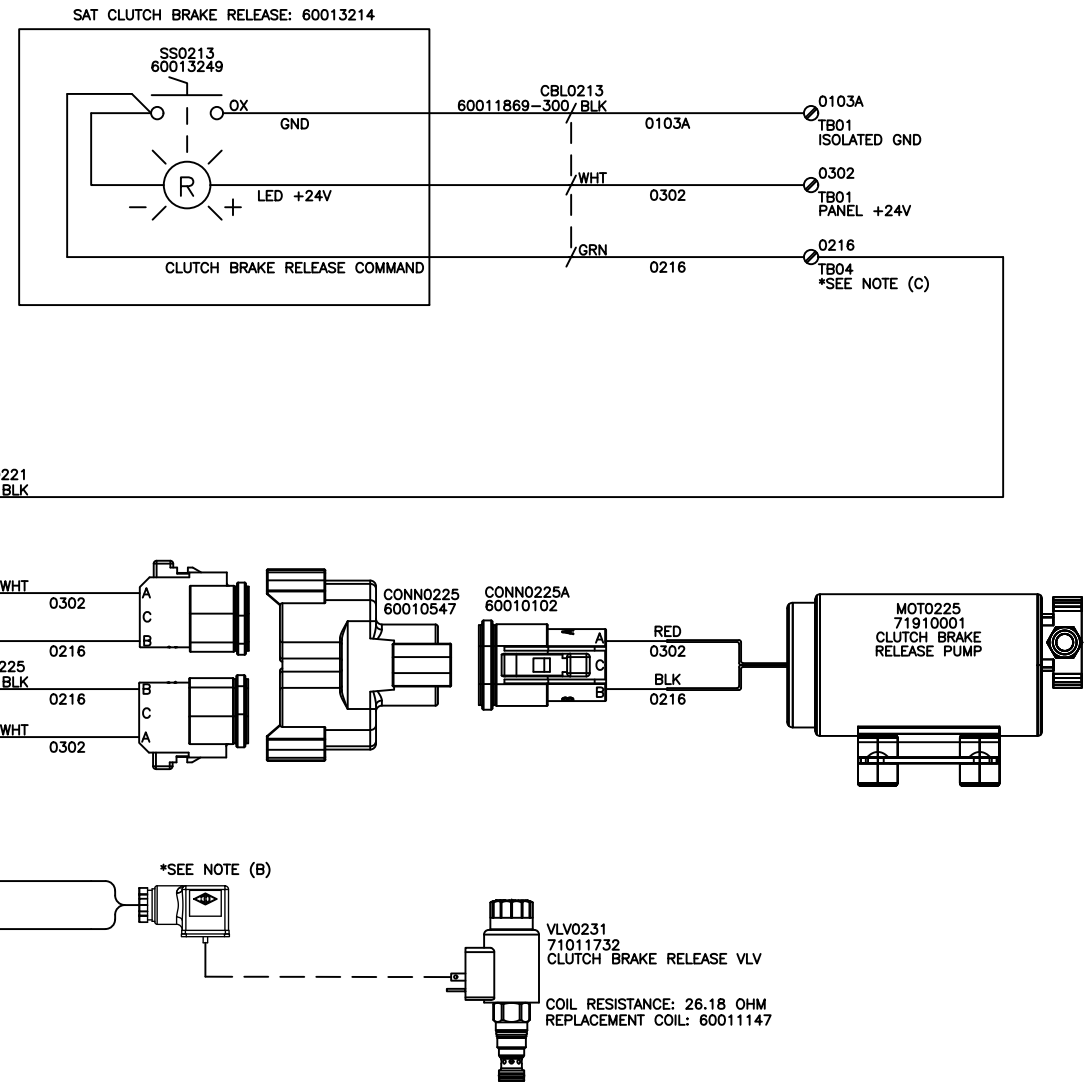
TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

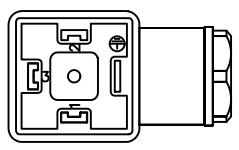
TITLE:
6400CT HETRONIC SCHEMATICS
POWER WIRING
MAIN

DRAWING. NO:	60012855	REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 01 OF 29



NOTE (A):
IF THE RADIATOR IS STILL GOOD, BUT A REPLACEMENT FAN IS NEEDED, SEE: 80013270

NOTE (B):
VIEW FROM BOTTOM OF CONNECTOR



NOTE (C):
MODIFY TERMINAL TB04 WITH EXISTING TERMINAL NUMBERS 0436 & 0438, WITH THE ADDITIONAL 0216 ON THE BASE (CLOSEST TO BACK PANEL) TIER. MARK TERMINAL IDENTIFICATION TAG ACCORDINGLY.

TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±.5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
BATTERY POWERED DEVICES

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	02	29

0151
to 0150
FU0151 PWR

FU0302
15A
60011437

CBL0133
from 0133
ISOLATED GND

0115A
TB01
SW'D GND

0115A
0115A

0115A
to 0150
SW'D GND

BLU 14AWG
0302

CBL0133

0302
TB01

0103A
TB01
ISOLATED GND

0302
TB01

R0310
60011167
120-OHMS

0310
TB01

BLK IN CBL
0310

0310
to 0956
TO TETHERED REMOTE

*SEE NOTE (A)
KS0312
60010462

00X
START

BLU 14AWG
0311

0311
to 0749
MD40700 C2:7

0302
TB01
DELAY PWR OFF

BLU 14AWG
0302

BAT

X00
CONTROL

BLU 16AWG
0312

0312
to 0747
MD40700 C2:6

BLU 14AWG
CR0743
3
4
0743

0XX
RELAY

BLU 14AWG

BLU 14AWG
0313

0313
TB01
RELAY +24V

BLU 14AWG

FU0315
10A
PANEL PROTECTION
60011438

BLU 16AWG
0315

0315
TB02

RED 16AWG
0315

0315
to 0704
+24V TO MD40700

0315
TB02

RED 14AWG
0315

0315
to 0802
+24V FOR XA20801

0315
TB02

RED 14AWG
0315

0315
to 0902
+24V TO XA20901

0315
TB02

RED 14AWG
0315

0315
to 1002
+24V FOR XA21001

0315
TB02

BLU 16AWG
0315

0315
to 0538
+24V TO TEMP SW

0315
TB02

BLU 16AWG
0315

0315
to 0743
+24V FOR ENGINE RELAY

0315
TB02

0315
TB02

BLU 16AWG
0315

0315
to 0552
+24V FOR MDS

0315
TB02

WHT IN CBL
0315

0315
to 0515
+24V FOR RADIO

0315
TB02

0315
TB02

BLU 16AWG
0315

0315
to 0457
+24V TO SAFETY RELAY

BLU 14AWG
0313

0313
to 0335

0313
from 0333

0313
TB01
RELAY +24V

FU0336
10A
AUXILLARY PROTECTION
60011438

0336
TB03

BLK IN CBL
0336

0336
to 2406
TO ECM, PIN 70

BLU 14AWG
0313

0313
to 0400

NOTE (A):
REPLACEMENT KEYS:
60010294

TEREX
Environmental Equipment

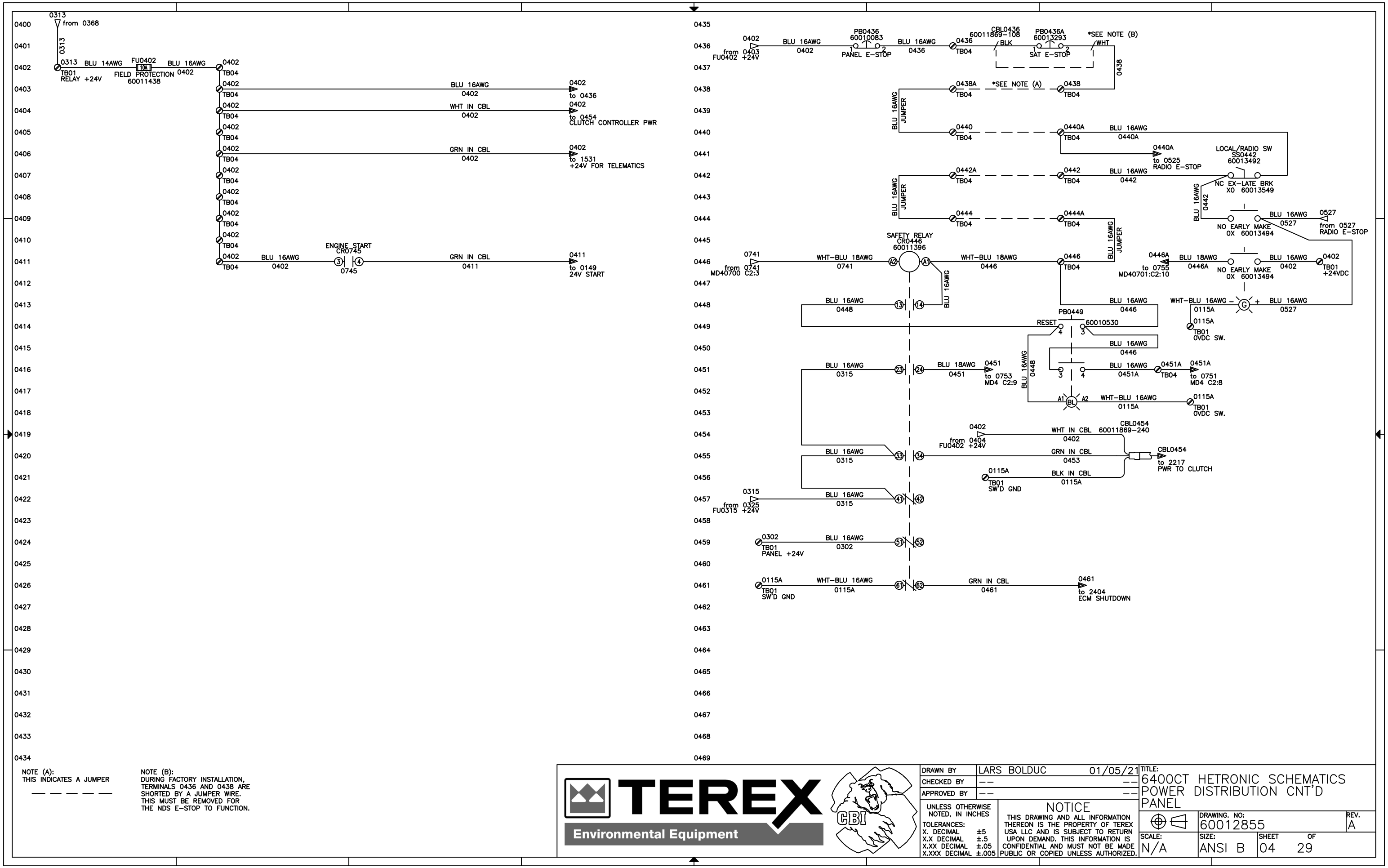
CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
POWER DISTRIBUTION PANEL

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 03 OF 29



NOTE (A):
THIS INDICATES A JUMPER
— — — — —

NOTE (B):
DURING FACTORY INSTALLATION, TERMINALS 0436 AND 0438 ARE SHORTED BY A JUMPER WIRE. THIS MUST BE REMOVED FOR THE NDS E-STOP TO FUNCTION.

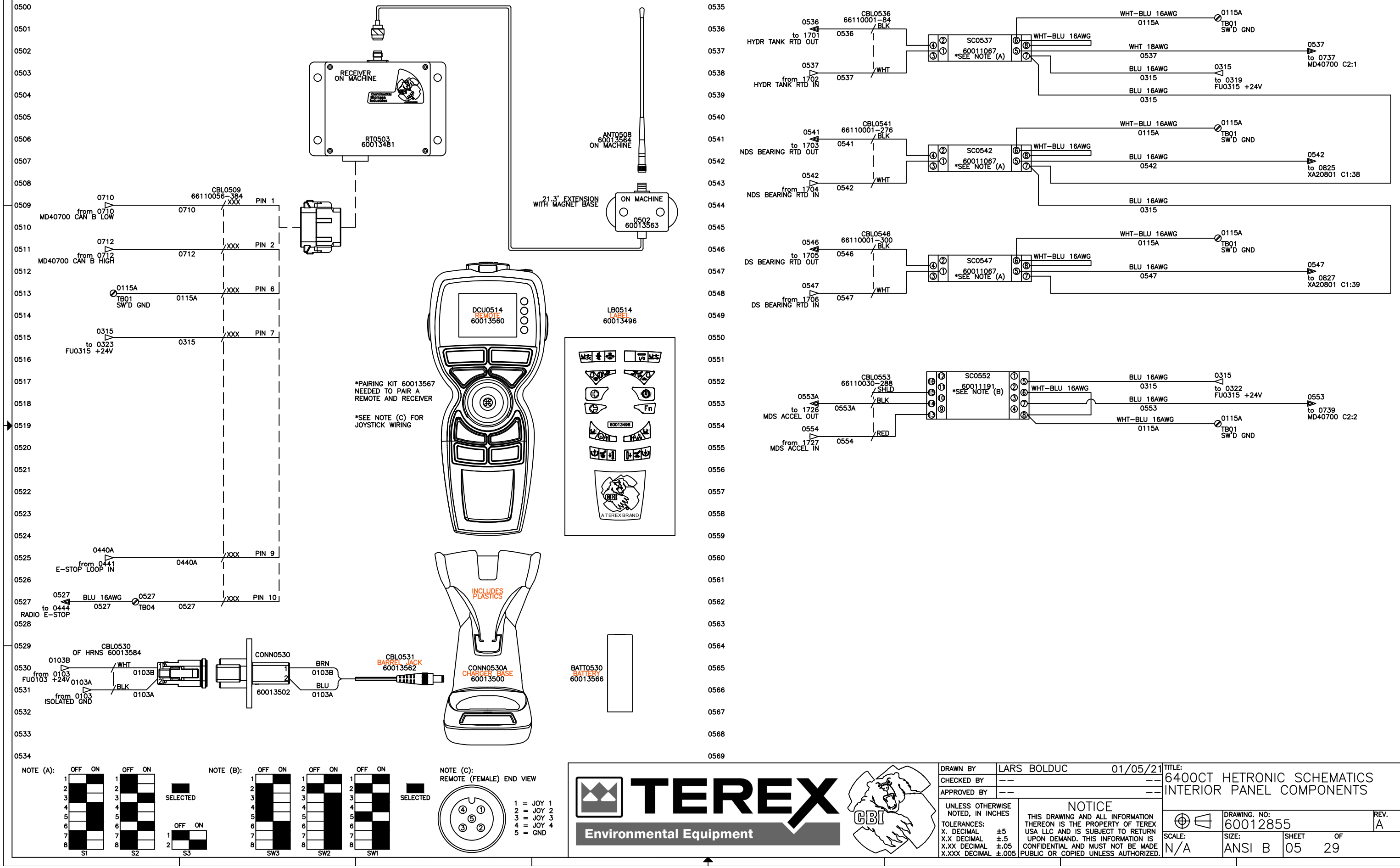
TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±.5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
POWER DISTRIBUTION CNT'D
PANEL

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 04 OF 29



TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

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TITLE:
6400CT HETRONIC SCHEMATICS
INTERIOR PANEL COMPONENTS

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 05 OF 29

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TEREX
Environmental Equipment

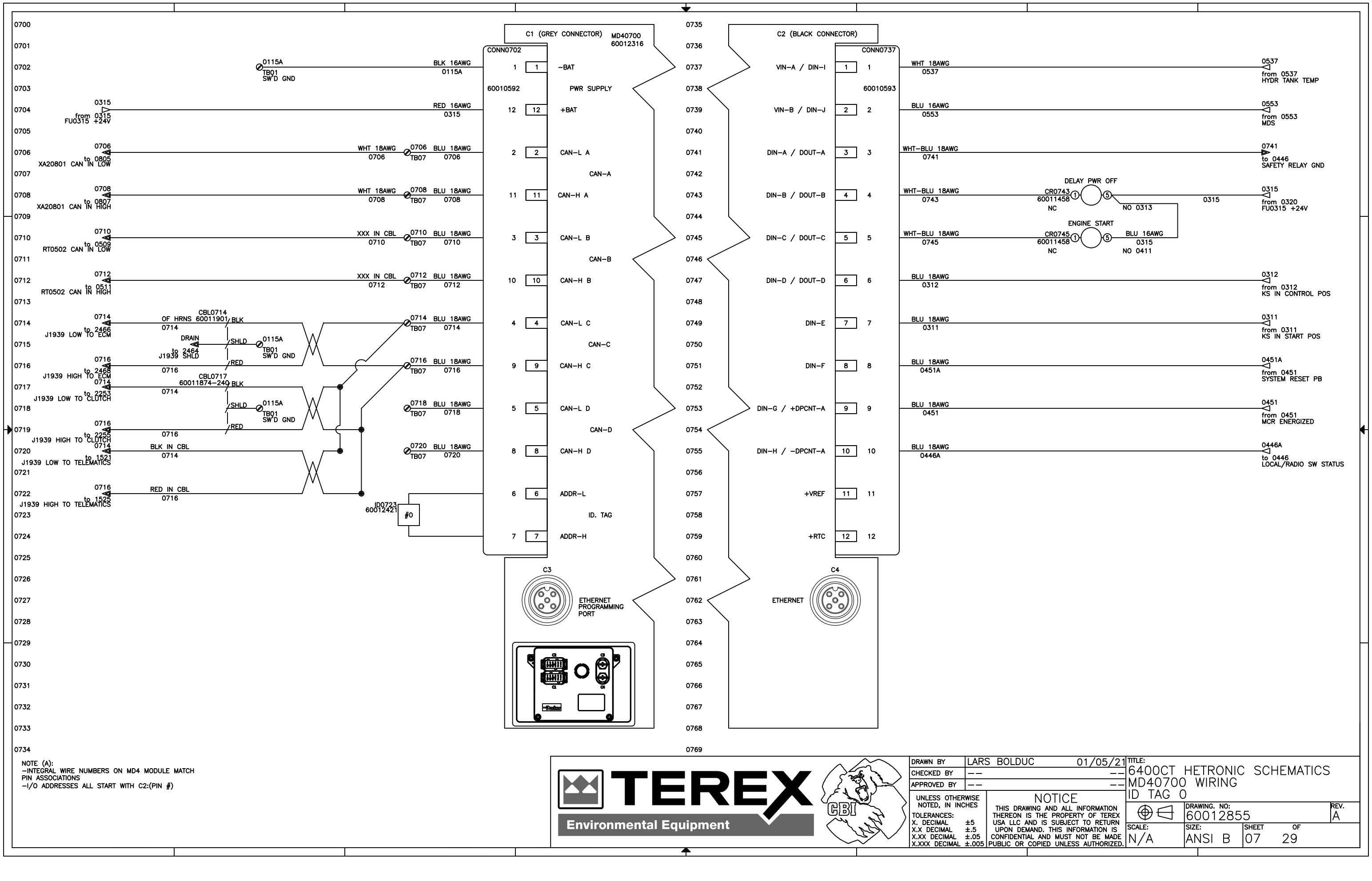
CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS – SPARE

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 06 OF 29


C1 (GREY CONNECTOR) MD40700 60012316
CONN0702
C2 (BLACK CONNECTOR)
CONN0737
0115A TB01 SW'D GND
BLK 16AWG 0115A
RED 16AWG 0315
from 0315 FU0315 +24V
0706 XA20801 CAN IN LOW to 0805
WHT 18AWG 0706
BLU 18AWG 0706 TB07
0708 XA20801 CAN IN HIGH to 0807
WHT 18AWG 0708
BLU 18AWG 0708 TB07
0710 RT0502 CAN IN LOW to 0509
XXX IN CBL 0710
BLU 18AWG 0710 TB07
0712 RT0502 CAN IN HIGH to 0511
XXX IN CBL 0712
BLU 18AWG 0712 TB07
CBL0714 OF HRNS 60011901
0714 J1939 LOW TO ECM to 2466
BLK 0714
DRAIN J1939 SHLD to 2464
SHLD 0115A TB01 SW'D GND
0716 J1939 HIGH TO ECM to 2468
RED 0716
CBL0717 60011874-240
0714 J1939 LOW TO CLUTCH to 2253
0716 J1939 HIGH TO CLUTCH to 2255
0714 J1939 LOW TO TELEMATICS to 1521
BLK IN CBL 0714
0716 J1939 HIGH TO TELEMATICS to 1525
RED IN CBL 0716
0714 TB07 BLU 18AWG 0714
0716 TB07 BLU 18AWG 0716
0718 TB07 BLU 18AWG 0718
0720 TB07 BLU 18AWG 0720
ID0723 60012421 #0
60010592 PWR SUPPLY
1 1 –BAT
12 12 +BAT
2 2 CAN–L A
CAN–A
11 11 CAN–H A
3 3 CAN–L B
CAN–B
10 10 CAN–H B
4 4 CAN–L C
CAN–C
9 9 CAN–H C
5 5 CAN–L D
CAN–D
8 8 CAN–H D
6 6 ADDR–L
ID. TAG
7 7 ADDR–H
60010593
VIN–A / DIN–I 1 1
VIN–B / DIN–J 2 2
DIN–A / DOUT–A 3 3
DIN–B / DOUT–B 4 4
DIN–C / DOUT–C 5 5
DIN–D / DOUT–D 6 6
DIN–E 7 7
DIN–F 8 8
DIN–G / +DPCNT–A 9 9
DIN–H / –DPCNT–A 10 10
+VREF 11 11
+RTC 12 12
WHT 18AWG 0537 0537 from 0537 HYDR TANK TEMP
BLU 16AWG 0553 0553 from 0553 MDS
WHT–BLU 18AWG 0741 0741 to 0446 SAFETY RELAY GND
DELAY PWR OFF
WHT–BLU 18AWG 0743 CR0743 60011458 NC 1 5 NO 0313 0315 0315 from 0320 FU0315 +24V
ENGINE START
WHT–BLU 18AWG 0745 CR0745 60011458 NC 1 5 BLU 16AWG 0315 NO 0411
BLU 18AWG 0312 0312 from 0312 KS IN CONTROL POS
BLU 18AWG 0311 0311 from 0311 KS IN START POS
BLU 18AWG 0451A 0451A from 0451 SYSTEM RESET PB
BLU 18AWG 0451 0451 from 0451 MCR ENERGIZED
BLU 18AWG 0446A 0446A to 0446 LOCAL/RADIO SW STATUS
C3
ETHERNET PROGRAMMING PORT
C4
ETHERNET
NOTE (A):
–INTEGRAL WIRE NUMBERS ON MD4 MODULE MATCH PIN ASSOCIATIONS
–I/O ADDRESSES ALL START WITH C2:(PIN #)
TEREX
Environmental Equipment
CBI
DRAWN BY LARS BOLDUC 01/05/21
CHECKED BY -- --
APPROVED BY -- --
UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005
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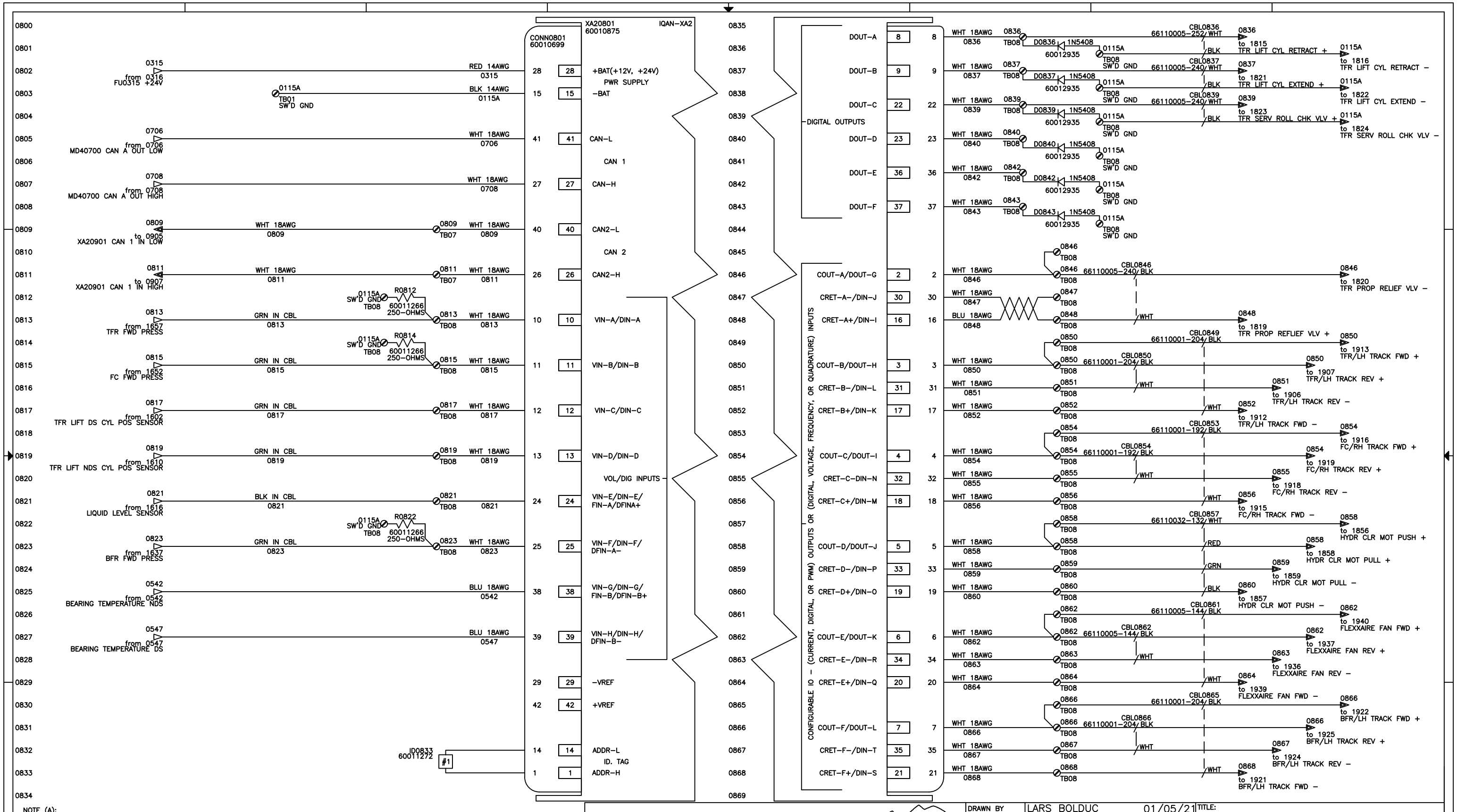
TITLE:
6400CT HETRONIC SCHEMATICS
MD40700 WIRING
ID TAG 0
DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 07 OF 29



NOTE (A):
–INTEGRAL WIRE NUMBERS ON XA2 MODULE MATCH PIN ASSOCIATIONS
–I/O ADDRESSES ALL START WITH C1:(PIN #)

TEREX
Environmental Equipment

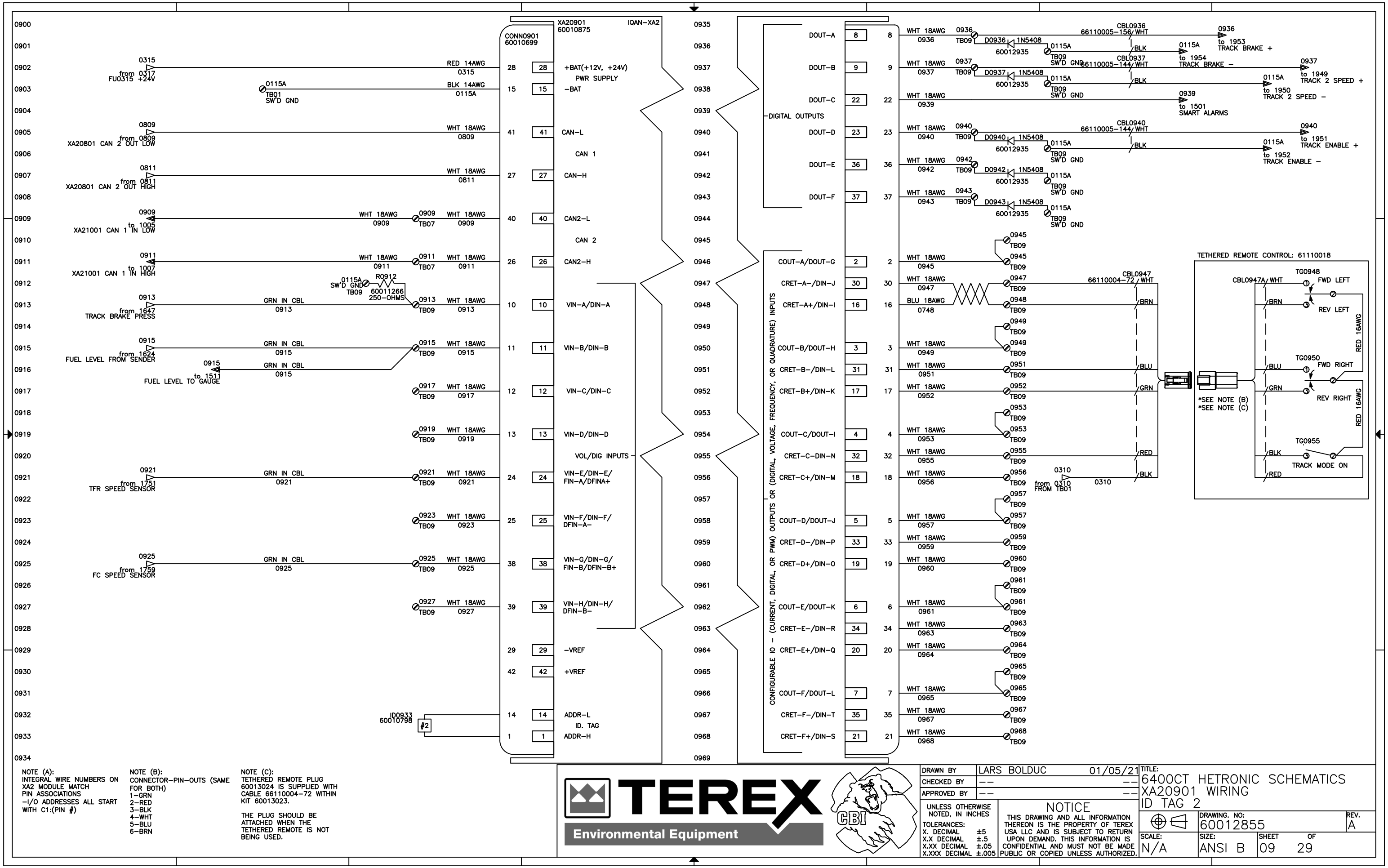
CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	––	––
APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±.5
X.X DECIMAL ±.05
X.XX DECIMAL ±.005
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
XA20801 WIRING
ID TAG 1

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 08 OF 29



NOTE (A):
INTEGRAL WIRE NUMBERS ON XA2 MODULE MATCH PIN ASSOCIATIONS –I/O ADDRESSES ALL START WITH C1:(PIN #)

NOTE (B):
CONNECTOR–PIN–OUTS (SAME FOR BOTH)
1–GRN
2–RED
3–BLK
4–WHT
5–BLU
6–BRN

NOTE (C):
TETHERED REMOTE PLUG 60013024 IS SUPPLIED WITH CABLE 66110004–72 WITHIN KIT 60013023.

THE PLUG SHOULD BE ATTACHED WHEN THE TETHERED REMOTE IS NOT BEING USED.

TEREX
Environmental Equipment

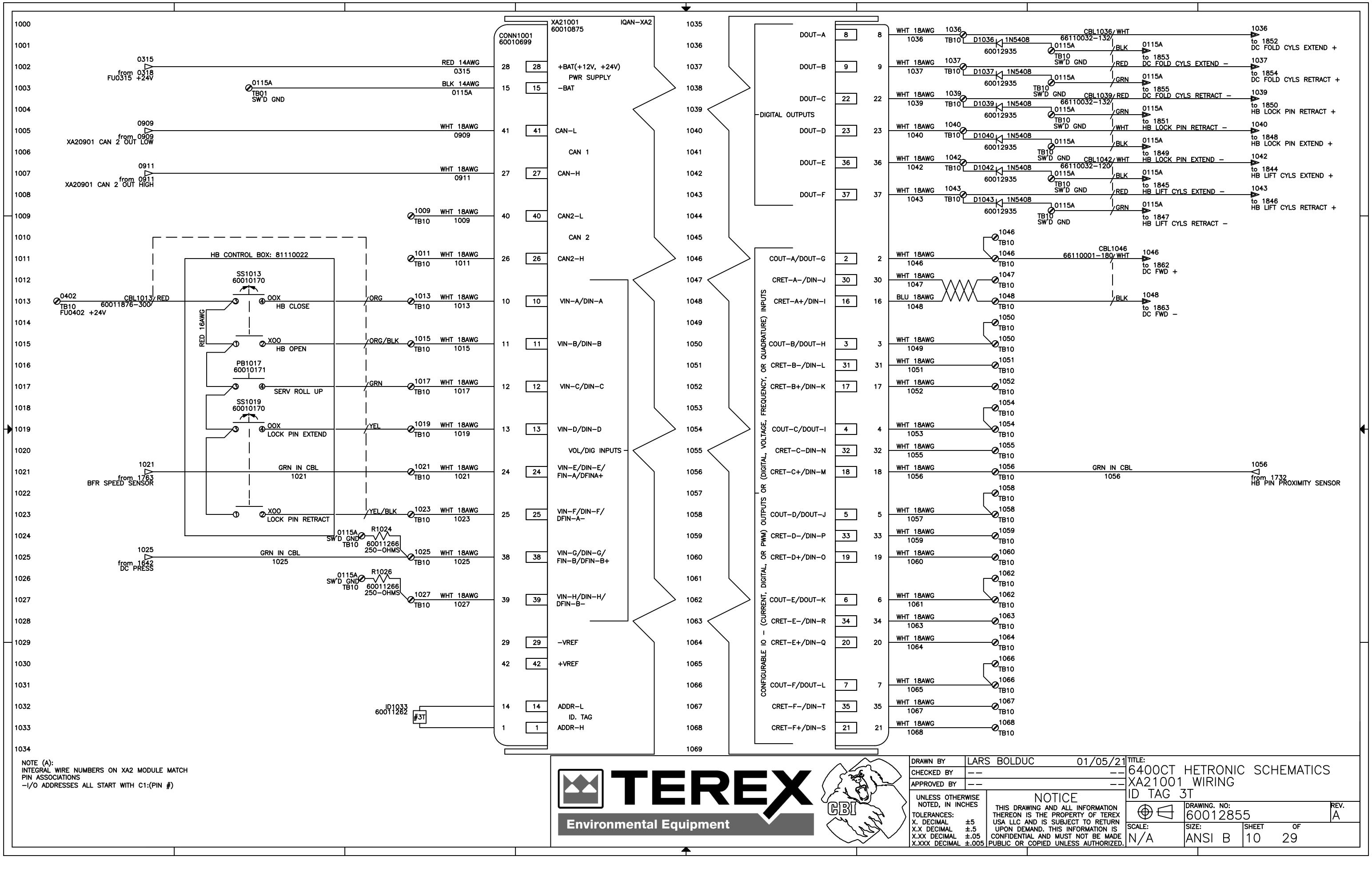
DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	––	––
APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±.5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
XA20901 WIRING
ID TAG 2

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	09	29



NOTE (A):
INTEGRAL WIRE NUMBERS ON XA2 MODULE MATCH PIN ASSOCIATIONS
–I/O ADDRESSES ALL START WITH C1:(PIN #)

TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	––	––
APPROVED BY	––	––

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

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TITLE:
6400CT HETRONIC SCHEMATICS
XA21001 WIRING
ID TAG 3T

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	10	29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ID TAG 4/T

DRAWING. NO: 60012855
REV. A

SCALE: N/A
SIZE: ANSI B
SHEET 11 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ID TAG 5/T

DRAWING. NO: 60012855
REV. A

SCALE: N/A
SIZE: ANSI B
SHEET 12 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES

TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ID TAG 6/T

DRAWING. NO: 60012855
REV. A

SCALE: N/A
SIZE: ANSI B
SHEET 13 OF 29

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TEREX
Environmental Equipment

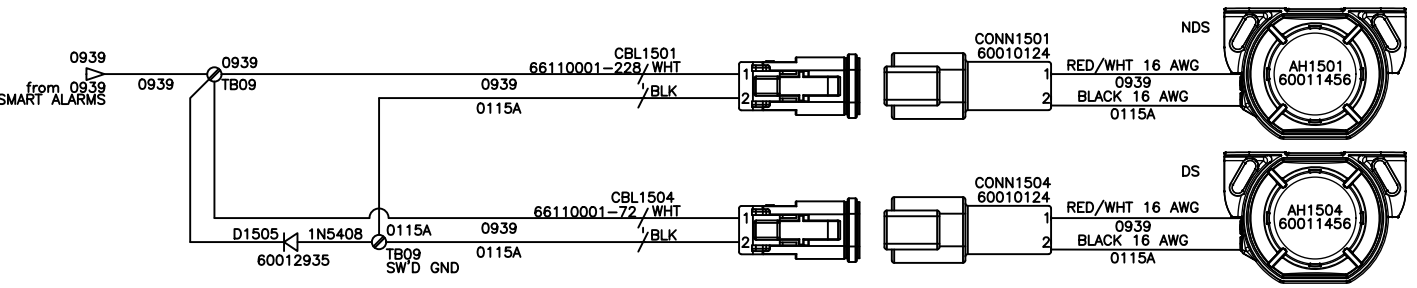
CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

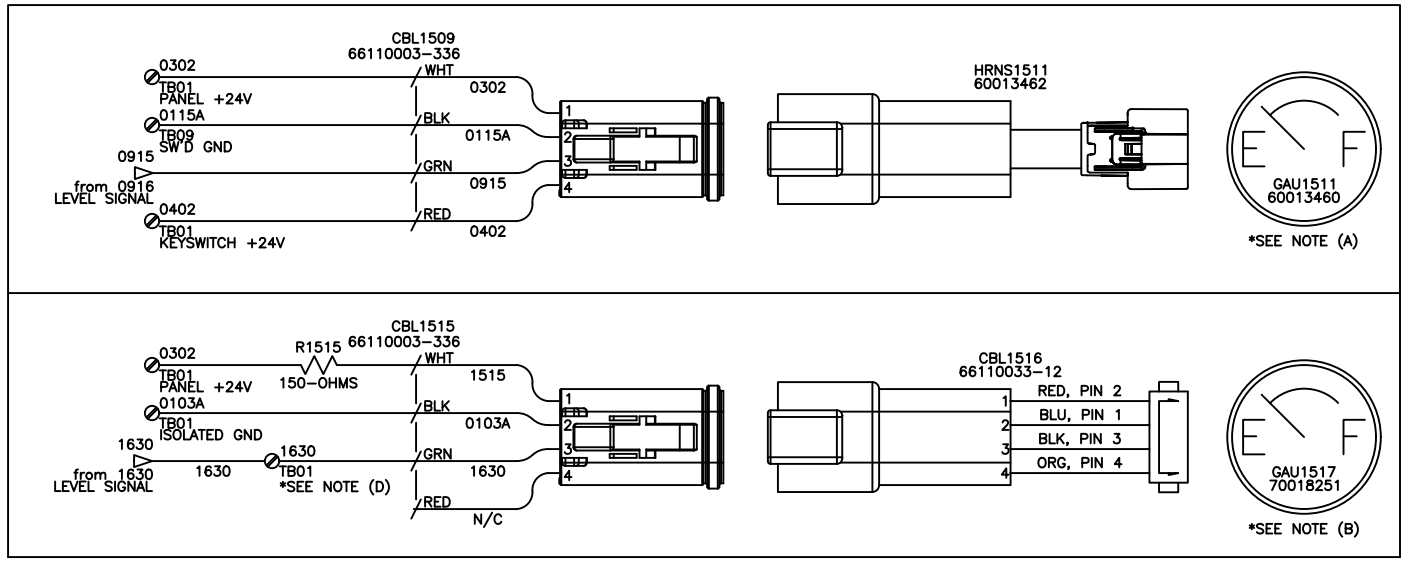
UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

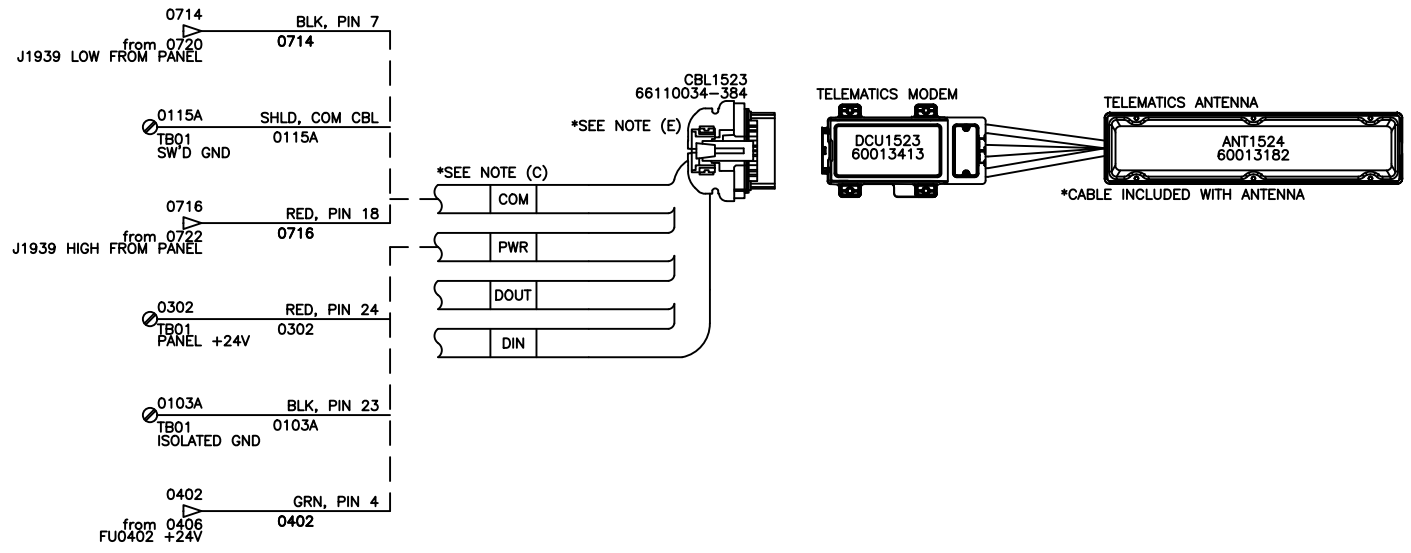
TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ID TAG 7/T

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 14 OF 29



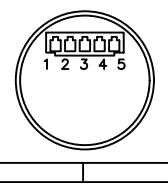
*TWO FUEL SENDER/GAUGE SOLUTIONS EXIST. SLIGHT WIRING DIFFERENCES ARE PRESENT.
UPPER WIRING FOR THE CAPACITIVE SENDER, LOWER WIRING FOR THE RESISTIVE SENDER.





NOTE (A):
GAUGE PINOUT
1 – 24VDC (PWR)
2 – GND (PWR)
3 – GND (SNSR)
4 – IGNITION
5 – 0–5VDC INPUT
6 – BACKLIGHT
7 – J1939 HIGH
8 – J1939 LOW

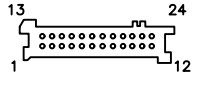
NOTE (B):
VIEW FROM BACK OF GAUGE



NOTE (C):
ALL UNUSED WIRES MUST BE READY TO BE LANDED IF NEEDED IN THE FUTURE. ALL SHALL BE LONG ENOUGH TO REACH ANY TERMINAL, STRIPPED, CAPPED, AND RESTED WITHIN THE WIRE-WAY.

NOTE (D):
MODIFY A SPARE TERMINAL ON TB01 TO BE 1630. MARK TERMINAL IDENTIFICATION TAG ACCORDINGLY.

NOTE (E):
VIEW FROM CONNECTOR END



TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

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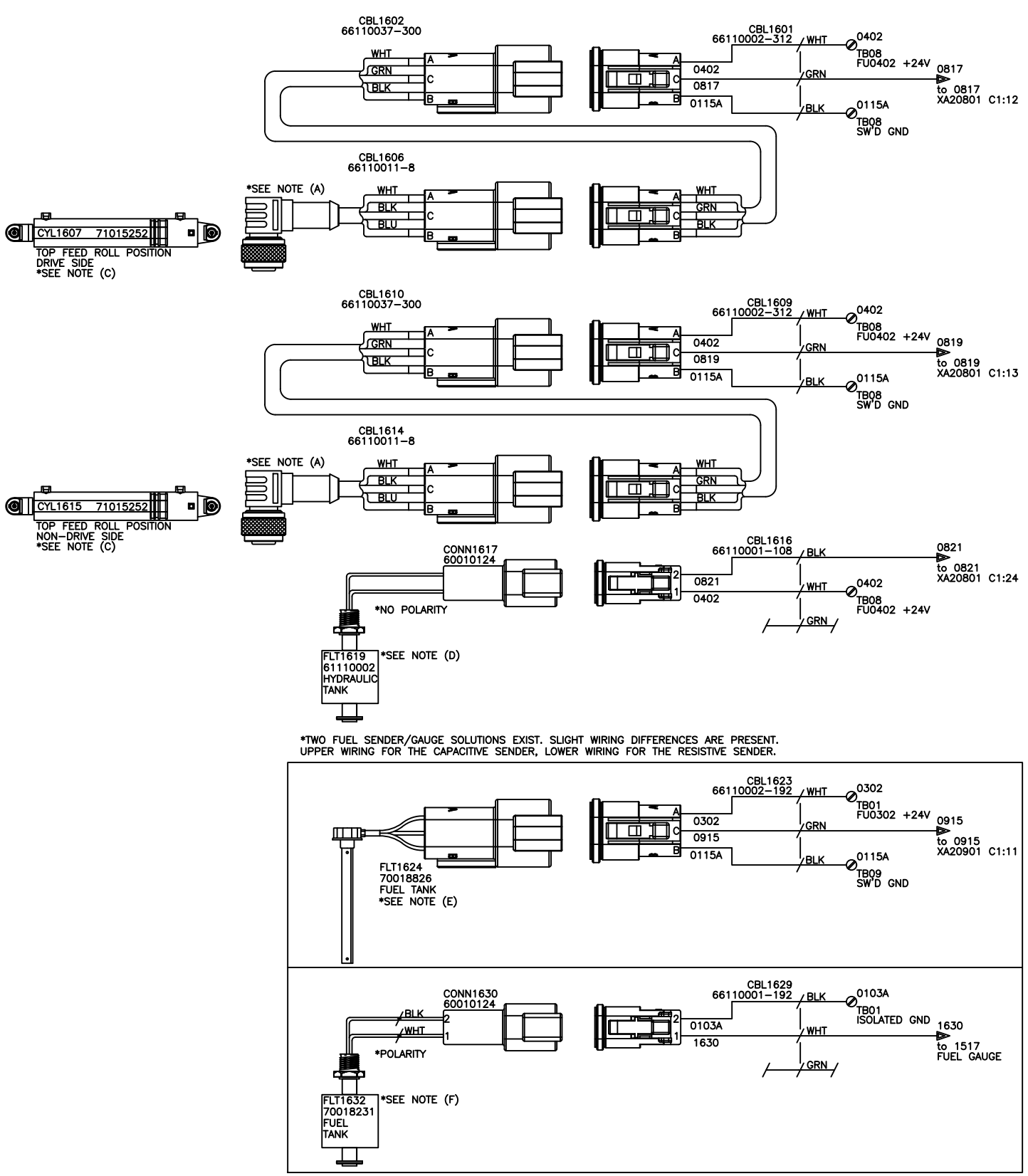
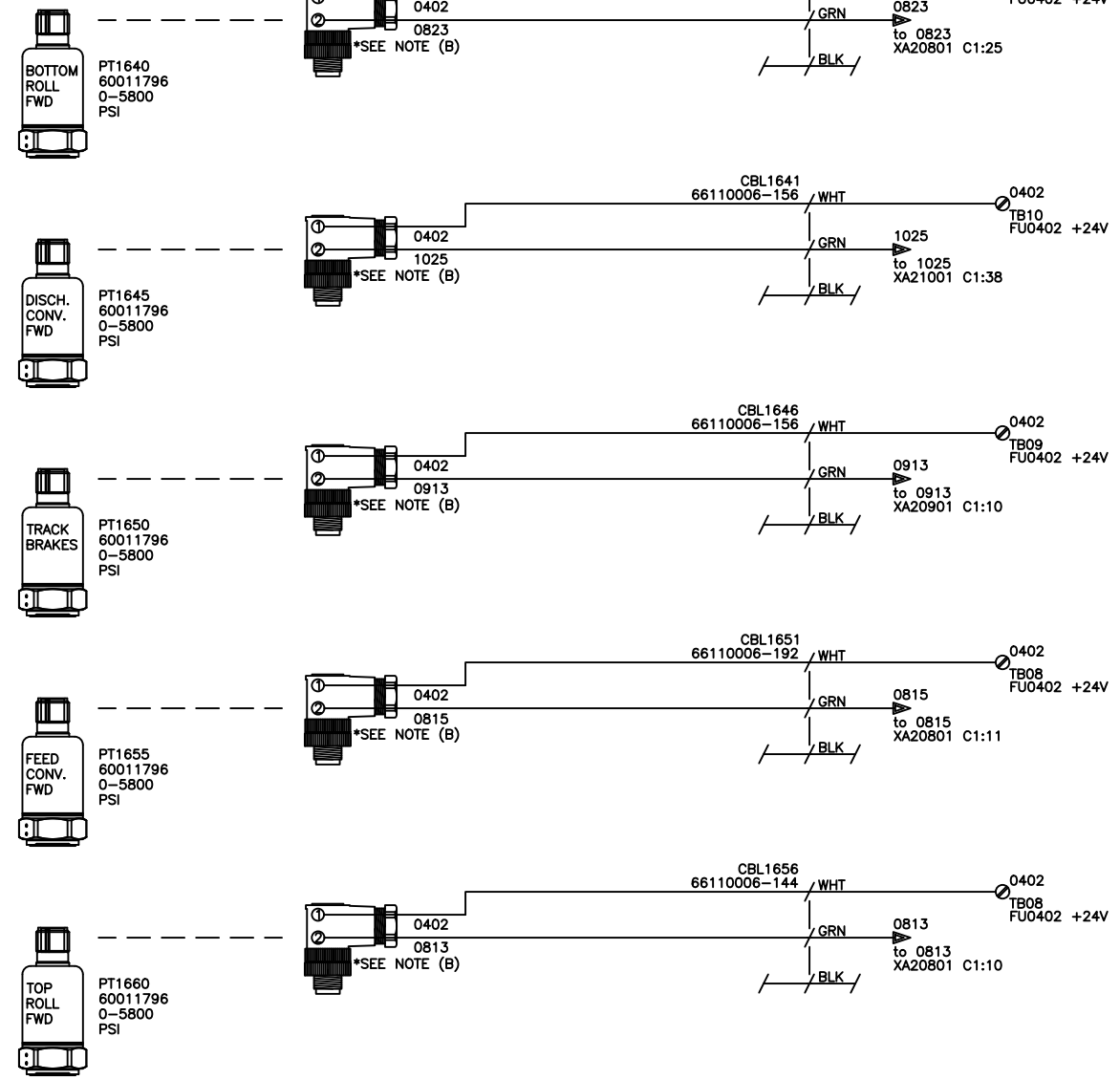
TITLE:
6400CT HETRONIC SCHEMATICS
ON-MACHINE GENERAL

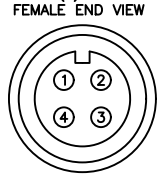
DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	15	29



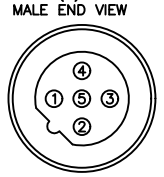


NOTE (A):
FEMALE END VIEW



1 = BROWN
2 = WHITE
3 = BLUE
4 = BLACK

NOTE (B):
MALE END VIEW



NOTE (C):
CYLINDER POSITION SENSOR IS INTEGRAL TO CYLINDER. IF SENSOR OR CONNECTOR GOES BAD, THE ENTIRE CYLINDER MUST BE REPLACED.

NOTE (D):
WITH AN ADEQUATE HYDRAULIC TANK LEVEL, THE SWITCH WILL READ CLOSED. WITH AN EMPTY TANK, THE SWITCH WILL READ OPEN.

NOTE (E):
THIS OUTPUTS A 0-5VDC SIGNAL.
5 VDC = FULL
0 VDC = EMTPY

NOTE (F):
THIS OUTPUTS A RANGE OF RESISTANCE WHICH IS READ BY THE GAUGE.
240-33 OHM

TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
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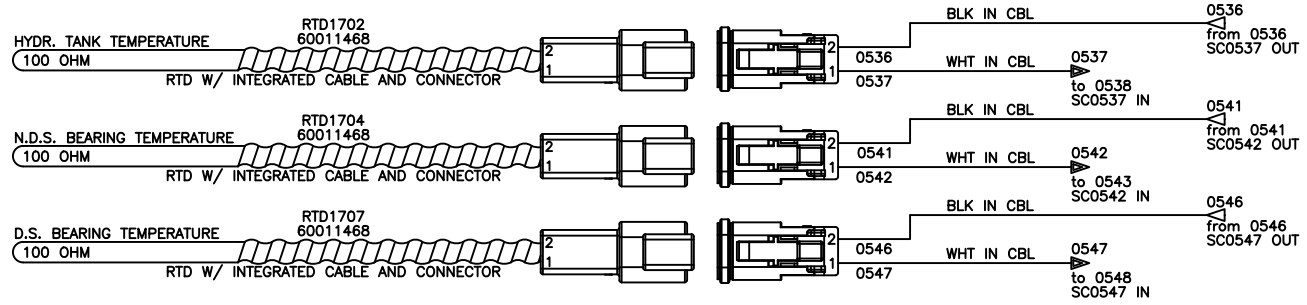
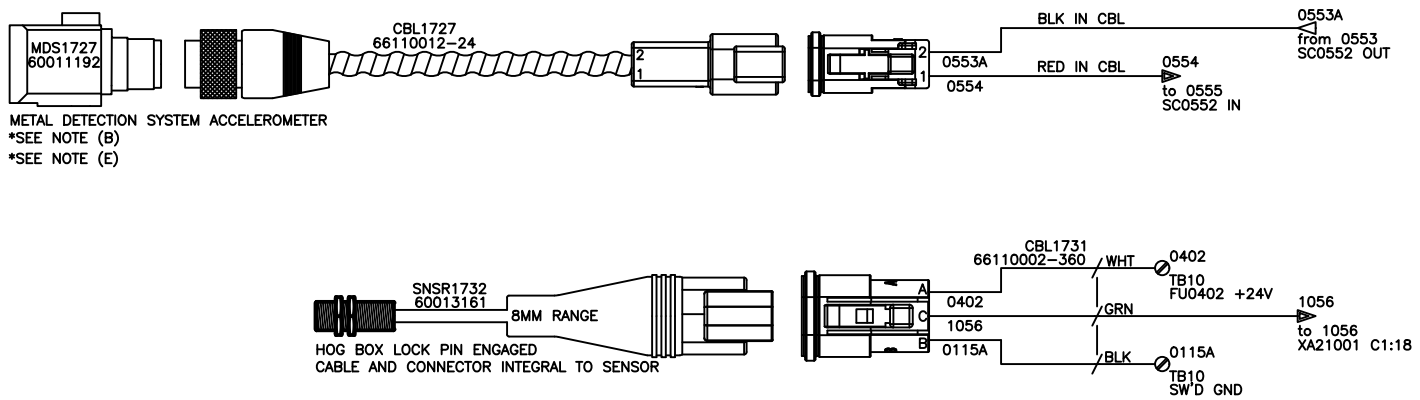
UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

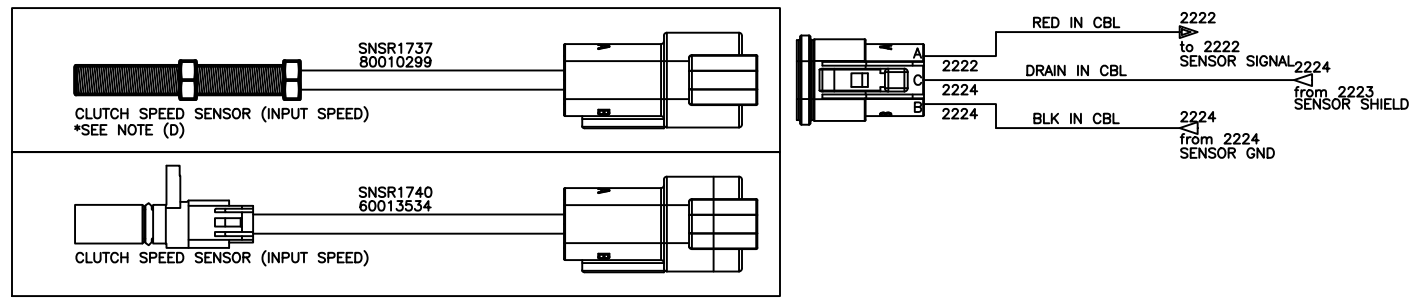
TITLE:
6400CT HETRONIC SCHEMATICS
ON-MACHINE SENSORS

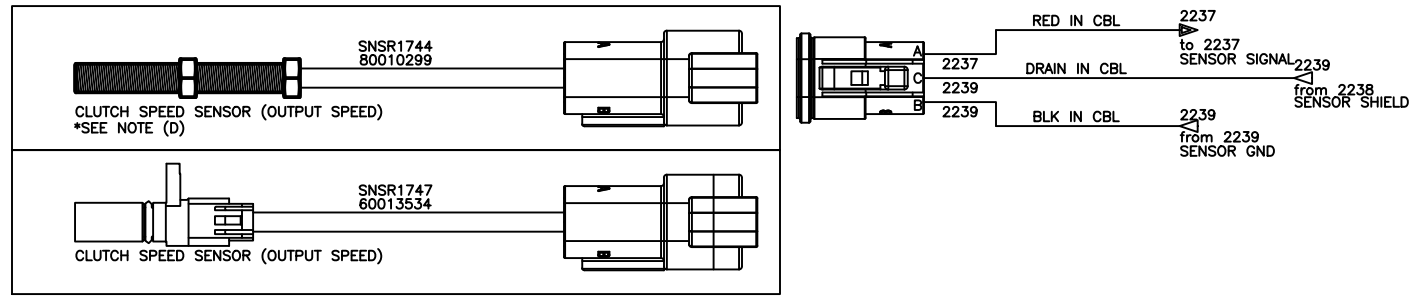
DRAWING. NO:	REV.
60012855	A

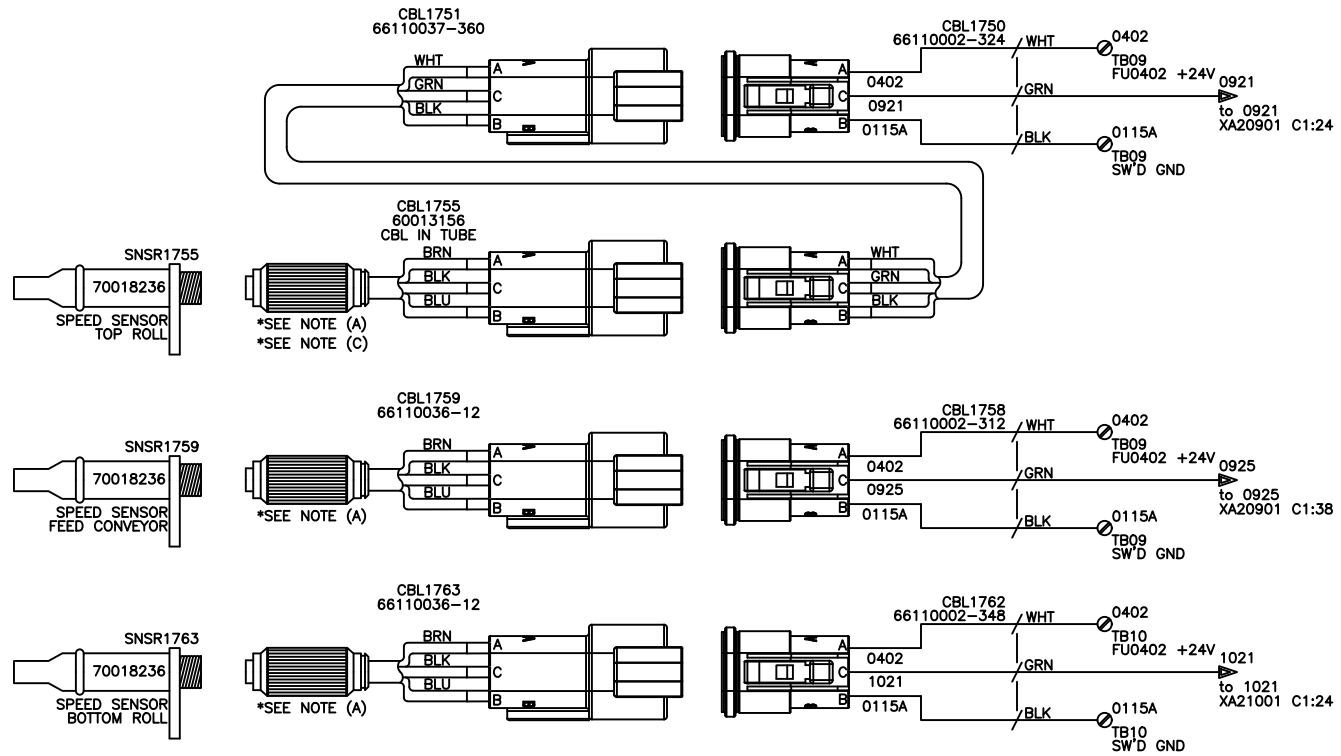
SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	16	29



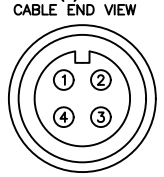






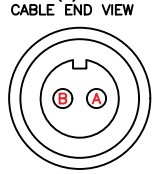


NOTE (A):
CABLE END VIEW



1 = BRN
2 = WHT
3 = BLU
4 = BLK

NOTE (B):
CABLE END VIEW



A = RED
(DEUTSCH PIN 1)
B = BLK
(DEUTSCH PIN 2)

NOTE (C):
60013156 IS A LARGE ASSEMBLY. IT IS MADE UP OF A CABLE WITHIN A BENT TUBE.

NOTE (D):
INSTALLATION INSTRUCTIONS: GENTLY SPIN SENSOR UNTIL IT STOPS. BACK IT OUT 1.5 TURNS & TIGHTEN NUT.

NOTE (E):
INSTALLATION INSTRUCTIONS: APPLY RED LOCTITE ON FLATTENED AREA. TORQUE TO 4 FT/LBS.

TEREX
Environmental Equipment

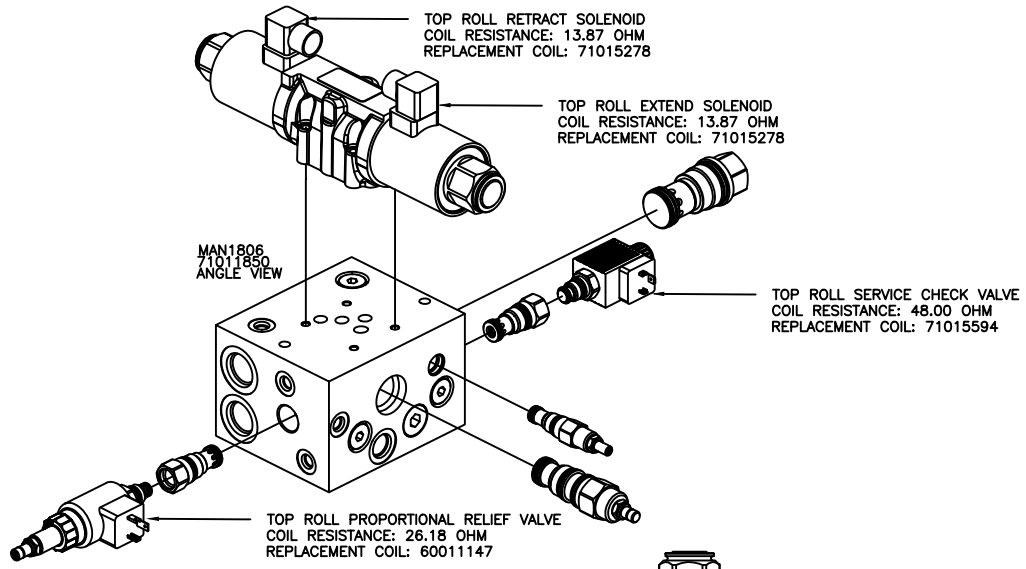
DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±.5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

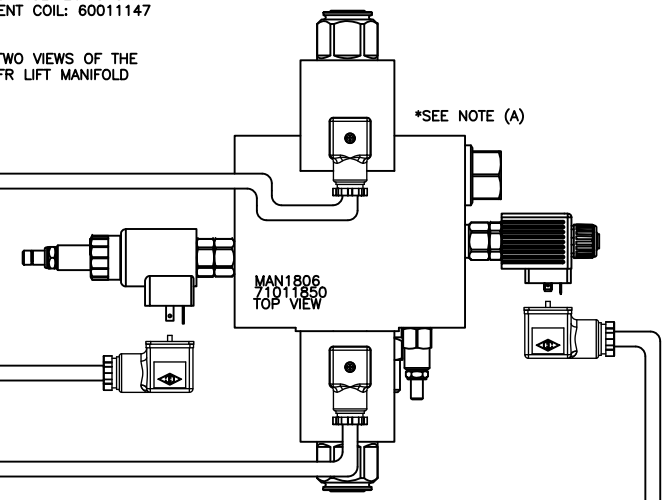
TITLE:
6400CT HETRONIC SCHEMATICS
ON-MACHINE SENSORS CNT'D

DRAWING. NO:	REV.
60012855	A

SCALE:	SIZE:	SHEET	OF
N/A	ANSI B	17	29



*TWO VIEWS OF THE TFR LIFT MANIFOLD



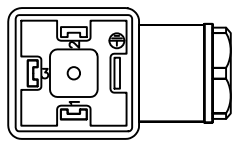
0836 from 0836 TFR LIFT CYL RETRACT + — WHT IN CBL 0836
0115A from 0836 TFR LIFT CYL RETRACT − — BLK IN CBL 0115A

0848 from 0848 TFR PROP RELIEF VLV + — WHT IN CBL 0848
0846 from 0846 TFR PROP RELIEF VLV − — BLK IN CBL 0846

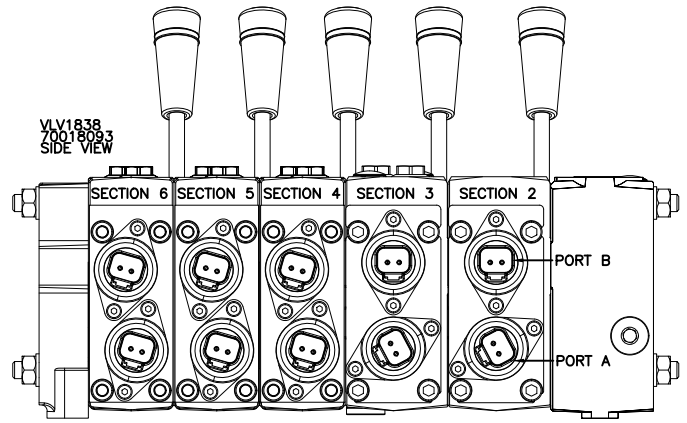
0837 from 0837 TFR LIFT CYL EXTEND + — WHT IN CBL 0837
0115A from 0838 TFR LIFT CYL EXTEND − — BLK IN CBL 0115A

0839 from 0839 TFR SERV ROLL CHK VLV + — WHT IN CBL 0839
0115A from 0839 TFR SERV ROLL CHK VLV − — BLK IN CBL 0115A

NOTE (A):
VIEW FROM BOTTOM OF CONNECTOR



PIN 1 = WHITE
PIN 2 = BLACK
ALL OTHER PINS NOT USED



COIL RESISTANCE: 20.80 OHM
REPLACEMENT COIL: 71015729 FOR SECTION 2–3
70018768 FOR SECTION 4–6

*AN EXPLODED VIEW OF THE LOAD SENSE VALVE BANK

1042 from 1042 HB LIFT CYLS EXTEND + — WHT IN CBL 1042
0115A from 1042 HB LIFT CYLS EXTEND − — BLK IN CBL 0115A
SECTION 6: B — HOG BOX LIFT CYLS EXTEND

1043 from 1043 HB LIFT CYLS RETRACT + — RED IN CBL 1043
0115A from 1044 HB LIFT CYLS RETRACT − — GRN IN CBL 0115A
SECTION 6: A — HOG BOX LIFT CYLS RETRACT

1040 from 1040 HB LOCK PIN EXTEND + — WHT IN CBL 1040
0115A from 1041 HB LOCK PIN EXTEND − — BLK IN CBL 0115A
SECTION 5: B — HOG BOX LOCK PIN EXTEND

1039 from 1039 HB LOCK PIN RETRACT + — RED IN CBL 1039
0115A from 1039 HB LOCK PIN RETRACT − — GRN IN CBL 0115A
SECTION 5: A — HOG BOX LOCK PIN RETRACT

1036 from 1036 DC FOLD CYLS EXTEND + — WHT IN CBL 1036
0115A from 1036 DC FOLD CYLS EXTEND − — BLK IN CBL 0115A
SECTION 4: B — DISCHARGE CONVEYOR FOLD CYLS EXTEND

1037 from 1037 DC FOLD CYLS RETRACT + — RED IN CBL 1037
0115A from 1038 DC FOLD CYLS RETRACT − — GRN IN CBL 0115A
SECTION 4: A — DISCHARGE CONVEYOR FOLD CYLS RETRACT

0858 from 0857 HYDR CLR MOT PUSH + — WHT IN CBL 0858
0860 from 0860 HYDR CLR MOT PUSH − — BLK IN CBL 0860
SECTION 3: B — HYDRAULIC COOLER MOTOR PUSH

0858 from 0858 HYDR CLR MOT PULL + — RED IN CBL 0858
0859 from 0859 HYDR CLR MOT PULL − — GRN IN CBL 0859
SECTION 3: A — HYDRAULIC COOLER MOTOR PULL

SECTION 2: B —
SECTION 2: A — DISCHARGE CONVEYOR FORWARD

1046 from 1046 DC FWD + — WHT IN CBL 1046
1048 from 1048 DC FWD − — BLK IN CBL 1048

TEREX
Environmental Equipment

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APPROVED BY	--	--

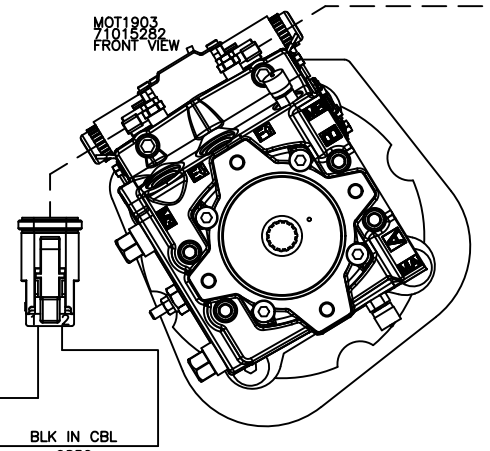
UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE: 6400CT HETRONIC SCHEMATICS ON-MACHINE HYDRAULIC

DRAWING. NO: 60012855 REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 18 OF 29

LEFT CLUTCH-MOUNTED PUMP
CLOSEST TO ENGINE

MOT1903
71015282
FRONT VIEW



COIL RESISTANCE: 14.20 OHM
REPLACEMENT COIL: 70018097

0852 WHT IN CBL 0852
from 0852 TFR/LH TRACK FWD –
0850 BLK IN CBL 0850
from 0849 TFR/LH TRACK FWD +

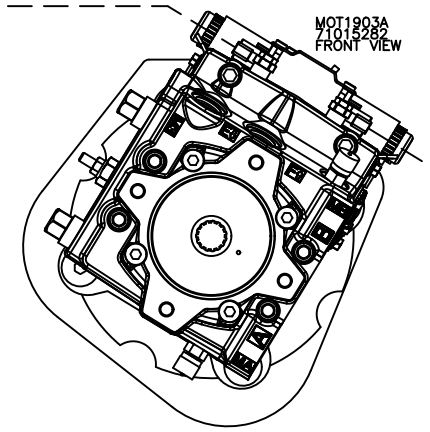
0851 WHT IN CBL 0851
from 0851 TFR/LH TRACK REV –
0850 BLK IN CBL 0850
from 0850 TFR/LH TRACK REV +

0856 WHT IN CBL 0856
from 0856 FC/RH TRACK FWD –
0854 BLK IN CBL 0854
from 0853 FC/RH TRACK FWD +

0855 WHT IN CBL 0855
from 0855 FC/RH TRACK REV –
0854 BLK IN CBL 0854
from 0854 FC/RH TRACK REV +

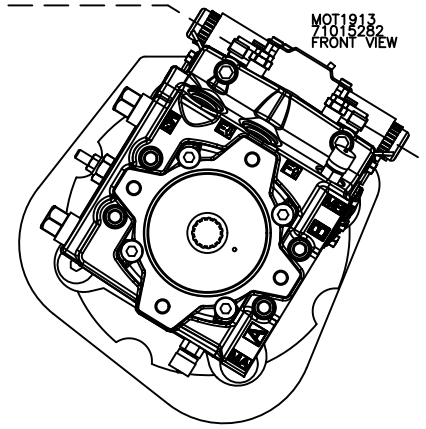
RIGHT CLUTCH-MOUNTED PUMP
CLOSEST TO ENGINE

MOT1903A
71015282
FRONT VIEW



RIGHT CLUTCH-MOUNTED PUMP
FURTHEST FROM ENGINE

MOT1913
71015282
FRONT VIEW



0868 WHT IN CBL 0868
from 0868 BFR/LH TRACK FWD –
0866 BLK IN CBL 0866
from 0865 BFR/LH TRACK FWD +

0867 WHT IN CBL 0867
from 0867 BFR/LH TRACK REV –
0866 BLK IN CBL 0866
from 0866 BFR/LH TRACK REV +

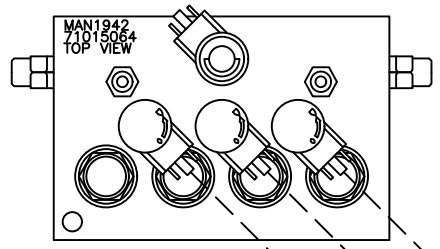
0863 WHT IN CBL 0863
from 0863 FLEXXAIRE FAN REV –
0862 BLK IN CBL 0862
from 0862 FLEXXAIRE FAN REV +

*SEE NOTE (A)

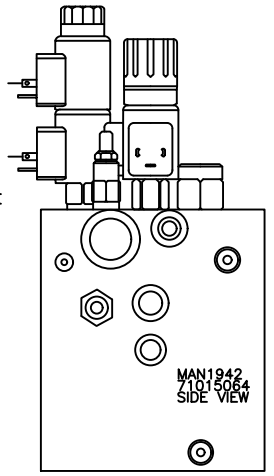
0864 WHT IN CBL 0864
from 0864 FLEXXAIRE FAN FWD –
0862 BLK IN CBL 0862
from 0861 FLEXXAIRE FAN FWD +

*TWO VIEWS OF THE
DIVERTER MANIFOLD

MAN1942
71015064
TOP VIEW



MAN1942
71015064
SIDE VIEW



COIL RESISTANCE: 26.18 OHM
REPLACEMENT COIL: 60011147

0937 WHT IN CBL 0937
from 0937 TRACK 2 SPEED +
0115A BLK IN CBL 0115A
from 0938 TRACK 2 SPEED –

*SEE NOTE (A)

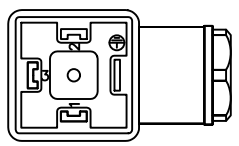
0940 WHT IN CBL 0940
from 0940 TRACK ENABLE +
0115A BLK IN CBL 0115A
from 0941 TRACK ENABLE –

*SEE NOTE (A)

0936 WHT IN CBL 0936
from 0936 TRACK BRAKE +
0115A BLK IN CBL 0115A
from 0936 TRACK BRAKE –

*SEE NOTE (A)

NOTE (A):
VIEW FROM BOTTOM OF CONNECTOR



PIN 1 = WHITE
PIN 2 = BLACK
ALL OTHER PINS NOT USED

TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
ON-MACHINE HYDRAULIC CNT'D

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 19 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
ON-MACHINE HYDRAULIC CNT'D

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 20 OF 29

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TEREX
Environmental Equipment

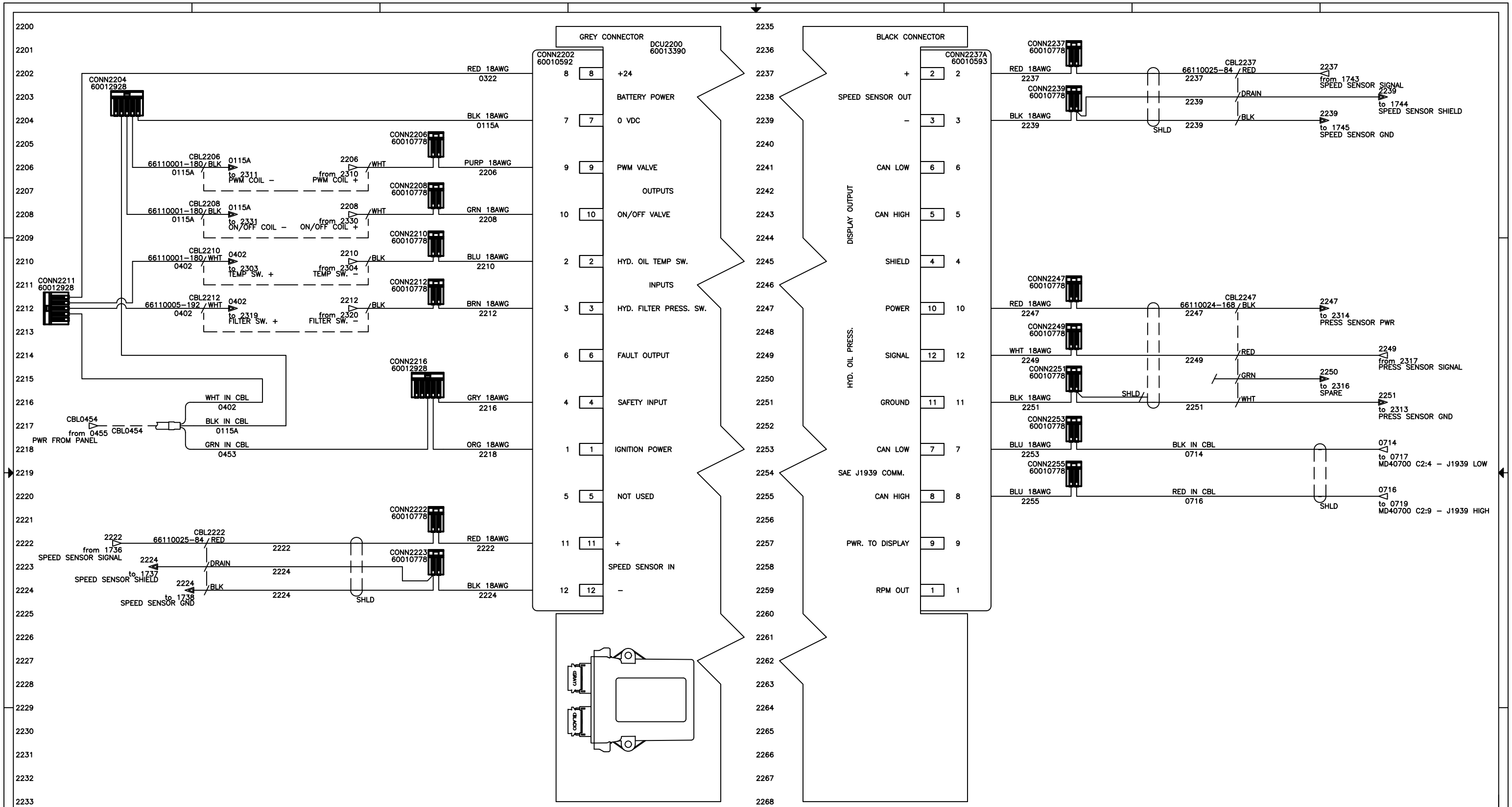
CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ON–MACHINE HYDRAULIC

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 21 OF 29



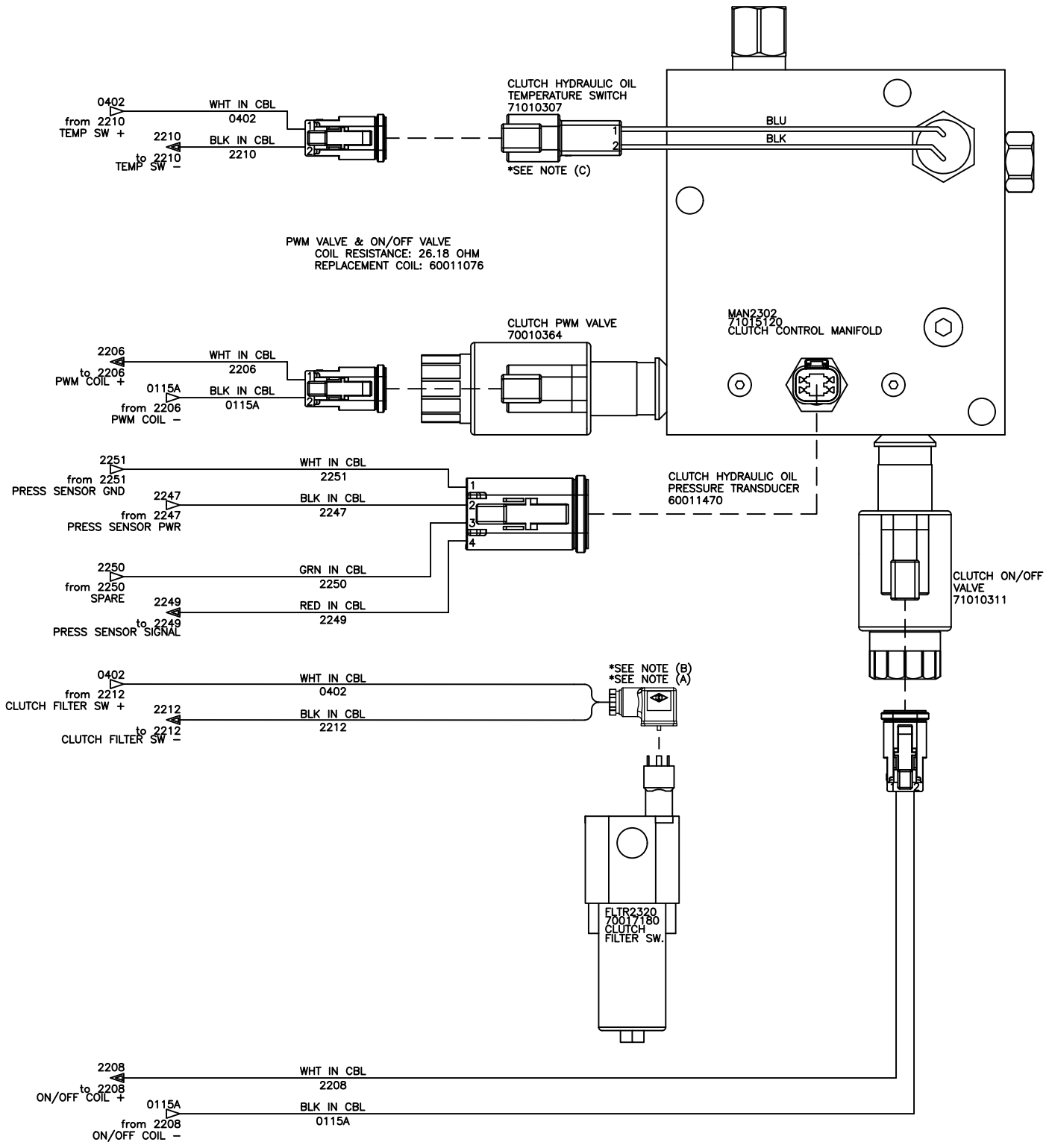
TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

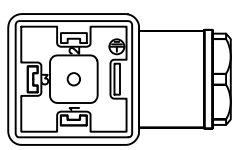
UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS CLUTCH PANEL WIRING

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 22 OF 29



NOTE (A):
VIEW FROM BOTTOM OF CONNECTOR



PIN 1 = WHITE
PIN 2 = BLACK
ALL OTHER PINS
NOT USED

NOTE (B):
FILTER SWITCH IS NORMALLY–CLOSED. HIGH RESISTANCE HERE INDICATES A CLOGGED OR BAD FILTER.

NOTE (C):
TEMPERATURE SWITCH IS NORMALLY–CLOSED. RESISTANCE HIGHER THAN 4.2 OHMS WILL PRODUCE A FAULT.

TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
CLUTCH WIRING

DRAWING. NO: 60012855
REV. A
SCALE: N/A
SIZE: ANSI B
SHEET 23 OF 29

ECM2400
SUPPLIED BY CAT
TIER 4 ECM
P1/J1 SIDE ONLY

CONN2402
60011149
OF 60013373
PLUG, 70 PIN
*SEE NOTE A

0461 from 0461 FROM SAFETY RELAY	CBL2404 OF HRNS 60013373 GRN	0461	44 REMOTE SHUTDOWN
0336 from 0336 FROM NON-SAFETY PWR	BLK	0336	70 KEY SWITCH
0143 from 0138 FU0143 PWR	BLK IN CBL 0143		48 +24VDC
0144 from 0139 FU0144 PWR	GRN IN CBL 0144		52 +24VDC
0145 from 0139 FU0145 PWR	RED IN CBL 0145		55 +24VDC
0146 from 0140 FU0146 PWR	WHT IN CBL 0146		53 +24VDC
			UNSWITCHED POWER
0115A from 0141 SW'D GND	BLK IN CBL 0115A		61 -24VDC
0115A from 0142 SW'D GND	RED IN CBL 0115A		65 -24VDC
0115A from 0143 SW'D GND	WHT IN CBL 0115A		69 -24VDC
0115A from 0142 SW'D GND	GRN IN CBL 0115A		63 ENABLE PTO

COOLANT LEVEL SWITCH

ANALOG RETURN	18	18
+8VDC	4	4
COOLANT LEVEL IN	49	49

ETHER START OUT	12	12
ETHER START OUT	10	10
INTAKE AIR RETURN	3	3
INTAKE AIR OUT	17	17

DATA BUS WIRING

CDL +	8	8
CDL -	9	9
J1939 +	50	50
J1939 -	34	34

CBL2437 BLK OF HRNS 60013373 2437
WHT 2439
GRN 2441
LS2439 60013030
COOLANT LEVEL SWITCH ASSEMBLY

CBL2443 RED OF HRNS 60013373 2443
BLK 2443
BLK 16AWG 2444
SOL2443 SUPPLIED BY CAT
ETHER START ASSEMBLY

CBL2447 WHT OF HRNS 60013373 2447
BLK 2449
INTAKE AIR

0147 to 0144 FU0147 PWR
0115A to 0145 SW'D GND

CONN2452
60011156
OF HRNS 60011901

BLU 16AWG 2451
GRN 16AWG 2453
WHT IN CBL 0141
BLK IN CBL 0115A

GRY 16AWG 0716
PUR 16AWG 0714
BUSSED
BUSSED

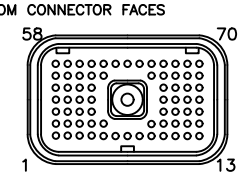
PUR 16AWG 0714
GRY 16AWG 0716

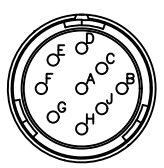
HRNS2430
SUPPLIED BY CAT

0148 from 0146 FU0148 PWR — WHT IN CBL 0148
0115A from 0147 SW'D GND — BLK IN CBL 0115A
FUEL PRIMING PUMP
FUEL PRIMING PUMP SW

DRAIN from 0715 MD40700 DRAIN — SHLD IN CBL DRAIN
0714 from 0714 MD40700 CAN-C LOW — BLK IN CBL 0714
0716 from 0716 MD40700 CAN-C HIGH — RED IN CBL 0716
120-OHM

NOTE (A):
VIEW FROM CONNECTOR FACES





TEREX
Environmental Equipment

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
ECM WIRING

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 24 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS
– RESERVED
ECM WIRING

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 25 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS – SPARE

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 26 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS – SPARE

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 27 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS – SPARE

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 28 OF 29

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TEREX
Environmental Equipment

CBI

DRAWN BY	LARS BOLDUC	01/05/21
CHECKED BY	--	--
APPROVED BY	--	--

UNLESS OTHERWISE NOTED, IN INCHES
TOLERANCES:
X. DECIMAL ±5
X.X DECIMAL ±.5
X.XX DECIMAL ±.05
X.XXX DECIMAL ±.005

TITLE:
6400CT HETRONIC SCHEMATICS – SPARE

DRAWING. NO: 60012855		REV. A
SCALE: N/A	SIZE: ANSI B	SHEET 29 OF 29

(2) Hydraulic Schematic

The following are schematics for the hydraulic system of your machine. Their purpose is to familiarize operators with the functions of their hydraulic system. For specific requests or detailed information, please contact Terex.

The system schematic for the hydraulic system of your machine is shown on the following page. Its purpose is to familiarize operators with the functions of their hydraulic system and to serve as a quick reference source. An additional large format copy for service use is available separately as a supplement. For detailed information on your hydraulic circuits, please contact Terex.

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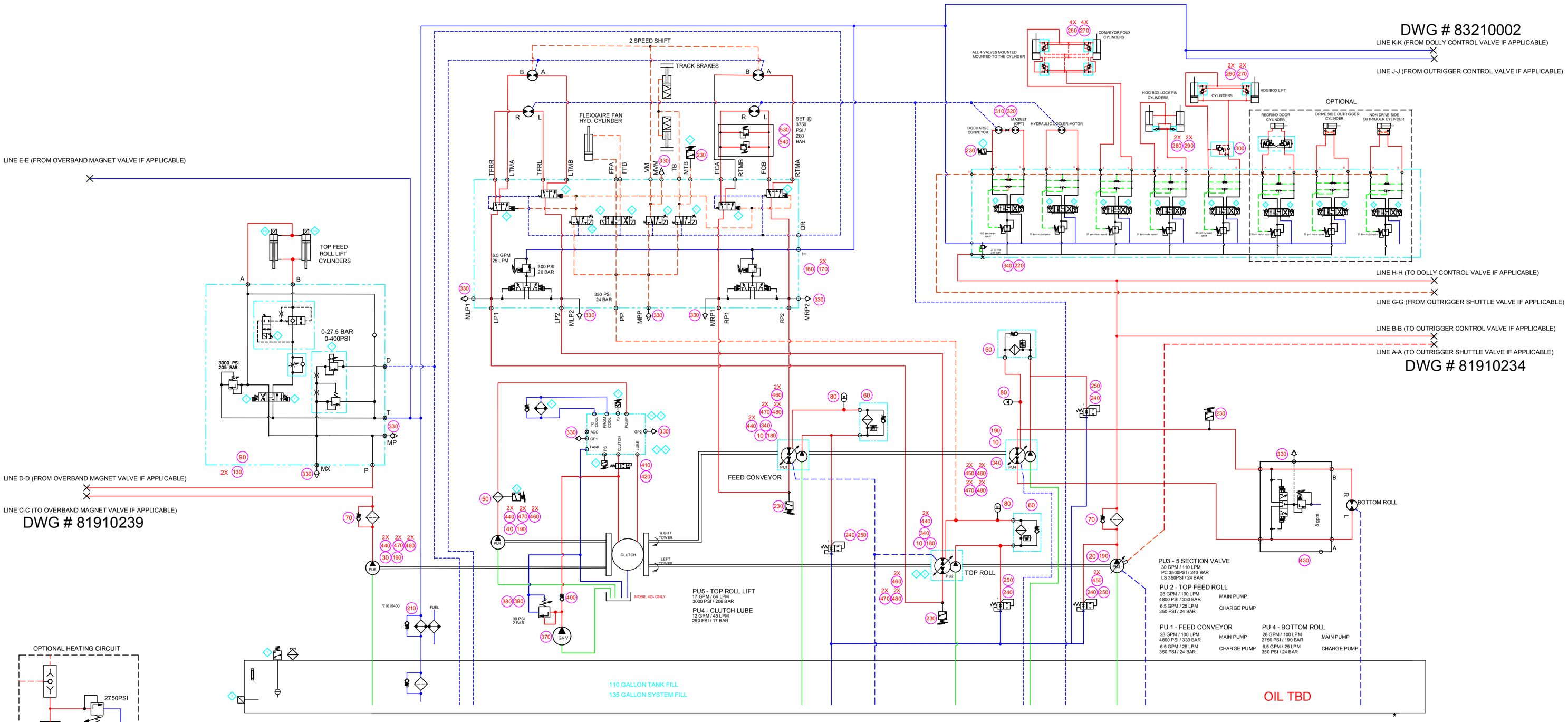
	REVISION	
REV	DESCRIPTION	DATE/APVD
–	INITIAL RELEASE	22AUG19
A	ADDED 1X71011298 (ITEM 350)	16SEPT19
B	ECO 20-268	14JUL20
C	ECO 20-367	09SEP20



RECOMMENDED SPARE PARTS		
QTY	CBI PART #	DESCRIPTION
1	70016576	REPLACEMENT ELEMENT, TANK BREATHER
4	70011472	FILTER ELEMENT, LOW PRESSURE FILTER
2	71015070	FILTER ELEMENT, HIGH PRESSURE FILTER
1	72910046	FILTER ELEMENT, IN TANK RETURN FILTER

RMC 22AUG19 DATE	
CHECKED BY DATE	
APVD	
DRAWN BY	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES : FRACTIONS ±1/16 .XX DECIMAL ±.03 .XXX DECIMAL ±.005 ANGLES ±.5 REMOVE BURRS & SHARP EDGES MACHINED SURFACE FINISH TO BE 125 RMS OTHER SURFACE FINISHES TO BE 250 RMS

CONTINENTAL BIOMASS INDUSTRIES
22 WHITTIER ST. NEWTON NH 03858

TITLE: HYDRAULIC SCHEMATIC 6400CT

SIZE C | DWG NO 01910076 | REV C

SCALE: NONE | SHEET 1 OF 1

DWG NO 01910076 SH 1

GEAR (FIXED DISPLACEMENT) PUMP

VARIABLE DISPLACEMENT OPEN LOOP PUMP

VARIABLE DISPLACEMENT CLOSED LOOP PUMP WITH CHARGE PUMP

ELECTRIC MOTOR DRIVEN HYDRAULIC PUMP

24V

PRESSURE GAUGE

CHARGE FILTER

RETURN / HIGH PRESSURE FILTER (DEPENDENT ON DIRECTION OF FLOW)

HEAT EXCHANGER / COOLER

MOTOR

COOLER MOTOR

MANIFOLD / ASSEMBLED COMPONENTS

3

2

1

FLOW CONTROL VALVE

SHUTTLE VALVE

DOUBLE COUNTER BALANCE VALVE

NEEDLE VALVE

GEAR BOX

TANK

VALVE SUBPLATE

X P T Y

LIQUID LEVEL SENSOR

RELIEF VALVE

BREATHER AND BREATHER STEM

CYLINDER

CLUTCH / GEAR BOX

BRAKES

ENCLOSED COMPONENTS

BALL VALVE

CHECK VALVE

PROPORTIONAL DIRECTIONAL VALVE

CONTROL VALVE (WITH MANUAL LEVER)

HOT OIL SHUTTLE / LOW LOOP FLUSHING VALVE

1

AIR BLEED VALVE

TEST POINT

GAS CHARGED ACCUMULATOR

PRESSURE TRANSDUCER

RTD

SUCTION LINE

RETURN LINE

DRAIN LINE

WORKING LINE

PILOT LINE

CLUTCH LINE

MECHANICAL CONNECTION

LINES THAT DO NOT INTERSECT

INTERSECTING LINES

LINE TO RESEVOIR ABOVE FLUID LEVEL

REVISION		
REV	DESCRIPTION	DATE/APVD
–	INITIAL RELEASE	12/3/2013

JOB NO		DRAWN BY NHF 12/3/2013 DATE	CONTINENTAL BIOMASS INDUSTRIES 22 WHITTIER ST. NEWTON NH 03858
X		CHECKED BY DATE	
X		APVD	TITLE: HYDRAULIC SCHEMATIC LEGEND
X		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES : FRACTIONS ±1/16 .XX DECIMAL ±.03 .XXX DECIMAL ±.005 ANGLES ±.5' REMOVE BURRS & SHARP EDGES MACHINED SURFACE FINISH TO BE 125 RMS OTHER SURFACE FINISHES TO BE 250 RMS	SIZE C · DWG NO 70016226 · REV A SCALE: NONE · SHEET 1 OF 1
X			
X			
X			
X			
X			
X			

DWG NO

SH 1

Lvl	Typ	Seq	Part Number	Revision	Alt	Description	Qty/Parent		Required Qty	
			01910076	**C**		**HYDRAULIC SCHEMATIC & BOM 6400**			1.00	EA
1	Mtl	10	.71015282	-		PUMP, AXIAL HYD	3.00	EA	3.00	EA
1	Mtl	20	.70018774	-		PUMP, SAUER, 74CC, SIDE PORTED	1.00	EA	1.00	EA
1	Mtl	30	.70016666	-		GEAR PUMP, CCW	1.00	EA	1.00	EA
1	Mtl	40	.70016339	-		PUMP, GEAR, 1.24CU IN. CCW ROT	1.00	EA	1.00	EA
1	Mtl	50	.70017180	A		FILTER WITH PRESSURE SWITCH	1.00	EA	1.00	EA
1	Mtl	60	.70011395	-		FILTER - ASSY LOW PRESSURE (3	3.00	EA	3.00	EA
1	Mtl	70	.71011896	-		FILTER, ASSY, HIGH PRESSURE (	2.00	EA	2.00	EA
1	Mtl	80	.71011256	-		ACCUMULATOR; HYD; 0.5L	3.00	EA	3.00	EA
1	Mtl	90	.71910152	-		TOP FEED ROLL MANIFOLD, 6400	1.00	EA	1.00	EA
1	Mtl	130	.41910312	A		VALVE BRACKET	2.00	EA	2.00	EA
1	Mtl	160	.71015064	D		DIVERTER MANIFOLD	1.00	EA	1.00	EA
1	Asm	170	.41910313	A		MOUNT, BLOCK VALVE	2.00	EA	2.00	EA
1	Mtl	180	.71015575	-		O RING, PT TECH PUMP FLANGE "B	2.00	EA	2.00	EA
1	Mtl	190	.71011465	-		GASKET, SAE B 2 BOLT	4.00	EA	4.00	EA
1	Mtl	210	.70011486	-		VALVE; HYD CHECK	1.00	EA	1.00	EA
1	Mtl	220	.70018314	-		LOAD SENSE VALVE, 5 SECTION	1.00	EA	1.00	EA
1	Mtl	230	.60011796	-		PRESSURE TRANSDUCER, 0-5800 PS	5.00	EA	5.00	EA
1	Mtl	240	.71015502	-		VALVE; HYD; FLOW CNTRL; AIR BL	4.00	EA	4.00	EA
1	Mtl	250	.71011941	-		VALVE; MANIFOLD BODY	4.00	EA	4.00	EA
1	Mtl	260	.70011595	-		VALVE; COUNTERBALANCE	6.00	EA	6.00	EA
1	Mtl	270	.71015134	-		VALVE BODY, SUN	6.00	EA	6.00	EA
1	Mtl	280	.71015133	-		VALVE, SUN	2.00	EA	2.00	EA
1	Mtl	290	.70018207	-		CYLINDER MOUNT BODY, SAE 6 ALL	2.00	EA	2.00	EA
1	Mtl	300	.71011416	-		VALVE, COUNTERBALANCE, SUN	1.00	EA	1.00	EA
1	Mtl	310	.71011336	-		DISCONNECT - MALE QUICK	1.00	EA	1.00	EA
1	Mtl	320	.71011337	-		DISCONNECT-FEMALE QUICK	1.00	EA	1.00	EA
1	Mtl	330	.70011459	A		TEST POINT , # 4 O-RING BOSS	11.00	EA	11.00	EA
1	Mtl	340	.70011284	-		TEST POINT - #6 O-RING BOSS	5.00	EA	5.00	EA
1	Mtl	350	.71011298	-		COUPLING - SAE 6 O-RING	7.00	EA	7.00	EA
1	Mtl	360	.40010254	-		UNISTRUT 7" LG	1.00	EA	1.00	EA
1	Mtl	370	.71910001	-		PUMP, CLUTCH BRAKE RELEASE	1.00	EA	1.00	EA
1	Mtl	380	.71011840	-		SUN CARTRIDGE	1.00	EA	1.00	EA
1	Mtl	390	.71011352	-		FAJ SUN BODY	1.00	EA	1.00	EA
1	Mtl	400	.71015500	-		VALVE, CHECK	1.00	EA	1.00	EA
1	Mtl	410	.71011732	A		VALVE; DIRECTIONAL CONTROL	1.00	EA	1.00	EA
1	Mtl	420	.71015730	-		VALVE; HYD BODY	1.00	EA	1.00	EA
1	Mtl	430	.71015170	-		MANIFOLD, FLUSHING RELIEF	1.00	EA	1.00	EA
1	Mtl	440	.50010114	-		HHCS, 1/2-13 X 1.1/2"	8.00	EA	8.00	EA
1	Mtl	450	.50010115	-		HHCS, 1/2-13 X 1.3/4"	4.00	EA	4.00	EA
1	Mtl	460	.50010348	-		WASHER, FLAT, 1/2" SAE	12.00	EA	12.00	EA
1	Mtl	470	.50010392	-		WASHER, LOCK, 1/2"	12.00	EA	12.00	EA
1	Mtl	480	.50011014			HHCS M12 X 45 LG. GR 10.9	12.00	EA	12.00	EA
1	Asm	500	.81110152	A		HYDRAULIC HOSE KIT, 6800C T4	1.00	EA	1.00	EA
1	Mtl	530	.70017921	-		150-6000PSI BALANCED PISTON RE	2.00	EA	2.00	EA
1	Mtl	540	.71015169	-		VALVE BODY, SUN	1.00	EA	1.00	EA
1	Mtl	550	.71015720	-		VALVE, SHUTTLE CARTRIDGE, SUN	1.00	EA	1.00	EA
1	Mtl	560	.71015721	-		BODY, IN LINE 90 DEGREE, SUN	1.00	EA	1.00	EA

Table of Content

Appendix D Declaration of Conformity

(1) Original Declaration of Conformity

DECLARATION OF CONFORMITY

ORIGINAL

Business Name and Full Address of Manufacturer

Terex Environmental Equipment: Terex USA LLC: 22 Whittier Street, Newton NH 03858 USA

Name and Address of the Person in Community Authorised to Compile the Technical File (If Different to Above).

Richard Kogelman: General Manager
CBI Europe BV. Fuutweg 6-7442CL- Nijverdal. The Netherlands

Description of product (Commercial Name)

Downswing Wood Grinder/Chipper

Function, Model, Type, Serial Number,

Function: Agricultural & Forestry Wood Grinder/Chipper **Model:** 6400CT
Power supply: CAT C27; 1050 hp + 2 x 12V Batteries **Serial No:** 019099
783 KW ZTN400CT8MN000215

Standards used:

EN ISO 4413 (2010); EN ISO 12100 (2010); EN ISO 13732-1 (2008); EN ISO 13850 (2015); EN ISO 13857 (2008); EN14120 (2015); EN ISO 14122-2 (2016); EN ISO 14122-3 (2016); EN ISO 14122-4 (2016); EN ISO 14982 (2009); EN 16590-1 (2014); EN ISO 22868 (2011) and EN 61310-1 (2008)

Place and Date of Declaration

Place: Newton, New Hampshire USA **Date**: 1/30/2021

Declaration

I declare that the machinery fulfils all the relevant provisions of the following Directives:- Machinery Directive 2006/42/EC, Noise Directive 2000/14/EC and the Electromagnetic Compatibility Directive 2014/30/EU.

Person Empowered to Draw Up Declaration

Name: Nate Fuller

Position: Engineering Manager

Signature:

CE

Page 1 of 1

www.terex.com/environmental-equipment

Terex Environmental Equipment, 22 Whittier Street, Newton, NH 03858 USA
Tel: +1 (603) 382-0556, Fax: +1 (603) 382-0557, Email: NWT.Sales@terex.com

TEREX®
Environmental Equipment

CBI
A TEREX BRAND