

# Specifications

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## *Lovat RME181SE / Series 16900 (Screw on Invert Configuration)*

### **Basic Dimensions**

Shield Diameter	180.3	in.
Length of TBM	25	Ft.
Length of Back-Up	160	Ft.

### **Tunnel Lining**

Prefabricated Concrete Segments		
Configuration: 5 segments, 1 key	6	No.

### **Cuttinghead**

#### ***Structural***

Spokes (Cantilever Structure Design)	4	No.
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#### ***Cuttinghead and Chamber Features***

Abrasion Resistant Plating on Cuttinghead Face and Rim		
Face Injection Port Assemblies	5	No.

#### ***Cutting Tools (Hard Rock Configuration)***

Single Disc Cutters (14" Diameter)	26	No.
Twin Disc Cutters (14" Diameter)	4	No.
Scraper Tools	64	No.

#### ***Cutting Tools (Soft Ground Configuration)***

Ripper, Face	25	No.
Ripper, Gauge (various geometry)	5	No.
Centre Fishplate	1	No.
Scraper Tools	64	No.

## Main Drive – Variable Frequency Electric Drive

### *General*

Clockwise and Counter-Clockwise Rotation

Variable speed

Inching function for maintenance

### *Planetary Gear Boxes*

Quantity	4	No.
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Water Cooled

### *Electric Motors*

Quantity	4	No.
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Water Cooled

Individual Capacity	200	kW
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Total Available Power to Cuttinghead	800	kW
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Operating Voltage	600	V
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### *Torque Limiters*

Quantity	4	No.
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Mechanical type

### *Main Bearing*

Triple Roller Bearing

Lubricated by an independent pressurized oil lubrication system

Sampling Points for monitoring of lubrication oil quality

### *Cuttinghead Drive Speed after Efficiencies*

Speed at Maximum Torque	2.3	rpm
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Speed at Nominal Torque	4.6	rpm
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## Main Drive Oil Sealing System

Multi stage type

Inner and Outer Diameter Sealing System

Single Lip type Seals

Sealing System “Fail-Safe”, malfunction initiates shutdown of Main Drive

Positively Pressurized Automatic Sealing System controlled by the PLC  
w/input from Earth Pressure Sensors

## Forward Shell

Earth Pressure Sensors in Cuttinghead Chamber	6	No.
Injection Ports in Cuttinghead Chamber	4	No.
Consolidation / Injection Ports on Forward Shell Periphery	10	No.
Personnel Access Hatch into Cuttinghead Chamber	1	No.

## Rotary Fluid Joint (Swivel)

Fluid transfer to the Cuttinghead Chamber and Face

Penetrations through Pressure Bulkhead for Utilities

## Active Articulation System

Connection between Forward Shell and Stationary Shell

Articulation Cylinders	16	No.
Articulation Angle	0 - 2	°
LDTs – One for each Quadrant	4	No.
Articulation Seal – Dynamic	2	No.

## Stationary Shell

Consolidation / Injection Ports on Stationary Shell Periphery		No.
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## Rear Support

Support for Forward Facing Probe Drill

### ***Automatic Tilt Control***

Electric Level Switches

Trip point adjustment range between	0.5 to 6	°
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### ***Propulsion***

Quantity of Cylinders	16	No.
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Maximum Capacity of Cylinder	115	ton
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Total Maximum Thrust	1,840	ton
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Operating Pressure at Maximum Thrust	4,000	psi
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Soft Mode for Segment Erection

Push Ring

### **Operators Station**

Located in the Stationary Shell

Controls for TBM mining functions

### ***Programmable Logic Controller (PLC)***

The TBM is equipped with a PLC (Programmable Logic Controller). The PLC is used to control the machine and record information from sensors. Any information in the PLC is sent to and displayed with HMI software (Human Machine Interface). The HMI software, which is run on an Industrial PC located in the TBM or Operators Cabin, can also record the information.

### ***Industrial Work Station (Located in the TBM)***

LCD Color Display

Windows HMI Program for information display

### **Trailing Shield**

#### ***Tail Seals***

Rows of Wire Brush Tail Seals	3	No.
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Invert Grout Flap on Last Row

## Muck Removal System

### *Screw Conveyor*

Nominal Diameter	32	in.
Overall Length	70	Ft.
Bi-Directional Operation		
Replaceable Auger Tip		
Injection Ports (Ground Conditioning)	11	No.
Retractable from Cuttinghead Chamber		
Inspection Ports – located at Auger Joints		
Bottom Discharge		
Guillotine Door over Discharge		

### *Trailing Belt Conveyor*

Length ( no. sections)	120	ft.
Sections		
Limber Rollers		
Rigid Rollers		
Belt Scrapers		

## Segment Handling and Erection Systems

### *Segment Transport Beam*

Single Segment Lift Operation
Delivers Segment to Erector
Hydraulic Operation and Controls
Ball Type Pick Up System

### *Segment Erector – Ring Type*

Ball Type Pick Up System
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Hydraulic Powered

Hydraulic Control of all Functions

### Trailing Gantry

Structural Steel, c/w: welded and bolted connections

Railing Up

Gantry Sections	7	No.
Structure Type	Open	
Support Type	Sleds	

### Support of TBM Ancillary Equipment

Walkways

### Electrical

Transformer (Class1, Div. 2)	1,875	kVA
Primary Voltage	4.16	kV
Secondary Voltage	600	V

### Gas Monitoring System

Monitoring points at the Screw Conveyor Discharge and in the TBM working area

### Ground Conditioning System

Injection Rate (Measured @ Atmospheric Pressure)	21.2	gpm
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Includes:

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|---|---|-----|
| • Pressure Meters for main water and air line |   |     |
| • Foam dosing peristaltic pump                | 1 | No. |
| • Polymer dosing peristaltic pump             | 1 | No. |

### Two-Component Grout System

A Component Injection Peristaltic Pump (7.5 HP)	2	No.
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B Component Injection Peristaltic Pump (1 HP)	2	No.
A Component Tank c/w agitator and level sensor	1500	gal
B Component Tank c/w level sensor	150	gal
Total Outlet Points	2	No.
Includes Local Controls and Pressure Sensors		

### Cooling Water Inlet Requirements

Required Inlet Flow	91.5	gpm
Maximum Inlet Temperature	73	°F
Maximum Inlet Pressure	100	psi