

Waratah Engineering

Technical Specification and Customer Configuration Agreement

WMB Mobile Bolter- “Warabolter”

Version: 1

Date: 19/09/2023

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Technical Specification & Customer Configuration Agreement

Quote Ref:		Contract Number:	
Customer:		Mine Location:	
Date:	19/09/2023	Revision:	1

1.0 Document and Customer Approval

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Document Version Control

Version	Description	Date
0	Issued	10/02/23
1	Issued	19/09/23
2		

Waratah Document Outline and Approval

MACHINE:	
TYPE:	
Reviewed by:	
Position:	Engineering Manager
Signature:	Date: 19/09/2023
Approved by:	
Position:	COO
Signature:	Date: 19/09/2023

Customer Configuration Signoff - Approval

Signed for and on behalf of the Customer			
CUSTOMER:			
Approved by:		Position:	
Signature:	Date:		
Signed for and on behalf of Waratah Engineering			
Approved by:		Position:	
Signature:	Date:		

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3.0 Outline

The following document outlines the technical specifications for the Waratah Engineering WMB Mobile Bolter “Warabolter”. The Warabolter is designed with feedback from the Australian underground mining community and is optimised to increase operator performance and reduce fatigue. From the layout of the platform to the simplicity of the controls, Waratah’s engineers have worked to create a machine that is easy to manoeuvre in tight confines and easy to manipulate in operation.

This document details the standard inclusions in the base specification as well as any additional options that are available. Available options are listed in the body or at the end of each section. These options require selection by the customer and together with selections in the standard inclusion section will define the Agreed configuration of the machine to be manufactured.

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4.0 Basic Mine Data – Customer To Supply

Specification Area	Standard Specifications
Seam height (m)	
Minimum Mining Height (m)	
Nominal Mining Height (m)	
Maximum Mining Height (m)	
Bord width (m)	
Pillar Length (m)	
Pillar Width (m)	
Mine Entry – Shaft / Drift	
Mine transport size limitations (m) – Height / Width / Length	
Mine transport limitations – weight (kg)	
Maximum Dip Gradient Ratio	
Maximum Cross Gradient Ratio	
Roof Conditions – strength (MPa)	
Floor Conditions – strength (MPa)	
Main Water Supply – Pressure and Flow Rate	
Roof Bolter – Required Operating Height Range (m)	
Roof Bolter – Required Operating Width Range (m)	
Roof Bolter drill steel details	
Roof Drilling Speed Range (rpm)	
Roof Bolting Torque Required (Nm)	
Roof Bolt type and anchor method	
Mesh Type Used and size	
Roof to Rib Bolter Spacing (m)	
Rib Bolter – Required Operating Height Range (m)	
Rib Bolter – Required Operating Width Range (m)	
Rib Bolter drill steel details	
Rib Drilling Speed Range (rpm)	
Rib Bolting Torque Required (Nm)	
Rib Bolt type and anchor method	
Rib Mesh Type Used and size	
Methane Monitoring Required – Yes / No	
Bolting Pod and accessories storage	Details to be provided by the customer

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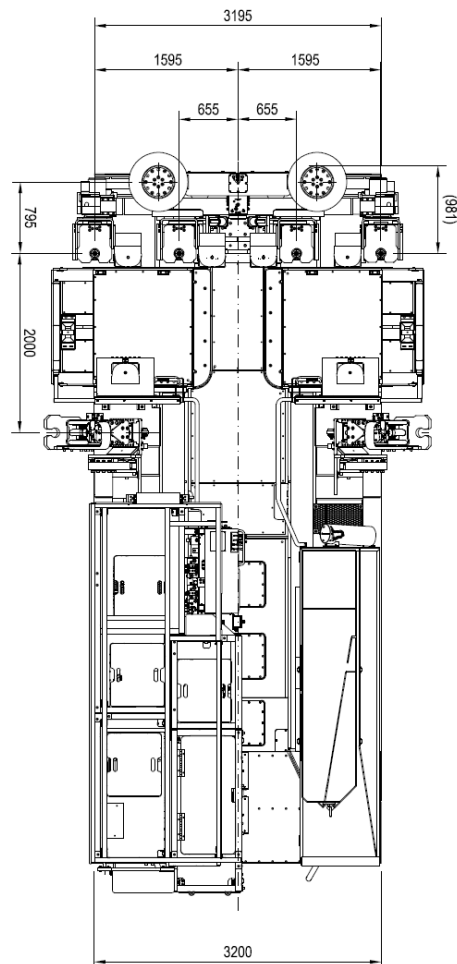
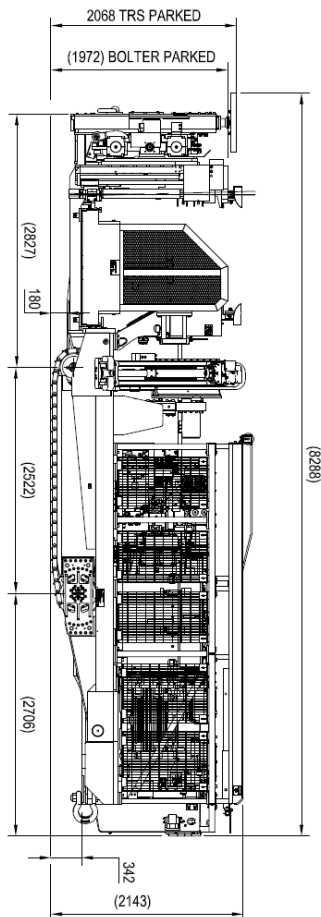
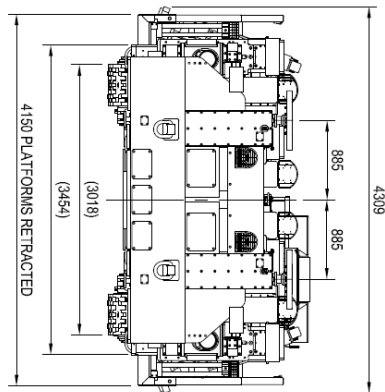
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5.0 Equipment Overview

The following outlines the design characteristics of the two available models of Waratah Engineering Warabolter.

5.1 General Arrangement(s)

Model – WMB2438-677

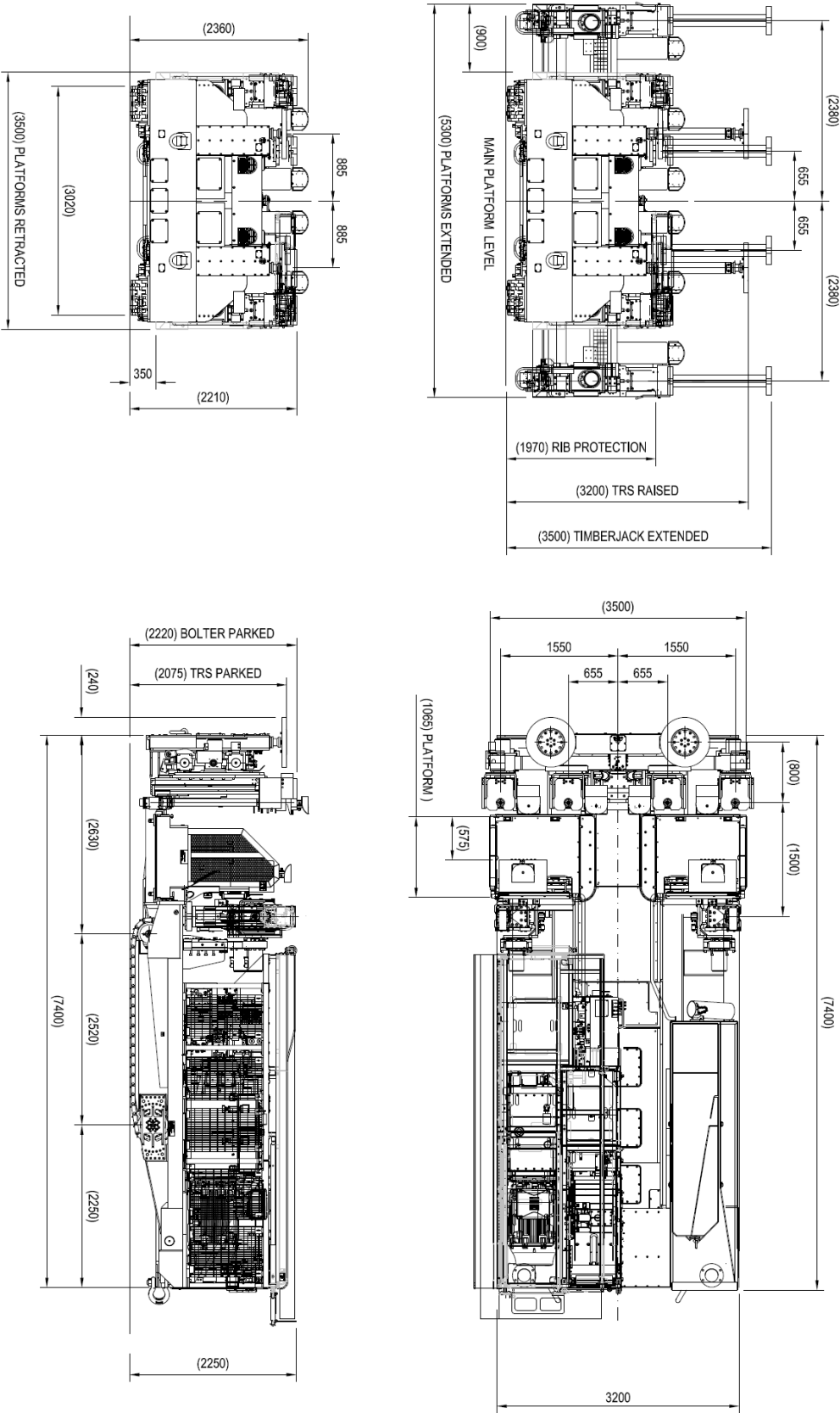


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Model – WMB2232-674



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General Base Line Specifications

Specification Area	Standard Specifications	
Machine Model (Selection Required)	☐ Model – WMB2438-677	☐ Model – WMB2232-674
Installed power	150kW	150kW
GVM	44,000 kg	43,000 kg TBC
Machine Tare Weight (kg)	41,000 kg	40,000 kg TBC
Tram Width (mm)	4132	3500
Tram Height Range (mm)	2262	2262
Tram Length (mm)	8300	7600
Max Operating Width (mm)	6500	5200
Max Operating Platform Area (m ²)	5.25	4.25
Bolting Orientation	North / South	North / South
Roof Bolter type - Standard	Waratah Engineering / RUS	Waratah Engineering / RUS
Rib Bolter type – standard	Waratah Engineering / RUS	Waratah Engineering / RUS
Control System type -	WRB Series 1 Control System	WRB Series 1 Control System
Operating Noise (Rig operation at station)	94 dBA	94 dBA
Hydraulic System Operating Pressure	330 Bar	330 Bar
Water Filtration	Backflush Filter200 Micron	Backflush Filter200 Micron
Paint: 1 coat zinc primer, 2 coats enamel	Shimmer Blue	Shimmer Blue

6.0 Technical Specification

The following Tables detail the specification of the machine to be supplied as agreed with the customer.

6.1 Chassis Data

Specification Area	Standard Specifications	
Construction Material	Mild Steel / Bisalloy	
Recovery Point	2 x 16.5T Rud Lugs (front)	
Floor jacks	Front / Rear	
Machine Asset Number Identification	150mm high steel lettering welded to frame & Machine Label	
Machine Model (Selection Required)	☐ Model – WMB2438-677	☐ Model – WMB2232-674
Nominal Machine Height (mm)	2260	2260
Nominal Ground Clearance (mm)	185	185
Nominal Machine Length (mm)	7700	7400
Machine Width - platforms parked(mm)	3200	3200
Machine Height – Floor Jacks Extended	2430	2430

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6.2 Traction Drive Data

Specification Area	Standard Specifications
Traction Drive Type	Dual Rexroth GFT 36 hydraulic motor and gearbox
Control Type	Manual-hydraulic controls
Crawler Centres (mm)	2560 mm
Crawler Pad Width (mm)	460 mm
Ground Bearing Pressure (kPa)	216 kPa
Rated Gradeability	1 in 8 inline. 1 in 12 Cross grade
Rated Speed Flat Ground	1.9 km/h

6.3 Brake Data

Specification Area	Standard Specifications
Compliance Standards	SANS 1589 MDG 39
Standard Brake Type	Rexroth GFT36

6.4 Hydraulic System

Specification Area	Standard Specifications
Approvals	MDA approved braking system. TBA
Pump	Load Sense 210L/min @330 Bar
Pump motor	150 kW 1000V AC
Operating pressure	330 bar
Filters:	10 micron absolute, Return
Tanks:	625 Litre + 375 Litre Chassis Tank. Inspection door, internal baffles. Sight glass fitted with mechanical protection
Cooling Method	Oil / water heat exchanger, chassis tanks
Power fill	Rexroth Flow divider
Hydraulic oil	Grade ISO VG 68
Hoses and fittings	MDG 41 Compliant / RS023
Hard Piping	Throughout Centre walkway and Platforms
TRS (Temporary Roof Support)	Dual Waratah TRS
TRS Design Nominal Force	170kN

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6.5 Roof Bolters Data

Specification Area	Specifications		
Roof Bolter Type	RUS JK		
Roof Bolter Control	Hydraulogic Logibolt		
Number of Roof Bolters	4		
Installation Configuration	North / South		
Rotation Type	Two Speed		
Chuck Type	25mm Square Drive		
Water Pressure – Operating Range	87 – 362psi		
Rotation Torque	355Nm		
Rotation Speed	643rpm		
Rib Protection	Yes		
Headplate Configuration (0° - 45° - 90°) (Selection Required)	☐ 0°	☐ 45°	☐ 90°

6.6 Rib Bolters Data

Specification Area	Specifications		
Rib Bolter Type	RUS JK		
Rib Bolter Control	Hydraulogic Logibolt		
Number of Rib Bolters	2		
Rotation Type	Two Speed		
Chuck Type	25mm Square Drive		
Water Pressure – Operating Range	87 – 362psi		
Rotation Torque	355Nm		
Rotation Speed	643rpm		
Rib Protection	Yes		

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6.7 General Electrical System

Safety upgrades include I.S. Machine stops & Lighting System and Main Enclosure Live Line indication.

Specification Area	Standard Specifications
Flameproof Main Enclosure:	- FK2005 Main Enclosure - Integrated isolation. - Integrated lockable control reset switches
Live Line Indication	Visual Indication of Machine Isolation
Contactors	A vacuum contactor is used within the electrical system
Protection	- Incoming Phase Loss / Phase Rotation - Control and Lighting Earth Leakage - Motor Protection – temperature, current, phase imbalance & phase loss
Headlights	ATF251 Flameproof headlights
Area Lights	Ampcontrol IS Area Lights
Machine Stops	8 x Waratah I.S Machine stops located around the machine
Emergency Stop	1 x Emergency Pilot Stop located on the main enclosure
Junction Boxes	Waratah Engineering LK2007 (Approval IECEx SIM 08.0008X)
Cables	Machine Cables AS/NZ1972 compliant installed in FRAS hosing
Alarm	Intrinsically Safe DB5 Sounder
Pressure Switch	Intrinsically Safe Pressure Switches Brake, Tram, Mode
Methane Make & Model	Ampcontrol Gas guard 1
Number of Methane Heads	1
Diagnostic Displays	Beijer X2 Pro4 – B2
Low Oil Indication	Warning and trip levels indicated on display
Emergency Shut-off Type	Emergency stop fitted as well as lockable isolation handle
FRAS cover on all external cables	Alfagomma FRAS Hose, FRAS rated spiral wrap on all exposed cables and hoses
Control Wire Markers	All control wiring fitted with identification numbers

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6.8 Cable Reel System

Specification Area	Standard Specifications	
Side Plates Diameter	1120mm Cheek plates	
Cable Capacity (Selection Required)	☐ 290m of 25mm ² cable	☐ 250m of 35mm ² cable
Cable Reel Receptacle	125-amp Right angle (Banana Plug) Receptacle	
Cable Indexing Unit	Waratah Engineering Cable Minder	
Overfill protection	LAN Overfill Device	
Run –out protection	Waratah Engineering integrated cable reel run-out protection switch	
Hub design	RK2005 – flameproof enclosure	
Cable sheave rollers	FRAS Rated Polyurethane	
Cable reel covers	Hinged steel covers	

7.0 Customer Requested Specific Details, Changes, Upgrades

List any items not covered in the checklist above:-

Specification Area	Options Available (Select or Complete missing information as Applicable)

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8.0 Documentation

8.1 Design documentation

Design Supporting Documentation is provided with every new Warabolter

Standard Engineering Audits and Assessments
SIL Assessment
Machine Audits – Australian Standards
Machine Audits – Mechanical Design Guidelines
Design Risk Assessment
Hydraulic System DFMEA

8.2 Safety file Documentation

A Comprehensive Safety File is provided with every new Warabolter including:-

Specification Area	Standard Specifications
Verification Dossier	Book 1 - 1 x electronic copy, 1 x paper copy.
Safety Dossier 1 – Compliance & Audits	Book 2 - 3 - 1 x electronic copy, 1 x paper copy.
Safety Dossier 2 – Build Documents	Book 4 - 1 x electronic copy, 1 x paper copy.
Safety Dossier 3 – Machine Modifications	Book 5 – Blank Folder 1 x electronic copy, 1 x paper copy.
Technical Manual	Book 6 - 1 x electronic copy, 1 x paper copy.
Parts Manual	Book 7 - 1 x electronic copy, 1 x paper copy.
Training Manual	Book 8 - 1 x electronic copy, 1 x paper copy.
Bolter Package	Book 9 & 10 – Blank Folder 1 x electronic copy, 1 x paper copy.
Superseded Dossier	Book 11 – Blank Folder 1 x electronic copy, 1 x paper copy.

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8.3 Design Standards and Regulations

Specification Area	Standard Specifications
Brake Design	SANS 1589 and MDG 39
Cabin Protection device	ISO 3164, ISO 3449 and MDG 1
Ergonomics	MIL.Std 1472F – Department of Defence Design Criteria Standard, Human Engineering Practical Ergonomics – Application of ergonomics principles in the workplace.
Electrical and Systems Designs	• ASNZS 600079. 0 – Electrical apparatus for explosive gas atmospheres – General requirements • ASNZS 600079. 1- Flame proof enclosures • ASNZS 600079. 7 – Increased Safety • ASNZS 600079. 11- Intrinsically Safe • AS61508. Parts 0 to 7 – Safety of Machinery, Functional Safety of safety related E/E/PE control systems. • AS62061 – Safety of Machinery – Functional Safety of Safety – Related Electrical, Electronic and Programmable Electronic Control Systems. • AS4024 – Safety of Machinery • AS/NZS 4024.1204 – Safety of Machinery – Electrical Equipment of Machines Part 1 General Requirements • AS4871.1 - Electrical equipment for mines and quarries - General requirements • AS4871.4 - Electrical equipment for mines and quarries - Mains powered electrical mobile machines • AS 2380 .1 - Electrical equipment for explosive atmospheres - Explosion-protection techniques - General requirements • AS 2380 .2 - Electrical equipment for explosive atmospheres - Explosion-protection techniques - Flameproof enclosure • AS 2381.1 – Electrical equipment for explosive gas atmospheres - Selection, installation, and maintenance - General requirements • AS 2381.2 - Electrical equipment for explosive atmospheres - Selection, installation, and maintenance - Flameproof enclosures
Mine Department Regulations	• MDG 1 - Guideline for Free Steered Vehicles (Revised 1995) • MDG 15 - Guidelines for Mobile and Transportable Equipment for Use in Mines • MDG 39 – Handbook for Approval Assessment of Transport Braking Systems on Free Steered vehicles in Underground Coal Mines • MDG 41 – Guideline for Fluid Power System Safety at Mines