

Mincon HDD Tools

Product Catalogue



"The Driller's Choice Worldwide"

Mincon.com



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1 The Mincon HDD Story

In 2002 Mincon, in collaboration with leading industry professionals, started design and manufacturing of a range of pneumatically powered horizontal directional drilling systems to service the trenchless utility industry. Since then the tools have become the benchmark for steerable drilling systems in medium to hard rock where conventional directional drilling systems struggle.

The Mincon Hard Rock Range offers the most complete line of steerable hammer systems on the market, covering pilot holes from 3 ½" (89mm) to 9 ¼" (235mm) the tools can be used on mini class HDD machines to large Pipeline Class machines. With the Mincon Hard Rock Support Station and hosing any conventional HDD machine can be converted for rock drilling. The sonde carriage can be easily adapted to your existing locating equipment.

Utilizing "high Frequency Cycle" technology Mincon hammer systems provide many benefits to the contractor. Small chip production and faster material removal from the bit face keeps the bore hole cleaner and reduces the possibility of getting stuck. With less vibration to the drill string you ensure less wear and tear to the rig and locating sonde. Steering capabilities are greatly improved and in head to head tests against other competitor manufacturers the Mincon Hard Rock systems out steered in dirt, cobble and solid rock.

Mincon offers the revolutionary Pull Reamer system. Once the pilot hole has been drilled, the pilot hammer and sonde is removed and the Mincon Pull Reamer is attached to the drill string. The Pull Reamer is then drawn back towards the drill machine and the system is capable of hammer reaming from 7" (178mm) to a maximum of 14" (356mm). This innovative reaming method is the fastest way to ream a rock bore and is vastly superior to conventional methods in all rock conditions.

The philosophy at Mincon is to provide "World Class" products, training, service and support. We like to think that we are with you from beginning to end. The Mincon Hard Rock Horizontal Directional Drilling Range are the only systems available that can offer the contractor the peace of mind that comes with superior performance, reliability, innovation and complete support. Be wary of imitators that promise the world but just can't deliver.

2 Mincon HDD Pilot Hammer System Features

The Mincon range of HDD Pilot Hammers is designed around proven technology to perform at the top end of the performance scale compared to other tools on the market. While providing the most complete range of pilot hammers, Mincon also provides their world class design and technology including:

- Dual steering point design incorporating slanted drill bit and 2° bent sub provides more responsive steering capabilities while transitioning in and out of rock formations.
- High frequency hammer cycle transmits less vibration that can be detrimental to sensitive electronics. Rock formations fracture into smaller pieces which are easier to flush out of the bore hole. Less Stress Transmits to pipe joints and gearbox assembly reducing maintenance requirements to drill. Provides the most effective steering in any pneumatically powered HDD system.
- High pressure/high volume compressed air powers drilling operations and requires minimal torque and feed pressure loads on drill machine increasing overall life of drill.
- Shorter body design compared to competitive models allows for easier steering in the bore hole and less rotational stresses on hammer body.
- Existing locating electronics (DCI, Subsite, or WIRELINE) can be used with no additional cost to the contractor.
- Support Station delivers compressed air mixed with a water/polymer (5-9 gal/min) and rock drill oil (2-4 pints/hr) to operate the drilling cycle resulting in minimal environmentally friendly clean up. Can be used on environmentally sensitive locations using Mincon Envirosafe RDO biodegradable rock drill oil.



3 Mincon HDD Pilot Hammer Systems Parts and Specifications

The following pages contain the breakdown of the Mincon HDD Pilot Systems. Each model can be purchased as a complete package including a Mincon Support Station Crate or a Mincon Remote Control or Manual Oiler. Each model can also be purchased as a Hammer Crate. Parts breakdown for each is given, as well as subsequent breakdowns of the Sonde Housing and Hammer.



3.1 Mincon HDD30 Hard Rock Systems

Item	Description	Part Number
Mincon HDD30 Hard Rock System with Support Station		MHDD30AS01
1	Mincon HDD30 Hard Rock Hammer Crate	MHDD30AS11
2	Mincon Support Station Crate	M103 072 01

Item	Description	Part Number
Mincon HDD30 Hard Rock System with Remote Control Oiler		MHDD30AS02
1	Mincon HDD30 Hard Rock Hammer Crate	MHDD30AS11
2	Mincon Remote Control Oiler Crate	M103 072 03

Item	Description	Part Number
Mincon HDD30 Hard Rock System with Manual Control Oiler		MHDD30AS03
1	Mincon HDD30 Hard Rock Hammer Crate	MHDD30AS11
2	Mincon Manual Oiler Crate	M103 072 00

3.1.1 Mincon HDD30 Hard Rock Hammer Crate

Item	Description	Part Number
Mincon HDD30 Hard Rock Hammer Crate		MHDD30AS11
1	Mincon HDD30 Sonde Housing	MHS201AS01
2	Mincon HDD30 Hammer	MHD201AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD226SK01
7	Service Kit (Sonde Housing)	MHS226SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	34HD30SDIR
10	HDD30 Timing Shim (0.015")	MN03015
11	HDD30 Timing Shim (0.030")	MN03030
12	HDD30 Timing Shim (0.060")	MN03060

3.1.2 Mincon Support Station Crate

Item	Description	Part Number
Mincon Support Station Crate		M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x 3/4" Water Hose with 3/4" Camlock Couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

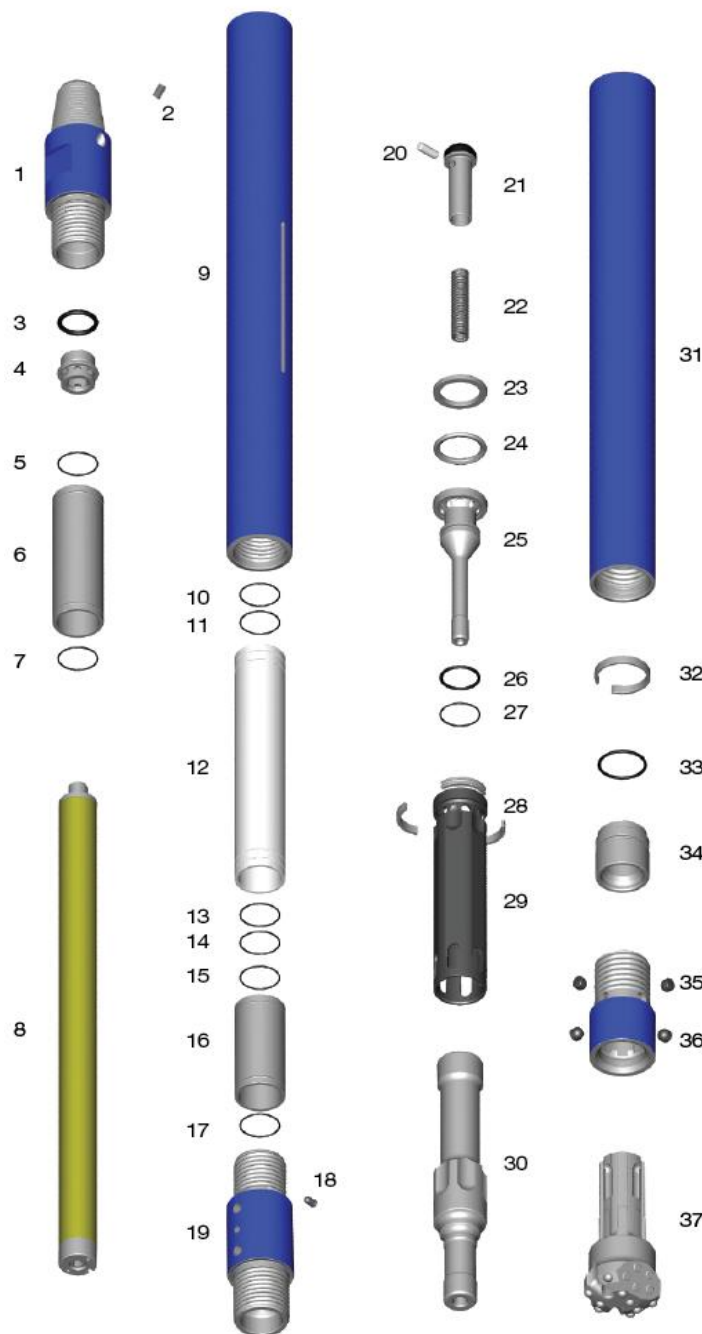
3.1.3 Mincon Remote Control Oiler Crate

Item	Description	Part Number
Mincon Remote Control Oiler Crate		M103 072 03
1	Mincon Remote Control Oiler	M103 072 04
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	Safety Whip Checks x 4	M103 020 71

3.1.4 Mincon Manual Oiler Crate

Item	Description	Part Number
Mincon Manual Oiler Crate		M103 072 00
1	Mincon Manual Control Oiler	M103 072 02
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
5	Safety Whip Checks x 4	M103 020 71

3.1.5 Mincon HDD30 Sonde Housing and Hammer Parts and Specifications



Item	Description	Part Number
Mincon HDD30 Sonde Housing		MHS201AS01
1	Sonde Housing Backhead (2 3/8" API Reg. Pin)	MHS201BH01
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	O Ring	MHS222OR01
4	Diverter	MHS202DV02
5	O Ring	MHS221OR02
6	Top Sonde Spacer	MHS203TS02
7	O Ring	MHS221OR02
8	Sonde Carriage (Not Included)	MN585
9	Sonde Housing Sleeve	MHS211SH02
10	O Ring	MHS221OR02
11	O Ring	MHS221OR02
12	Sealing Sleeve	MHS204SL02
13	O Ring	MHS221OR02
14	O Ring	MHS221OR02
15	O Ring	MHS221OR02
16	Bottom Sonde Spacer	MHS205BS02
17	O Ring	MHS221OR02
18	Locating Pin	MHS208LP02
Service Kit		MHS226SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 3, 5, 7, 10, 11, 13, 14, 15, 17)	MHS225OK01
Mincon HDD30 Hammer		MHD201AS01
19	Bent Sub	MHD201BH02
20	Choke Blank	MB506CH01
21	Check Valve	MB302CV01
22	Spring	MB503SP01
23	Steel Make Up Ring	MS304SM01
24	Lock Ring	MS305LR01
25	Air Distributor	MS307DR02
26	O Ring	MB321OR01
27	O Ring	MB322OR01
28	Seating Ring	MS309SR01
29	Inner Cylinder	MS308IC02
30	Piston	MS310PN02
31	Wear Sleeve	MHD211WS01
32	Piston Retaining Ring	MS312PR01
33	O Ring	MD421OR01
34	Aligner	MS313BB01
35	Bit Retaining Pieces	MS313BR02
36	Chuck	MHD214CK01
37	Drill Bit	34HD30SDIRD
Service Kit		MHD226SK01
17	Choke Blank	MB506CH01
	Choke 1/8" (3.2mm)	MB506CH02
	Choke 3/16" (4.8mm)	MB506CH03
19	Spring	MB503SP01
	O Ring Kit (Items 26, 27, 33)	MHD225OK01

Specifications

	Metric	Imperial
Hammer Outside Diameter	77mm	3.03"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1713mm	66.4"
Backhead Spanner Flat Size	64mm	2.5"
Drill Bit Shank Type	HDD30	
Pilot Bit Size	89mm	3.5"
Hammer Weight (Less Bit)	38.6Kgs	85Lbs
Piston Weight	4.1 Kgs	9 Lbs
Bent Sub to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	3050 – 4045 NM	2250 – 3000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	177 l/s @ 17.2 Bar	375 cfm @ 250 psi
Recommended Minimum Air Package (>250ft Bore Length)	236 l/s @ 24.1 Bar	500 cfm @ 350 psi



3.2 Mincon HDD40 Hard Rock System

Item	Description	Part Number
	Mincon HDD40 Hard Rock System with Support Station	MHDD40AS01
1	Mincon HDD40 Hard Rock Hammer Crate	MHDD40AS11
2	Mincon Support Station Complete	M103 072 01

Item	Description	Part Number
	Mincon HDD40 Hard Rock System with Remote Control Oiler	MHDD40AS02
1	Mincon HDD40 Hard Rock Hammer Crate	MHDD40AS11
2	Mincon Remote Control Oiler Crate	M103 072 03

Item	Description	Part Number
	Mincon HDD40 Hard Rock System with Manual Control Oiler	MHDD40AS03
1	Mincon HDD40 Hard Rock Hammer Crate	MHDD40AS11
2	Mincon Manual Oiler Crate	M103 072 00

3.2.1 Mincon HDD40 Hard Rock Hammer Crate

Item	Description	Part Number
	Mincon HDD40 Hard Rock Hammer Crate	MHDD40AS11
1	Mincon HDD40 Sonde Housing	MHS301AS01
2	Mincon HDD40 Hammer	MHD301AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD326SK01
7	Service Kit (Sonde Housing)	MHS326SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	42HD40SDIRD
10	HDD40 Timing Shim (0.015") x 2	MN04015
11	HDD40 Timing Shim (0.030") x 2	MN04030
12	HDD40 Timing Shim (0.060") x 2	MN04060

3.2.2 Mincon Support Station Crate

Item	Description	Part Number
	Mincon Support Station Crate	M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x 3/4" Water Hose with 3/4" Camlock couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

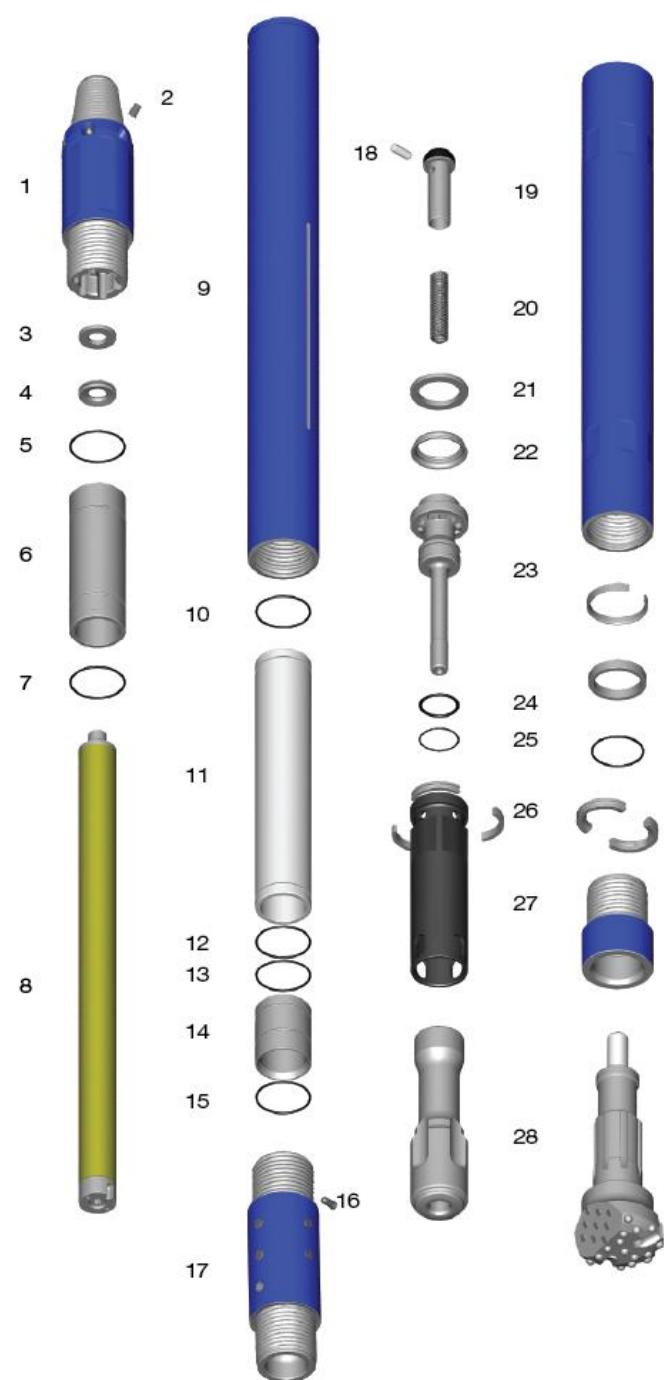
3.2.3 Mincon Remote Control Oiler Crate

Item	Description	Part Number
	Mincon Remote Control Oiler Crate	M103 072 03
1	Mincon Remote Control Oiler	M103 072 04
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	Safety Whip Checks x 4	M103 020 71

3.2.4 Mincon Manual Oiler Crate

Item	Description	Part Number
	Mincon Manual Oiler Crate	M103 072 00
1	Mincon Manual Oiler	M103 072 02
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
5	Safety Whip Checks x 4	M103 020 71

3.2.5 Mincon HDD40 Sonde Housing and Hammer Parts and Specifications



Item	Description	Part Number
Mincon HDD40 Sonde Housing		MHS301AS01
1	Sonde Housing Backhead (2 ³ / ₈ " API Reg. Pin)	MHS301BH02
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	Spacer	MHS304SM01
4	Compression Ring	MHS305LR01
5	O Ring	MHS321OR01
6	Sonde Spacer	MHS302SS01
7	O Ring	MHS321OR01
8	Sonde Carriage (Not Included)	MN585
9	Sonde Housing Sleeve	MHS311SH01
10	O Ring	MHS321OR01
11	Sealing Sleeve	MHS306SL01
12	O Ring	MHS321OR01
13	O Ring	MHS321OR01
14	Carriage Guide	MHS307CG01
15	O Ring	MHS321OR01
16	Locating Pin	MHS308LP01
Service Kit		MHS326SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 5, 7, 10, 12, 13,15)	MHS325OK01
Mincon HDD40 Hammer		MHD301AS01
17	Bent Sub	MHD301BH01
18	Choke Blank	MB506CH01
19	Check Valve	MB302CV01
20	Spring	MB503SP01
21	Steel Make Up Ring	MB304SM01
22	Lock Ring	MB305LR01
23	Air Distributor	MB307DR01
24	O Ring	MB321OR01
25	O Ring	MB322OR01
26	Seating Ring	MB309SR01
27	Inner Cylinder	MB308IC02
28	Piston	MB310PN01
29	Wear Sleeve	MHD311WS01
30	Piston Retaining Ring	MB312PR01
31	Bit Spacer	MB317BS01
32	O Ring	MB320OR01
33	Bit Retaining Ring	MB313BR02
34	Chuck HDD40	MHD314CK01
35	Drill Bit	42HD40SDIRD
Service Kit		MHD326SK01
18	Choke Blank	MB506CH01
	Choke ¹ / ₈ " (3.2mm)	MB506CH02
	Choke ³ / ₁₆ " (4.8mm)	MB506CH03
20	Spring	MB503SP01
	O Ring Kit (Items 24, 25, 32)	MHD325OK01

Specifications

	Metric	Imperial
Hammer Outside Diameter	85mm	3.35"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1867mm	73.5"
Backhead Spanner Flat Size	82mm	3.23"
Drill Bit Shank Type	HDD40	
Pilot Bit Size	108mm	4.25"
Hammer Weight (Less Bit)	49.4Kgs	109Lbs
Piston Weight	3.6 Kgs	8 Lbs
Bent Bit to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	3050 – 4045 NM	2250 – 3000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	189 l/s @ 17.2 Bar	400 cfm @ 250 psi
Recommended Minimum Air Package (>250ft Bore Length)	330 l/s @ 24.1 Bar	700 cfm @ 350 psi



3.3 Mincon HDD50 Hard Rock System

Item	Description	Part Number
	Mincon HDD50 Hard Rock System with Support Station	MHDD50AS01
1	Mincon HDD50 Hard Rock Hammer Crate	MHDD50AS11
2	Mincon Support Station Complete	M103 072 01

Item	Description	Part Number
	Mincon HDD50 Hard Rock System with Remote Control Oiler	MHDD50AS02
1	Mincon HDD50 Hard Rock Hammer Crate	MHDD50AS11
2	Mincon Remote Control Oiler Crate	M103 072 03

Item	Description	Part Number
	Mincon HDD50 Hard Rock System with Manual Control Oiler	MHDD50AS03
1	Mincon HDD50 Hard Rock Hammer Crate	MHDD50AS11
2	Mincon Manual Oiler Crate	M103 072 00

3.3.1 Mincon HDD50 Hard Rock Hammer Crate

Item	Description	Part Number
	Mincon HDD50 Hard Rock Hammer Crate	MHDD50AS11
1	Mincon HDD50 Sonde Housing	MHS401AS01
2	Mincon HDD50 Hammer	MHD401AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD426SK01
7	Service Kit (Sonde Housing)	MHS426SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	52HD50SDIRD
10	HDD50 Timing Shim (0.015") x 2	MN05015
11	HDD50 Timing Shim (0.030") x 2	MN05030
12	HDD50 Timing Shim (0.060") x 2	MN05060

3.3.2 Mincon Support Station Crate

Item	Description	Part Number
	Mincon Support Station Crate	M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x 3/4" Water Hose with 3/4" Camlock couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

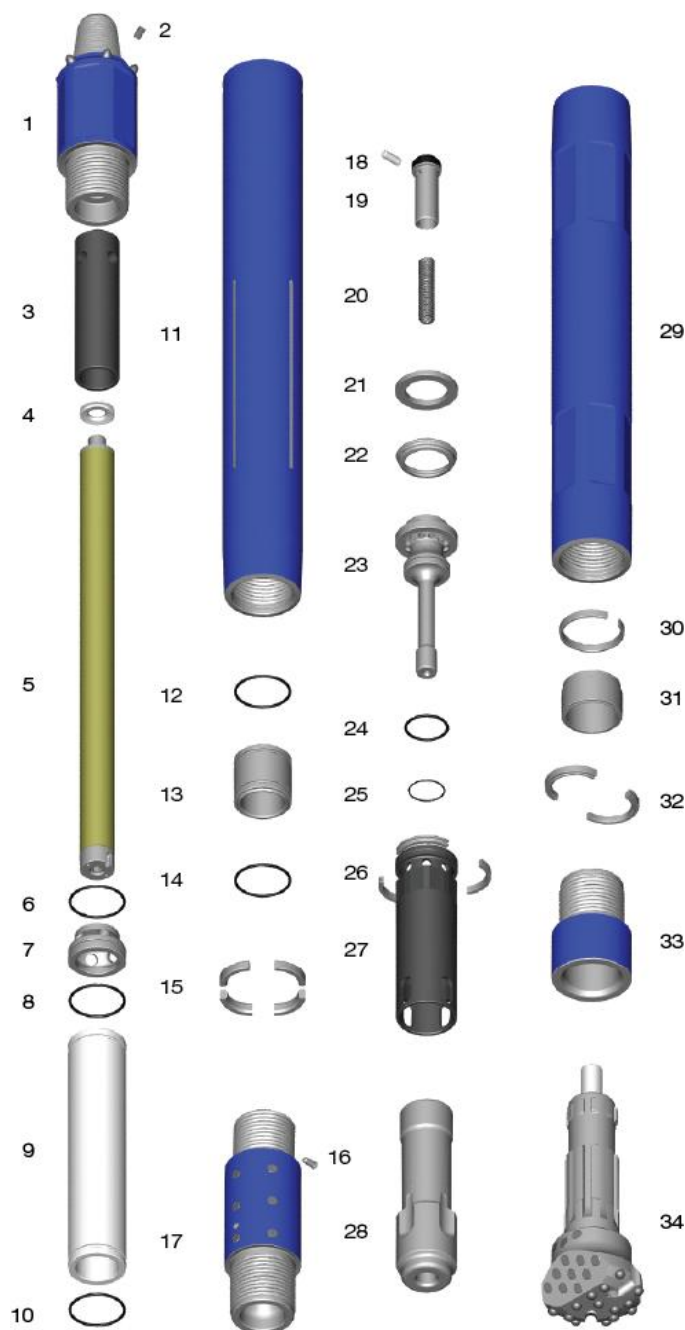
3.3.3 Mincon Remote Control Oiler Crate

Item	Description	Part Number
	Mincon Remote Control Oiler Crate	M103 072 03
1	Mincon Remote Control Oiler	M103 072 04
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	Safety Whip Checks x 4	M103 020 71

3.3.4 Mincon Manual Oiler Crate

Item	Description	Part Number
	Mincon Manual Oiler Crate	M103 072 00
1	Mincon Manual Oiler	M103 072 02
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
5	Safety Whip Checks x 4	M103 020 71

3.3.5 Mincon HDD50 Sonde Housing and Hammer Parts and Specifications



Item	Description	Part Number
Mincon HDD50 Sonde Housing		MHS401AS01
1	Sonde Housing Backhead (2 3/8" API Reg. Pin)	MHS401BH02
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	Sonde Spacer	MHS402SS01
4	Compression Ring	MHS305LR01
5	Sonde Carriage (Not Included)	MN585
6	O Ring	MHS421OR01
7	Diverter	MHS405DV01
8	O Ring	MHS421OR01
9	Sealing Sleeve	MHS406SL01
10	O Ring	MHS421OR01
11	Sonde Housing Sleeve	MHS404SH01
12	O Ring	MHS421OR01
13	Carriage Guide	MHS407CG01
14	O Ring	MHS421OR01
15	Seating Ring	MHS403SR01
16	Locating Pin	MHS408LP01
Service Kit		MHS426SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 6, 8, 10, 12, 14)	MHS425OK01
Mincon HDD50 Hammer		MHD401AS01
17	Bent Sub	MHD401BH02
18	Choke Blank	MB506CH01
19	Check Valve	MB502CV01
20	Spring	MB503SP01
21	Steel Make up Ring	MD404SM01
22	Lock Ring	MD405LR01
23	Air Distributor	MD407DR03
24	O Ring	MD421OR01
25	O Ring	MD422OR01
26	Seating Ring	MD409SR01
27	Inner Cylinder	MD408IC02
28	Piston	MD410PN04
29	Wear Sleeve	MHD411WS02
30	Piston Retaining Ring	MD412PR01
31	Aligner	MHD413BB01
32	Bit Retaining Ring	MHD413BR01
33	Chuck HDD50	MHD414CK01
34	Drill Bit	52HD50SDIRD
Service Kit		MHD426SK01
	Choke Blank	MB506CH01
	Choke 1/8" (3.2mm)	MB506CH02
	Choke 3/16" (4.8mm)	MB506CH03
	Spring	MB503SP01
	O Ring Kit (Items 24, 25)	MHD425OK01

Specifications

	Metric	Imperial
Hammer Outside Diameter	103mm	4.06"
Hammer Length (Sonde Backhead Shoulder to Chuck)	2007mm	79"
Backhead Spanner Flat Size	96mm	3.78"
Drill Bit Shank Type	HDD50	
Pilot Bit Size	133mm	5.25"
Hammer Weight (Less Bit)	81.8Kgs	180Lbs
Piston Weight	7.7 Kgs	17 Lbs
Bent Sub to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	4050 – 5425 NM	3000 – 4000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	354 l/s @ 20.7 Bar	700 cfm @ 300 psi
Recommended Minimum Air Package (>250ft Bore Length)	425 l/s @ 24.1 Bar	900 cfm @ 350 psi



3.4 Mincon HDD60 Hard Rock System

Item	Description	Part Number
	Mincon HDD60 Hard Rock System with Support Station	MHDD60AS01
1	Mincon HDD60 Hard Rock Hammer Crate	MHDD60AS11
2	Mincon Support Station Complete	M103 072 01

Item	Description	Part Number
	Mincon HDD60 Hard Rock System with Remote Control Oiler	MHDD60AS02
1	Mincon HDD60 Hard Rock Hammer Crate	MHDD60AS11
2	Mincon Remote Control Oiler Crate	M103 072 03

Item	Description	Part Number
	Mincon HDD60 Hard Rock System with Manual Control Oiler	MHDD60AS03
1	Mincon HDD60 Hard Rock Hammer Crate	MHDD60AS11
2	Mincon Manual Oiler Crate	M103 072 00

3.4.1 Mincon HDD60 Hard Rock Hammer Crate

Item	Description	Part Number
	Mincon HDD60 Hard Rock Hammer Crate	MHDD60AS11
1	Mincon HDD60 Sonde Housing	MHS501AS01
2	Mincon HDD60 Hammer	MHD501AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD526SK01
7	Service Kit (Sonde Housing)	MHS426SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	62HD60SDIRD
10	HDD60 Timing Shim (0.015") x 2	MN06015
11	HDD60 Timing Shim (0.030") x 2	MN06030
12	HDD60 Timing Shim (0.060") x 2	MN06060

3.4.2 Mincon Support Station Crate

Item	Description	Part Number
	Mincon Support Station Crate	M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x 3/4" Water Hose with 3/4" Camlock couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

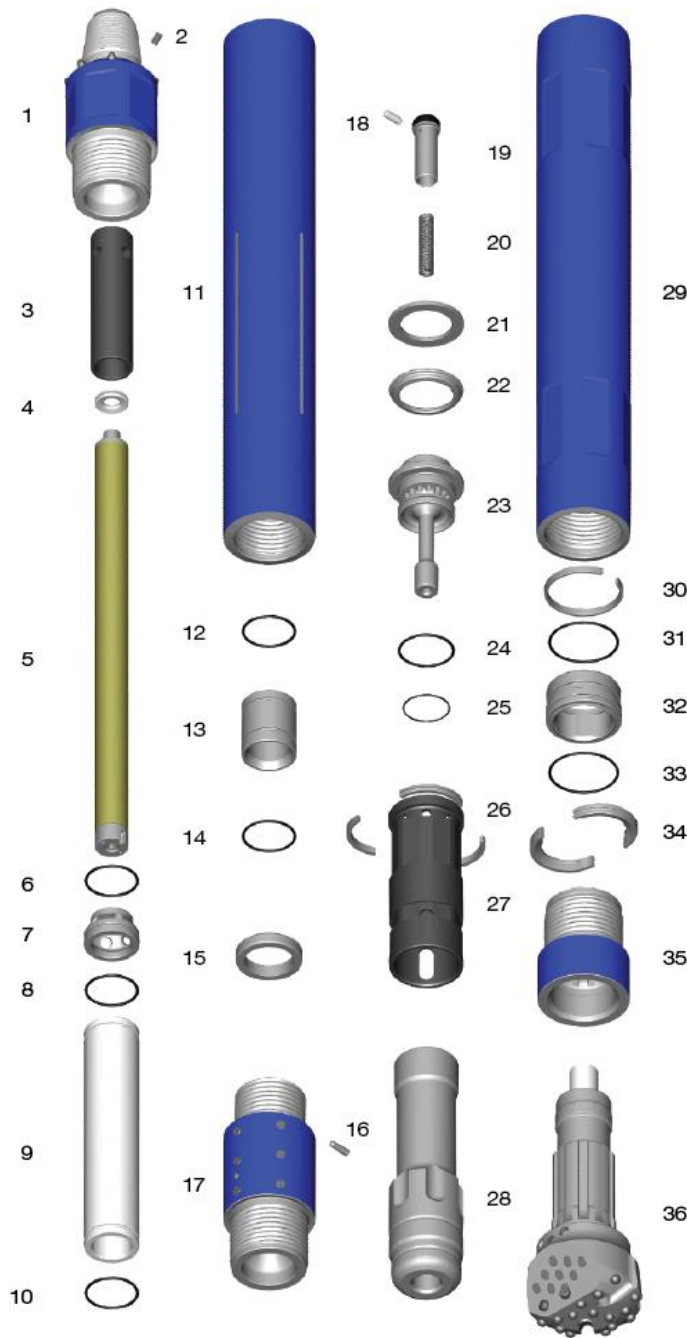
3.4.3 Mincon Remote Control Oiler Crate

Item	Description	Part Number
	Mincon Remote Control Oiler Crate	M103 072 03
1	Mincon Remote Control Oiler	M103 072 04
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	Safety Whip Checks x 4	M103 020 71

3.4.4 Mincon Manual Oiler Crate

Item	Description	Part Number
	Mincon Manual Oiler Crate	M103 072 00
1	Mincon Manual Oiler	M103 072 02
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
5	Safety Whip Checks x 4	M103 020 71

3.4.5 Mincon HDD60 Sonde Housing and Hammer Parts and Specifications



Item	Description	Part Number
Mincon HDD60 Sonde Housing		MHS501AS01
1	Sonde Housing Backhead (3 1/2" API Reg. Pin)	MHS501BH01
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	Sonde Spacer	MHS402SS01
4	Compression Ring	MHS305LR01
5	Sonde Carriage (Not Included)	MN585
6	O Ring	MHS421OR01
7	Diverter	MHS405DV01
8	O Ring	MHS421OR01
9	Sealing Sleeve	MHS406SL01
10	O Ring	MHS421OR01
11	Sonde Housing Sleeve	MHS511SH01
12	O Ring	MHS421OR01
13	Carriage Guide	MHS407CG01
14	O Ring	MHS421OR01
15	Seating Ring	MHS503SR01
16	Locating Pin	MHS508LP01
Service Kit		MHS426SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 6, 8, 10, 12, 14)	MHS425OK01
Mincon HDD60 Hammer		MHD501AS01
17	Bent Sub	MHD501BH01
18	Choke Blank	MB506CH01
19	Check Valve	MB502CV01
20	Spring	MB503SP01
21	Steel Make up Ring	MB504SM01
22	Lock Ring	MB505LR01
23	Air Distributor	MB507DR01
24	O Ring	MB521OR01
25	O Ring	MB523OR01
26	Seating Ring	MB509SR01
27	Inner Cylinder	MB508IC02
28	Piston	MB510PN04
29	Wear Sleeve	MHD511WS01
30	Piston Retaining Ring	MB511PR01
31	O Ring	MB521OR01
32	Aligner	MB517BB01
33	O Ring	MD621OR01
34	Bit Retaining Ring	MB513BR03
35	Chuck HDD60	MHD514CK02
36	Drill Bit	62HD60SDIRD
Service Kit		MHD526SK01
17	Choke Blank	MB506CH01
	Choke 1/8" (3.2mm)	MB506CH02
	Choke 3/16" (4.8mm)	MB506CH03
19	Spring	MB503SP01
	O Ring Kit (Items 24, 25, 31, 33)	MHD525OK01

Specifications

	Metric	Imperial
Hammer Outside Diameter	124mm	4.88"
Hammer Length (Sonde Backhead Shoulder to Chuck)	2057mm	81"
Backhead Spanner Flat Size	115mm	4.53"
Drill Bit Shank Type	HDD60	
Pilot Bit Size	159mm	6.25"
Hammer Weight (Less Bit)	137Kgs	302Lbs
Piston Weight	15 Kgs	33.6 Lbs
Bent Sub to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	5085 – 6780 NM	3750 – 5000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	425 l/s @ 24.1 Bar	900 cfm @ 350 psi
Recommended Minimum Air Package (>250ft Bore Length)	519 l/s @ 24.1 Bar	1100 cfm @ 350 psi



3.5 Mincon HDD70 Hard Rock System

Item	Description	Part Number
	Mincon HDD70 Hard Rock System with Support Station	MHDD70AS01
1	Mincon HDD70 Hard Rock Hammer Crate	MHDD70AS11
2	Mincon Support Station Complete	M103 072 01

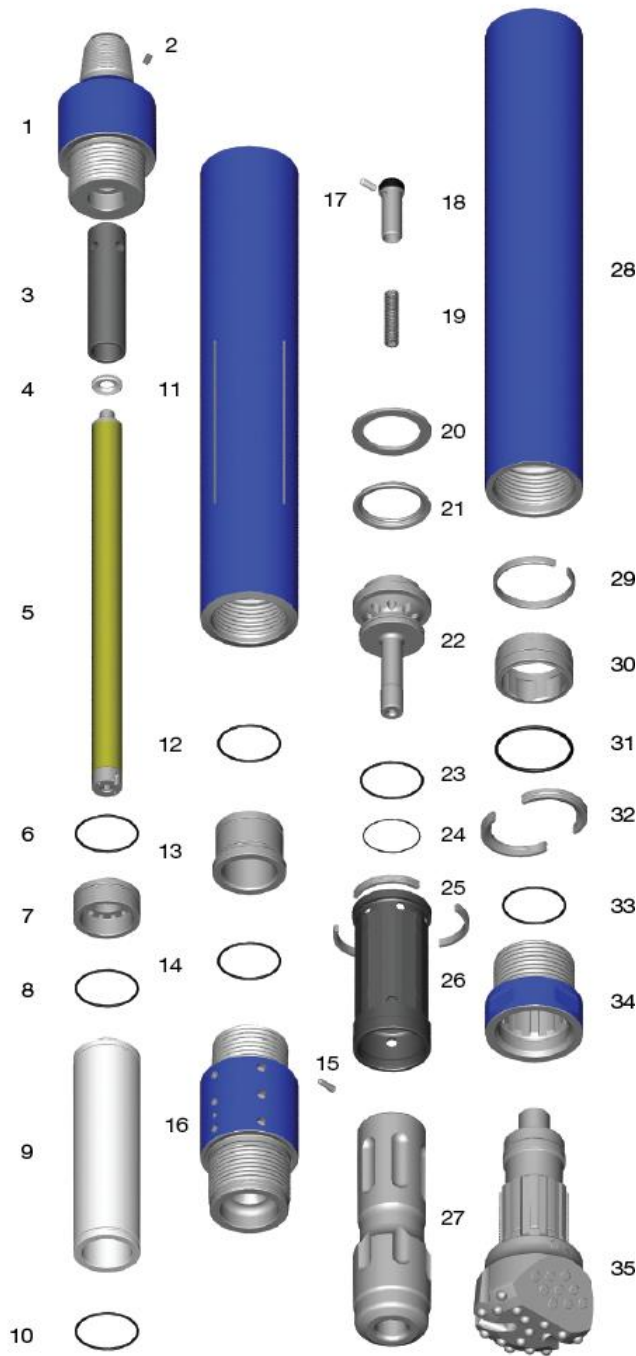
3.5.1 Mincon HDD70 Hard Rock Hammer Crate

Item	Description	Part Number
	Mincon HDD70 Hard Rock Hammer Crate	MHDD70AS11
1	Mincon HDD70 Sonde Housing	MHS601AS01
2	Mincon HDD70 Hammer	MHD601AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD626SK01
7	Service Kit (Sonde Housing)	MHS626SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	74HD70SDIRD
10	HDD70 Timing Shim (0.015") x 2	MN07015
11	HDD70 Timing Shim (0.030") x 2	MN07030
12	HDD70 Timing Shim (0.060") x 2	MN07060

3.5.2 Mincon Support Station Crate

Item	Description	Part Number
	Mincon Support Station Crate	M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x 3/4" Water Hose with 3/4" Camlock couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

3.5.3 Mincon HDD70 Sonde Housing and Hammer Parts and Specifications



Item	Description	Part Number
Mincon HDD70 Sonde Housing		MHS601AS01
1	Sonde Housing Backhead (3 1/2" API Reg. Pin)	MHS601BH01
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	Sonde Spacer	MHS402SS01
4	Compression Ring	MHS305LR01
5	Sonde Carriage (Not Included)	MN585
6	O Ring	MHS621OR01
7	Diverter	MHS605DV01
8	O Ring	MHS621OR01
9	Sealing Sleeve	MHS606SL01
10	O Ring	MHS621OR01
11	Sonde Housing Sleeve	MHS604SH01
12	O Ring	MHS621OR01
13	Carriage Guide	MHS607CG01
14	O Ring	MHS621OR01
15	Locating Pin	MHS608LP01
Service Kit		MHS626SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 6, 8, 10, 12,14)	MHS425OK01
Mincon HDD70 Hammer		MHD601AS01
16	Bent Sub	MHD601BH01
17	Choke Blank	MB506CH01
18	Check Valve	MB502CV01
19	Spring	MB503SP01
20	Steel Make up Ring	MD604SM01
21	Lock Ring	MD605LR01
22	Air Distributor	MD607DR01
23	O Ring	MD621OR01
24	O Ring	MD620OR01
25	Seating Ring	MD609SR01
26	Inner Cylinder	MD608IC01
27	Piston	MD610PN01
28	Wear Sleeve	MHD611WS01
29	Piston Retaining Ring	MD612PR01
30	Aligner	MHD613BB01
31	O Ring	MD622OR01
32	Bit Retaining Ring	MHD614BR01
33	O Ring	MD621OR01
34	Chuck HDD60	MHD614CK01
35	Drill Bit	74HD70SDIRD
Service Kit		MHD626SK01
17	Choke Blank	MB506CH01
	Choke 1/8" (3.2mm)	MB506CH02
	Choke 3/16" (4.8mm)	MB506CH03
19	Spring	MB503SP01
	O Ring Kit (Items 23, 24, 31, 33)	MHD625OK01

Specifications

	Metric	Imperial
Hammer Outside Diameter	146mm	5.75"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1951mm	76.8"
Backhead Spanner Flat Size	134mm	5.28"
Drill Bit Shank Type	HDD70	
Pilot Bit Size	190mm	7.5"
Hammer Weight (Less Bit)	158.6Kgs	327.5Lbs
Piston Weight	20 Kgs	44 Lbs
Bent Sub to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	6100 – 8135 NM	4500 – 6000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	425 l/s @ 24.1 Bar	900 cfm @ 350 psi
Recommended Minimum Air Package (>250ft Bore Length)	519 l/s @ 24.1 Bar	1100 cfm @ 350 psi



3.6 Mincon HDD90 Hard Rock System

Item	Description	Part Number
	Mincon HDD90 Hard Rock System with Support Station	MHDD90AS01
1	Mincon HDD90 Hard Rock Hammer Crate	MHDD80AS11
2	Mincon Support Station Complete	M103 072 01

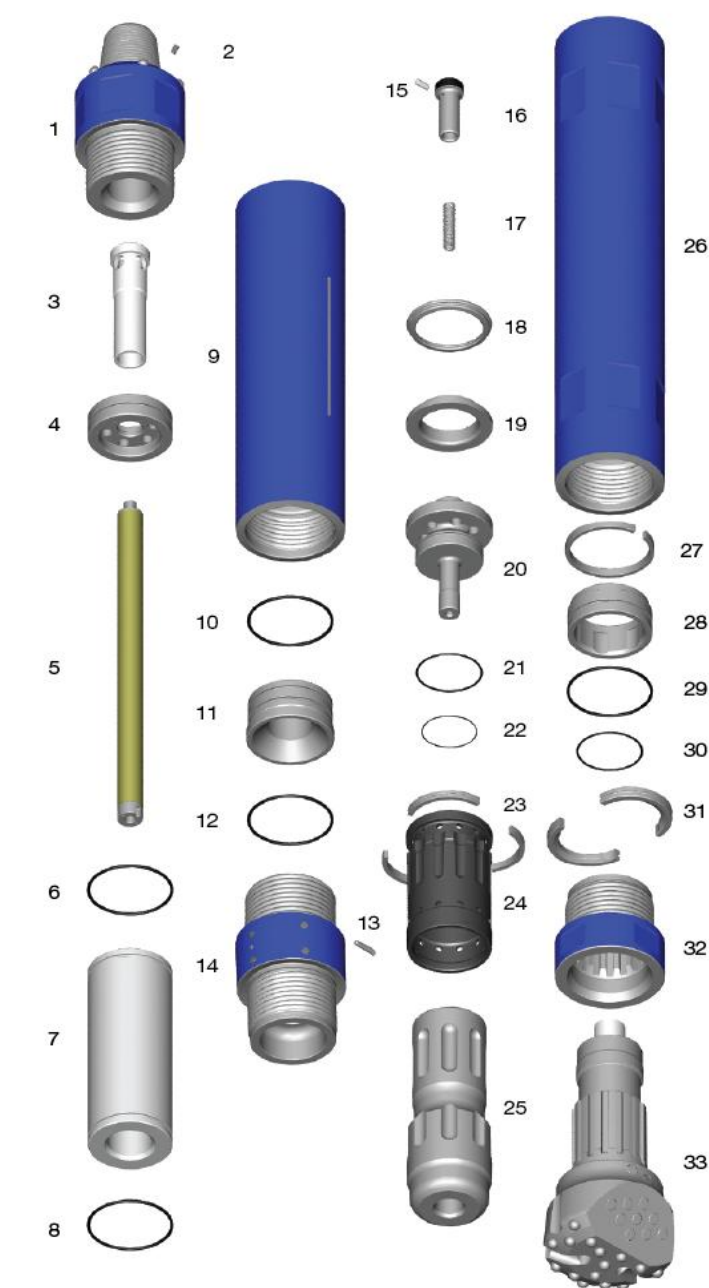
3.6.1 Mincon HDD90 Hard Rock Hammer Crate

Item	Description	Part Number
	Mincon HDD90 Hard Rock Hammer Crate	MHDD90AS11
1	Mincon HDD90 Sonde Housing	MHS801AS01
2	Mincon HDD90 Hammer	MHD801AS01
3	DCI 15" Sonde Carriage	MN585
4	Sonde Torque Wrench	MN553
5	Sonde Line up Tool	MN551
6	Service Kit (Hammer)	MHD826SK02
7	Service Kit (Sonde Housing)	MHS826SK01
8	Plusco Thread Sealant	MN730
9	Drill Bit x 2	92HD90SDIRD
10	HDD90 Timing Shim (0.015") x 2	MN09015
11	HDD90 Timing Shim (0.030") x 2	MN09030
12	HDD90 Timing Shim (0.060") x 2	MN09060

3.6.2 Mincon Support Station Complete

Item	Description	Part Number
	Mincon Support Station Complete	M103 072 01
1	Mincon Support Station	M103 036 90
2	20 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 43
3	30 Foot x 2" 1000 PSI High Pressure Hose with Hammer Lock Couplings	M103 038 44
4	40 Foot x ¾" Water Hose with ¾" Camlock couplings	M103 038 45
5	Safety Whip Checks x 4	M103 020 71

3.6.3 Mincon HDD90 Sonde Housing and Hammer Parts and Specifications



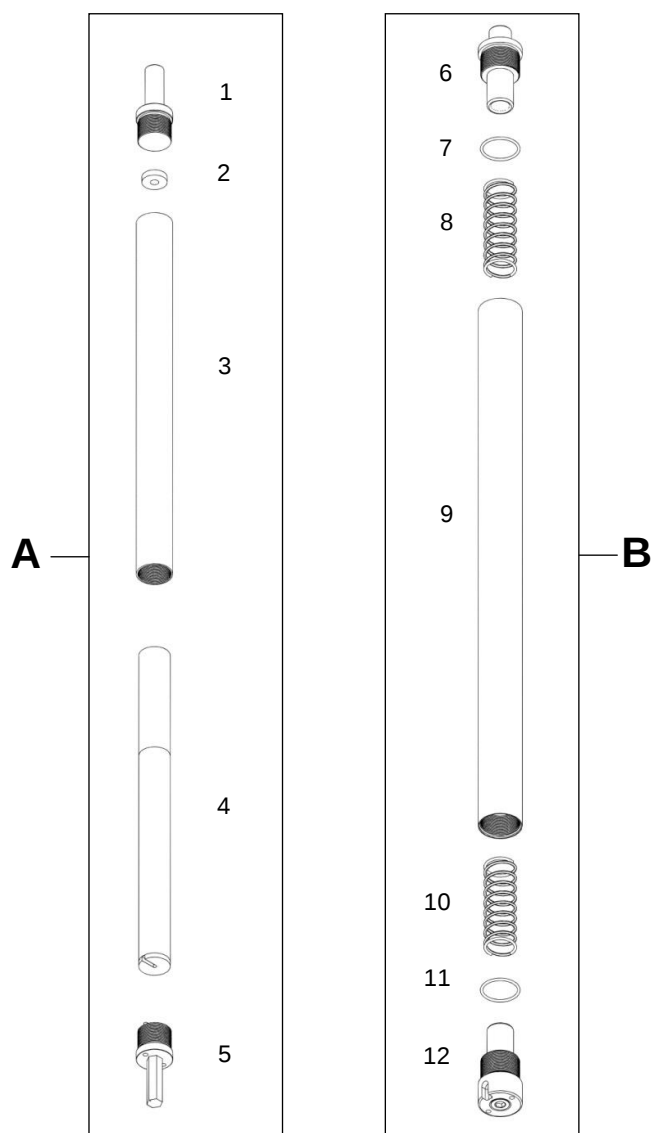
Item	Description	Part Number
Mincon HDD90 Sonde Housing		MHS801AS01
1	Sonde Housing Backhead (4 1/2" API Reg. Pin)	MHS801BH01
2	Air Diverter Plug (1/8" Orifice)	MHS409DP02
3	Sonde Spacer	MHS802SS01
4	Diverter	MHS805DV02
5	Sonde Carriage (Not Included)	MN585
6	O Ring	MHS821OR01
7	Sealing Sleeve	MHS806SL01
8	O Ring	MHS821OR01
9	Sonde Housing Sleeve	MHS804SH01
10	O Ring	MHS821OR01
11	Carriage Guide	MHS807CG01
12	O Ring	MHS821OR01
13	Locating Pin	MHS808LP01
Service Kit		MHS826SK01
	Air Diverter Plug (Solid)	MHS409DP01
	O Ring Kit (Items 6, 8, 10, 12,)	MHS825OK01
Mincon HDD90 Hammer		MHD801AS01
14	Bent Sub	MHD801BH01
15	Choke Blank	MB506CH01
16	Check Valve	MB802CV01
17	Spring	MB503SP01
18	Lock Ring	MD805LR01
19	Steel Make Up Ring	MD804SM01
20	Air Distributor	MD807DR01
21	O Ring	MD821OR01
22	O Ring	MD820OR01
23	Seating Ring	MD809SR01
24	Inner Cylinder	MD808IC01
25	Piston	MD810PN02
26	Wear Sleeve	MHD811WS01
27	Piston Retaining Ring	MD812PR01
28	Aligner	MHD813BB01
29	O Ring	MD822OR01
30	O Ring	MD821OR01
31	Bit Retaining Ring	MHD814BR01
32	Chuck HDD90	MHD815CK01
33	Drill Bit	92HD90SDIRD
Service Kit		MHD826SK01
15	Choke Blank	MB506CH01
	Choke 1/8" (3.2mm)	MB506CH02
	Choke 3/16" (4.8mm)	MB506CH03
17	Spring	MB503SP01
	O Ring Kit (Items 21, 22, 29, 30)	MHD825OK01

Specifications

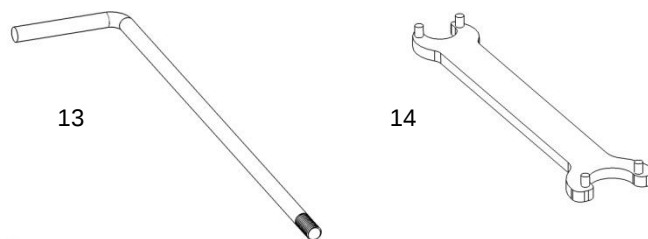
	Metric	Imperial
Hammer Outside Diameter	194mm	7.63"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1946mm	76.6"
Backhead Spanner Flat Size	184mm	7.23"
Drill Bit Shank Type	HDD90	
Pilot Bit Size	235mm	9.25"
Hammer Weight (Less Bit)	327.5Kgs	722Lbs
Piston Weight	39.1 Kgs	86 Lbs
Bent Sub to Backhead Stand Off	0.75mm	0.030"
Make Up Torque	8135 – 10850 NM	6000 – 8000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	519 l/s @ 24.1 Bar	1100 cfm @ 350 psi
Recommended Minimum Air Package (>250ft Bore Length)	590 l/s @ 24.1 Bar	1250 cfm @ 350 psi



3.7 Mincon DCI 15" Sonde Carriage Parts List and Assembly Instructions



Item	Description	Part Number
A+B	Mincon DCI 15" Sonde Carriage	MN585
A	DCI 15" Sonde Inner Tube Assembly	MN51000
1	DCI 15" Sonde Inner End Cap	MN51030
2	Sonde Shock Ring	MN51050
3	DCI 15" Sonde Inner Tube	MN51010
4	DCI 15" Sonde (Not Included)	
5	DCI 15" Sonde Inner Locating Cap	MN51020
B	Outer Carriage Assembly	MN50000
6	Outer Retrieval Cap	MN50030
7	O Ring	MN50040
8	Shock Spring (4")	MN51040
9	Outer Carriage Tube	MN50010
10	Shock Spring (4")	MN51040
11	O Ring	MN50040
12	Outer Locating Cap	MN50020
Tools		
13	Sonde Line Up Tool (Not Included)	MN551
14	Sonde Torque Wrench (Not Included)	MN553
Other Options		
	Battery 3.6V Super Cell	MN595
	Battery Pack 3.6V Super Cell (qty. 3)	MN596

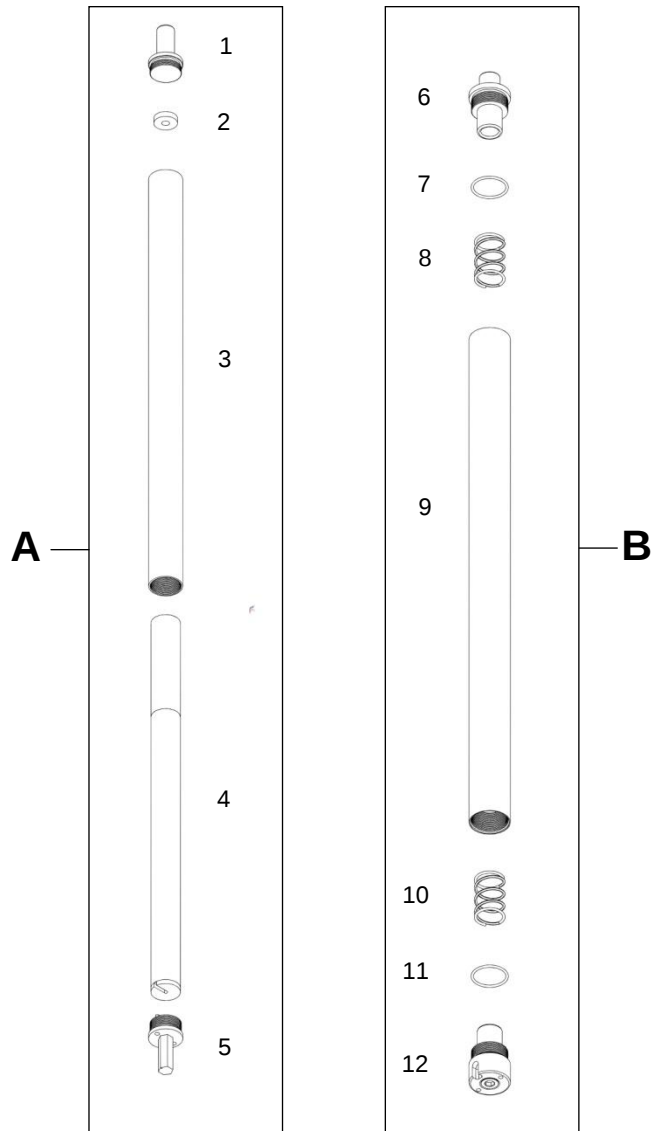


3.7.1 Assembly Instructions

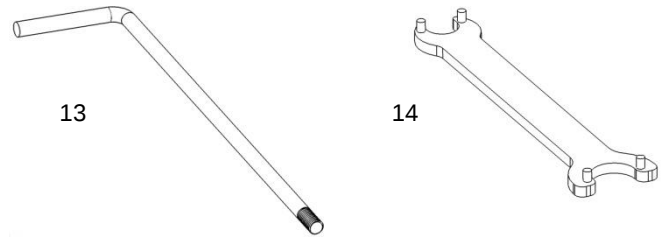
Assembly A - DCI 15" Sonde Inner Tube Complete: Please refer to the exploded view above. Insert the locating tab on the Sonde Inner Locating Cap (Item 5) into the slot of the DCI Sonde (Item 4). Insert the DCI Sonde and Locating cap into the Sonde Inner Tube (Item 3) and screw together. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten. Take care not to cross thread the connection. Thread the Sonde Inner End Cap (Item 1) onto the Inner tube and check to see if there is any slop with the DCI Sonde within the tube. If there is some slop, unscrew the Inner End Cap and insert the Sonde Shock Ring (Item 2) on top of the Sonde within the Sonde Inner Tube and reinstall the Inner End Cap. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten.

Assembly B + A - Outer Carriage Complete with Inner Tube Complete: Place O Ring (Item 7) onto Outer Retrieval Cap (Item 6) so that it sits in the groove at the end of the threads. Place O Ring (Item 11) onto Outer Locating Cap (Item 12) in the same manner. Screw the Outer Retrieval Cap into the Outer Carriage Tube (Item 9). Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten. Drop the Shock Spring (Item 8) into the Outer Carriage Tube so that it sits on top of the Outer Retrieval Cap. Insert Assembly A into the Outer Carriage Tube with the Inner End Cap (Item 1) end of the assembly first. Place the Second Shock Spring (Item 10) into the Outer Carriage Tube on top of the Inner Locating Cap (Item 5). Identify the locating dot (12 O Clock) on the end of the hex section of the Inner Locating Cap (Item 5) and align the slot (12 O Clock) on the Outer Locating Cap (Item 12) with it. Push the Outer Locating cap over the Inner Locating Cap keeping the alignment and compress the spring and screw in. Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten.

3.8 Mincon DCI 19" Sonde Carriage Parts List and Assembly Instructions



Item	Description	Part Number
A+B	Mincon DCI 19" Sonde Carriage	MN586
A	DCI 19" Sonde Inner Tube Assembly	MN50100
1	DCI 19" Sonde Inner End Cap	MN51130
2	Sonde Shock Ring	MN51050
3	DCI 19" Sonde Inner Tube	MN51110
4	DCI 19" Sonde (Not Included)	
5	DCI 19" Sonde Inner Locating Cap	MN51120
B	Outer Carriage Assembly	MN51100
6	Outer Retrieval Cap	MN50120
7	O Ring	MN50040
8	Shock Spring (2")	MN51140
9	Outer Carriage Tube	MN50010
10	Shock Spring (2")	MN51140
11	O Ring	MN50040
12	Outer Locating Cap	MN50110
Tools		
13	Sonde Line Up Tool (Not Included)	MN551
14	Sonde Torque Wrench (Not Included)	MN553
Other Options		
	Battery 3.6V Super Cell	MN595
	Battery Pack 3.6V Super Cell (qty. 3)	MN596



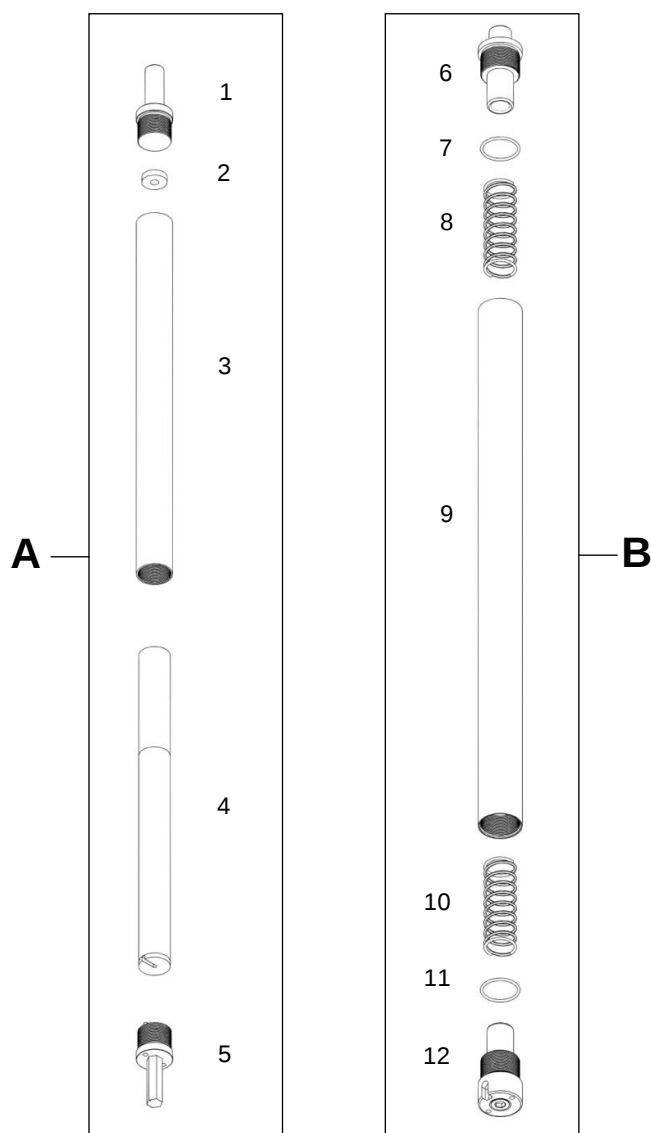
3.8.1 Assembly Instructions

Assembly A - DCI 19" Sonde Inner Tube Complete: Please refer to the exploded view above. Insert the locating tab on the Sonde Inner Locating Cap (Item 5) into the slot of the DCI Sonde (Item 4). Insert the DCI Sonde and Locating cap into the Sonde Inner Tube (Item 3) and screw together. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten. Take care not to cross thread the connection. Thread the Sonde Inner End Cap (Item 1) onto the Inner tube and check to see if there is any slop with the DCI Sonde within the tube. If there is some slop, unscrew the Inner End Cap and insert the Sonde Shock Ring (Item 2) on top of the Sonde within the Sonde Inner Tube and reinstall the Inner End Cap. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten.

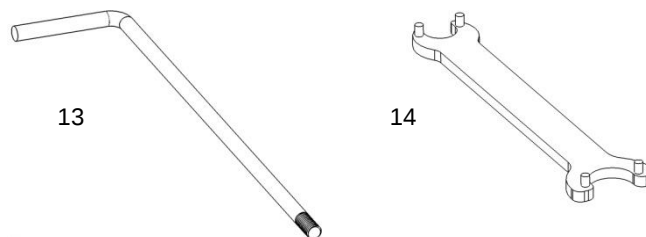
Assembly B + A - Outer Carriage Complete with Inner Tube Complete: Place O Ring (Item 7) onto Outer Retrieval Cap (Item 6) so that it sits in the groove at the end of the threads. Place O Ring (Item 11) onto Outer Locating Cap (Item 12) in the same manner. Screw the Outer Retrieval Cap into the Outer Carriage Tube (Item 9). Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten. Drop the Shock Spring (Item 8) into the Outer Carriage Tube so that it sits on top of the Outer Retrieval Cap. Insert Assembly A into the Outer Carriage Tube with the Inner End Cap (Item 1) end of the assembly first. Place the Second Shock Spring (Item 10) into the Outer Carriage Tube on top of the Inner Locating Cap (Item 5). Identify the locating dot (12 O Clock) on the end of the hex section of the Inner Locating Cap (Item 5) and align the slot (12 O Clock) on the Outer Locating Cap (Item 12) with it. Push the Outer Locating cap over the Inner Locating Cap keeping the alignment and compress the spring and screw in. Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten.



3.9 Mincon DCI 8" Sonde Carriage Parts List and Assembly Instructions



Item	Description	Part Number
A+B	Mincon DCI 8" Sonde Carriage	MN583
A	DCI 8" Sonde Inner Tube Assembly	MN51300
1	DCI 8" Sonde Inner End Cap	MN51530
2	Sonde Shock Ring	MN51050
3	DCI 8" Sonde Inner Tube	MN51510
4	DCI 8" Sonde (Not Included)	
5	DCI 8" Sonde Inner Locating Cap	MN51520
B	Outer Carriage Assembly	MN50300
6	Outer Retrieval Cap	MN50330
7	O Ring	MN50040
8	Shock Spring (3")	MN51540
9	Outer Carriage Tube	MN50310
10	Shock Spring (3")	MN51540
11	O Ring	MN50040
12	Outer Locating Cap	MN50320
Tools		
13	Sonde Line Up Tool (Not Included)	MN555
14	Sonde Torque Wrench (Not Included)	MN552
Other Options		
	Battery 3.6V Super Cell	MN595
	Battery Pack 3.6V Super Cell (qty. 3)	MN596

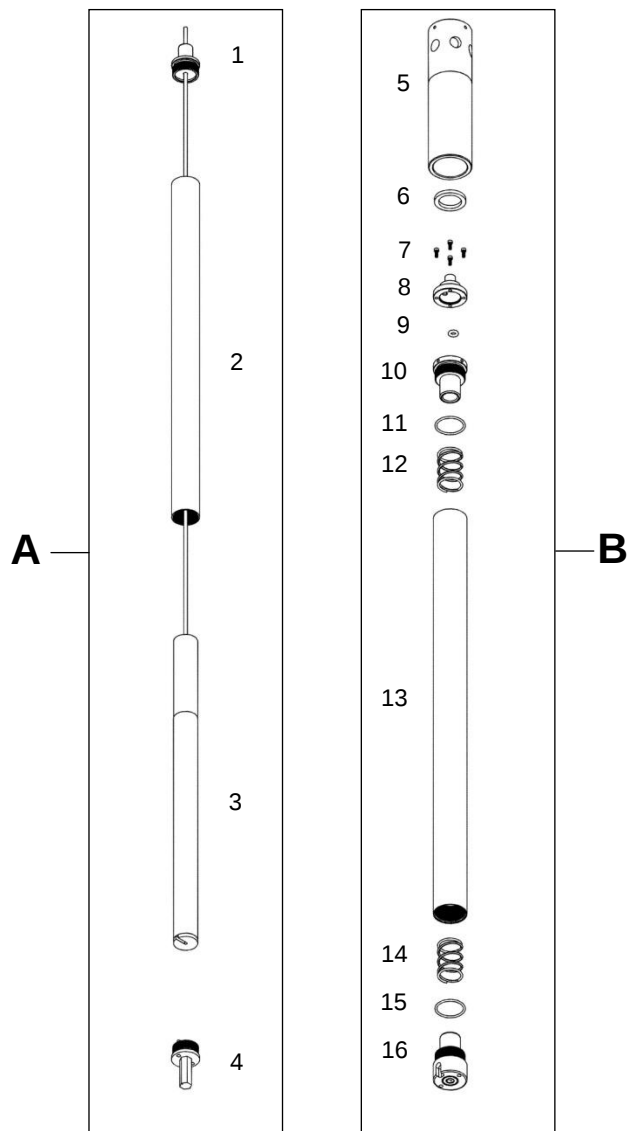


3.9.1 Assembly Instructions

Assembly A - DCI 15" Sonde Inner Tube Complete: Please refer to the exploded view above. Insert the locating tab on the Sonde Inner Locating Cap (Item 5) into the slot of the DCI Sonde (Item 4). Insert the DCI Sonde and Locating cap into the Sonde Inner Tube (Item 3) and screw together. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten. Take care not to cross thread the connection. Thread the Sonde Inner End Cap (Item 1) onto the Inner tube and check to see if there is any slop with the DCI Sonde within the tube. If there is some slop, unscrew the Inner End Cap and insert the Sonde Shock Ring (Item 2) on top of the Sonde within the Sonde Inner Tube and reinstall the Inner End Cap. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten.

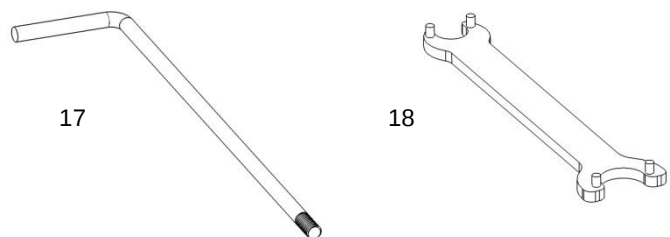
Assembly B + A - Outer Carriage Complete with Inner Tube Complete: Place O Ring (Item 7) onto Outer Retrieval Cap (Item 6) so that it sits in the groove at the end of the threads. Place O Ring (Item 11) onto Outer Locating Cap (Item 12) in the same manner. Screw the Outer Retrieval Cap into the Outer Carriage Tube (Item 9). Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten. Drop the Shock Spring (Item 8) into the Outer Carriage Tube so that it sits on top of the Outer Retrieval Cap. Insert Assembly A into the Outer Carriage Tube with the Inner End Cap (Item 1) end of the assembly first. Place the Second Shock Spring (Item 10) into the Outer Carriage Tube on top of the Inner Locating Cap (Item 5). Identify the locating dot (12 O Clock) on the end of the hex section of the Inner Locating Cap (Item 5) and align the slot (12 O Clock) on the Outer Locating Cap (Item 12) with it. Push the Outer Locating cap over the Inner Locating Cap keeping the alignment and compress the spring and screw in. Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten.

3.10 Mincon DCI 19" Cable Sonde Carriage Parts List and Assembly Instructions



Item	Description	Part Number
A+B	Mincon DCI 19" Cable Sonde Carriage	MN587
A	DCI 19" Sonde Inner Tube Assembly	MN50100
1	DCI 19" Cable Sonde Inner End Cap	MN51433
2	DCI 19" Sonde Inner Tube	MN51110
3	DCI 19" Cable Sonde (Not Included)	
4	DCI 19" Sonde Inner Locating Cap	MN51120
B	Outer Carriage Assembly	MN51100
5	Grounded Sonde Spacer Assembly ¹	MHS402SS02
6	Sonde Make Up Seal	MN52000
	Outer Retrieval Cap Assembly	MN50420
7	6-32 x ³ / ₈ " Socket Screws (Qty 4)	MN50424
8	Outer Retrieval Top Cap	MN50421
9	O Ring	MN50422
10	Outer Retrieval Bottom Cap	MN50423
11	O Ring	MN50040
12	Shock Spring (2")	MN51140
13	Outer Carriage Tube	MN50010
14	Shock Spring (2")	MN51140
15	O Ring	MN50040
16	Outer Locating Cap	MN50110
	Tools	
17	Sonde Line Up Tool (Not Included)	MN551
18	Sonde Torque Wrench (Not Included)	MN553

¹This Grounded Sonde Spacer is used for all models except the HDD90 and HDD30. The HDD30 is not compatible with cable sondes.



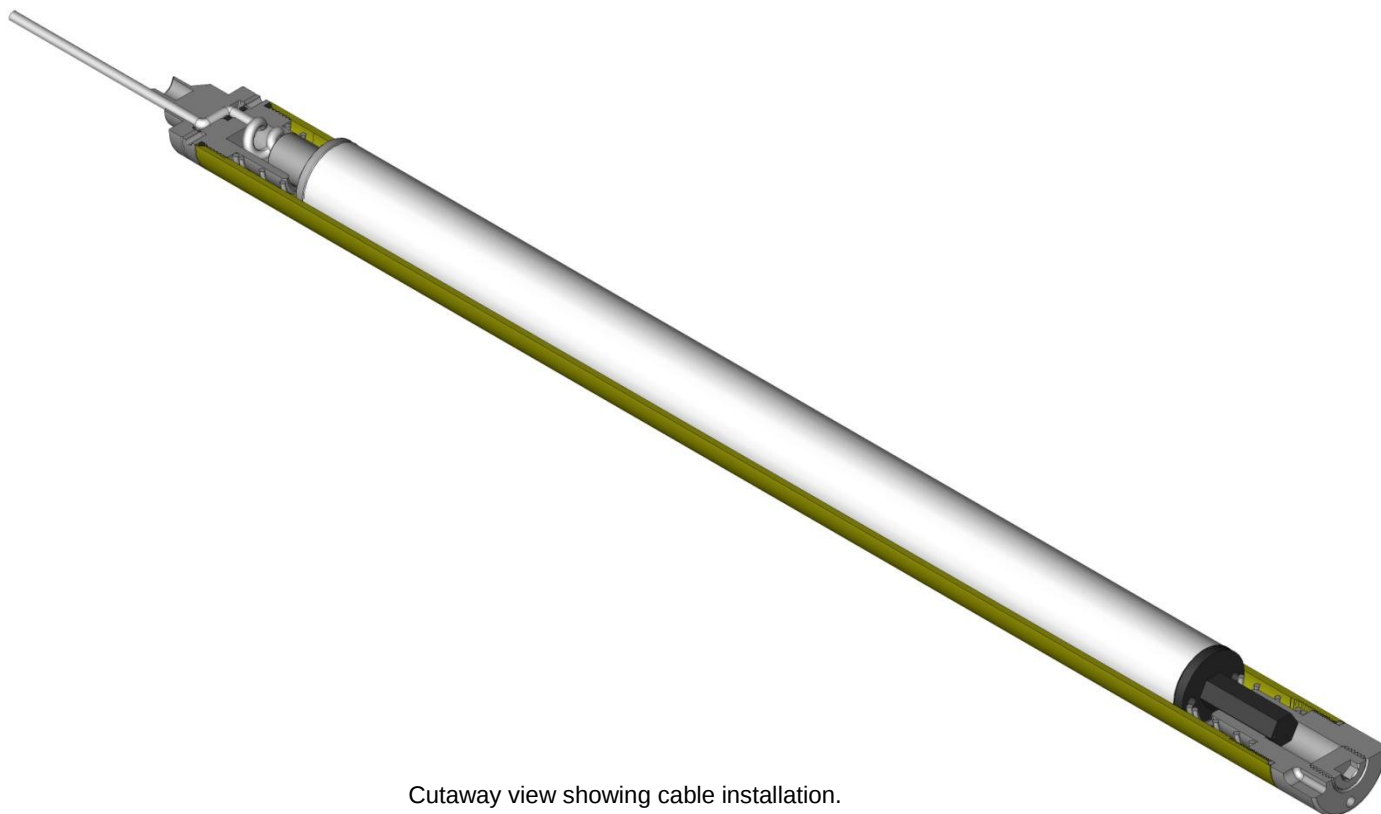
3.10.1 Assembly Instructions

Assembly A - DCI 19" Sonde Inner Tube Complete: Please refer to the exploded view above. Insert the locating tab on the Sonde Inner Locating Cap (Item 4) into the slot of the DCI Sonde (Item 3). Thread the cable on the sonde through the Sonde Inner Tube (Item 2) and insert the DCI Sonde and Locating Cap into the Sonde Inner Tube (Item 2) and screw together. Tighten with the small end of the Sonde Torque Wrench (Item 17). Do not over tighten. Take care not to cross thread the connection. Pass the cable on the sonde through the Cable Sonde Inner End Cap (Item 1) and thread the Cable Sonde Inner End Cap (Item 1) onto the Inner tube. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten.

Assembly B + A - Outer Carriage Complete with Inner Tube Complete: Disassemble the Outer Retrieval Cap Assembly (Items 6-10). Use a ⁷/₆₄" Allen Wrench to unscrew the 6-32 x ³/₈" Socket Screws. Place O Ring (Item 11) onto Outer Retrieval Bottom Cap (Item 10) so that it sits in the groove at the end of the threads. Place O Ring (Item 15) onto Outer Locating Cap (Item 16) in the same manner. Create a loop about ¹/₂" wide on the cable where the cable comes out of the Inner Sonde Tube Assembly (Item A). This loop will act as a spring to remove any stress on the cable going into the Sonde during drilling operations. Place the Shock Spring (Item 14) onto the Outer Locating Cap (Item 16). Identify the locating dot (12 O Clock) on the end of the hex section of the Inner Locating Cap (Item 4) and align the slot (12 O Clock) on the Outer Locating Cap (Item 16) with it. Push the Outer Locating cap over the Inner Locating Cap keeping the alignment and Thread the cable and Inner Tube Assembly (Item A) into the Outer Carriage Tube (Item 13) and screw the Outer Locating Cap (Item 16) and Outer Carriage Tube (Item 13) together. Tighten with the large end of the Sonde Torque Wrench (Item 17). Do not over tighten and ensure the Inner Tube Assembly does not disengage from the Outer Locating Cap. Place the currently assembled parts upright with the Outer Locating Cap at the bottom. Place the cable through the Shock Spring (Item 12) and seat the spring on top of the Inner End Cap (Item 1). Thread the cable through the hole on of the Outer Retrieval Bottom Cap (Item 10) and push the Outer Retrieval Bottom Cap over the half loop on the



cable and screw the Outer Retrieval Bottom Cap onto the Outer Carriage Tube. Thread the O Ring (Item 9) over the cable and seat it in the O Ring Groove on the Outer Retrieval Bottom Cap (Item 10). Bend the Cable 90° to far edge of the inner clamping surface of the Outer Retrieval Bottom Cap (Item 10). Bend the cable again 90° so it is now perpendicular to the inner clamping surface of the Outer Retrieval Bottom Cap (Item 10).). Thread the cable through the hole on of the Outer Retrieval Top Cap (Item 8) and push it down onto the Outer Retrieval Bottom Cap (Item 10). Apply blue or red Loctite, or equivalent to all screws. Align the holes on both and insert and screw the 6-32 x 3/8" Socket Screws in to secure the both halves of the Outer Retrieval Cap together. Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten.



Cutaway view showing cable installation.

3.11 Mincon Subsite New Style 86 Series Sonde Carriage Parts List and Assembly Instructions

Item		Description	Part Number
A+B		Mincon Subsite Sonde Carriage	MN591
A		Subsite Sonde Inner Assembly	MN51000
1		Sonde Inner End Cap	MN51320
2		Sonde Shock Ring	MN51050
3		Subsite 86 Series Sonde (Not Included)	MN51010
		Subsite Inner Locating Cap Assembly	MN51350
4		6-32 x 1/2" Socket Screw (Qty 2)	MN51354
5		Inner Locating Cap Split Collar A	MN51351
6		Inner Locating Cap Split Collar B	MN51352
7		Inner Locating Cap Hex	MN51353
8		10-32 x 5/8" Socket Screw (Qty 2)	MN51355
B		Outer Carriage Assembly	MN50000
6		Outer Retrieval Cap	MN50030
7		O Ring	MN50040
8		Shock Spring (4")	MN51040
9		Outer Carriage Tube	MN50010
10		Shock Spring (4")	MN51040
11		O Ring	MN50040
12		Outer Locating Cap	MN50020
		Tools	
13		Sonde Line Up Tool (Not Included)	MN551
14		Sonde Torque Wrench (Not Included)	MN553
		Other Options	
		Battery 3.6V Super Cell	MN595
		Battery Pack 3.6V Super Cell (qty. 3)	MN596

3.11.1 Assembly Instructions

Assembly A - Subsite Sonde Inner Assembly Complete: Please refer to the exploded view above. Remove the battery cap from the Subsite Sonde and remove the spring from the battery cap. Insert the spring into the Sonde Inner End Cap (Item 1) and place the Sonde Shock Ring (Item 2) over the spring. Screw the Sonde Inner End Cap into the Subsite Sonde. Tighten with the small end of the Sonde Torque Wrench (Item 14). Do not over tighten. Disassemble the Inner locating cap assembly. Use a 5/32" Allen Wrench to remove the Inner Locating Cap Hex (Item 7) from the Inner Locating Cap Split Collar assembly (Items 5 & 6). Use a 7/64" Allen Wrench to separate the Inner Locating Cap Split Collar assembly (Items 5 & 6). Remove the rubber protector cap from the end of the Subsite Sonde to expose the locating flat on the Sonde. Place the Flat on the tab of the Inner Locating Cap Split Collar A (Item 5) against the locating flat on the Sonde. Apply blue or red Loctite, or equivalent to all screws. Place the Inner Locating Cap Split Collar B in place to complete the sub assembly and secure in place with the 6-32 x 1/2" Socket Screws (Item 6). Locate the half circle witness mark on the side of the Inner Locating Cap Hex (Item 7) and match it up with the witness mark on the side of the Inner Locating Cap Split Collar A (Item 5). Secure Inner Locating Cap Hex (Item 7) with the 10-32 x 5/8" Socket Screws (Item 8).

Assembly B + A - Outer Carriage Complete with Inner Tube Complete: Place O Ring (Item 7) onto Outer Retrieval Cap (Item 6) so that it sits in the groove at the end of the threads. Place O Ring (Item 11) onto Outer Locating Cap (Item 12) in the same manner. Screw the Outer Retrieval Cap into the Outer Carriage Tube (Item 9). Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten. Drop the Shock Spring (Item 8) into the Outer Carriage Tube so that it sits on top of the Outer Retrieval Cap. Insert Assembly A into the Outer Carriage Tube with the Inner End Cap (Item 1) end of the assembly first. Place the Second Shock Spring (Item 10) into the Outer Carriage Tube on top of the Inner Locating Cap (Item 5). Identify the locating dot (12 O Clock) on the end of the hex section of the Inner Locating Cap (Item 5) and align the slot (12 O Clock) on the Outer Locating Cap (Item 12) with it. Push the Outer Locating cap over the Inner Locating Cap keeping the alignment and compress the spring and screw in. Tighten with the large end of the Sonde Torque Wrench (Item 14). Do not over tighten.



4 Mincon HDD Pull Reamer Hammer Features

The Mincon range of HDD Pull Reamer Hammers is the only pneumatic hammers being employed in the HDD industry and is designed around proven technology and redefines the performance scale when compared to other conventional HDD reaming tools on the market. While providing the most complete range of pilot hammers, Mincon also provides their world class design and technology including:

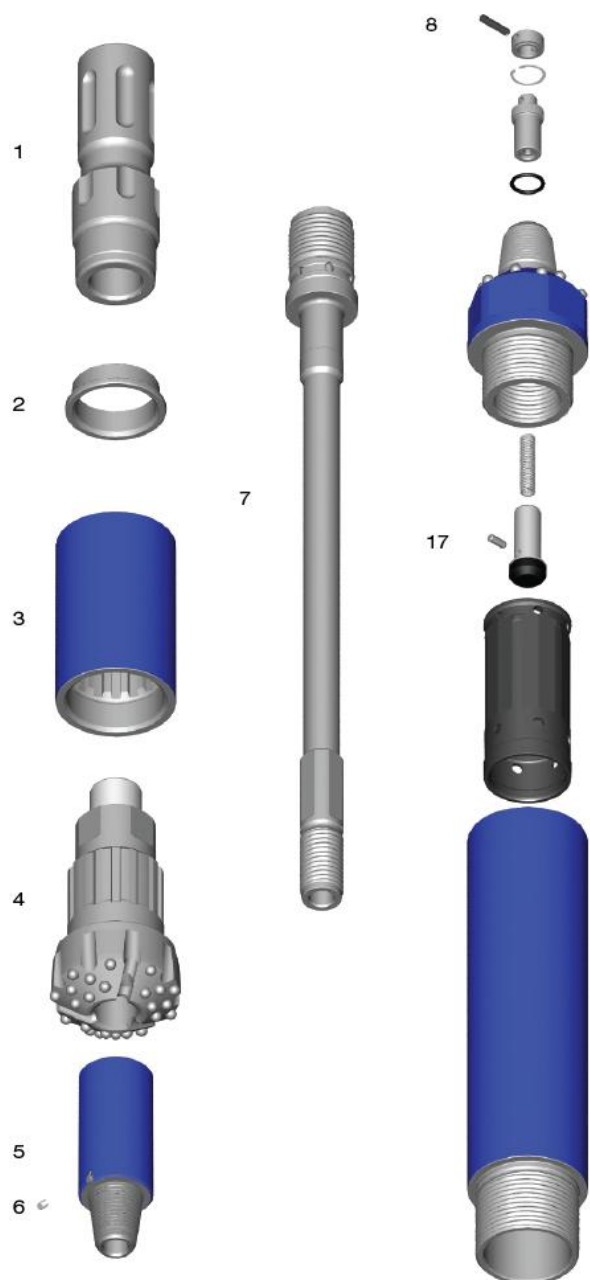
- Patented reverse air flow hammer cycle allows for pull reaming of a pilot bore of 3-1/2" (89mm) out to 7-8" (178-203mm) and 4-1/4" (108mm) out to 9" (229mm) and pull reaming of a pilot bore of 5 1/4" (133mm) out to 10-12" (254-305mm) and 6 1/4" (159mm) out to 14" (356mm) on the HDD80PR.
- A range of bits are offered with different grades of standard carbide and diamond enhanced carbide to maximize bit life in every drilling condition.
- High pressure/high volume compressed air powers reaming operations and requires minimal torque and feed pressure loads on drill machine increasing overall life of drill.
- Attachments can be used to pull utilities as the hole is reamed.
- Support Station delivers compressed air mixed with a water/polymer (5-9 gal/min) and rock drill oil (2-4 pints/hr) to operate the drilling cycle resulting in minimal environmentally freindly clean up. Can be used on environmentally sensitive locations using Mincon Envirosafe RDO biodegradable rock drill oil.



5 Mincon HDD Pull Reaming Hammer Parts and Specifications

The following pages contain the breakdown of the Mincon HDD Pull Reaming Hammers.

5.1 Mincon HDD70PR Pull Reaming Hammer Parts and Specifications



Item	Description	Part Number
9	HDD70PR Hard Rock 7-9" Pull Reaming Hammer 4" Rod Adaptor	MBR701AS01
10	HDD70PR Hard Rock 7-9" Pull Reaming Hammer 3 1/2" Rod Adaptor	MBR701AS02
11	HDD70PR Hard Rock 7-9 Pull Reaming Hammer 5" Rod Adaptor	MBR701AS03
12		
1	Piston	MBR710PN01
2	Aligner	MBR712BB01
3	Chuck	MBR715CK01
4	7" HDD60PR Pull Reaming Bit	70PR70V50D
14	8" HDD60PR Pull Reaming Bit	80PR70V39D
	9" HDD60PR Pull Reaming Bit	90PR70V39D
5	Rod Adaptor 4" OD 2 3/8" API Reg. Pin	MBR716RA01
	Rod Adaptor 3 1/2" OD 2 3/8" API Reg. Pin	MBR716RA02
	Rod Adaptor 5" OD 3 1/2" API Reg. Pin	MBR716RA03
15	6 Air Diverter Plug (1/8" Orifice)	MHS409DP02
	7 Transmission Shaft	MBR707TS01
16	8 Locking Pin	MBR818RP01
	9 Locking Bush	MBR819LB01
10	10 Circlip	MP618CP01
	11 Check Valve Seat	MBR717CT01
12	12 O Ring	MBR820OR01
	13 Air Diverter Plug (1/8" Orifice)	MHS409DP02
18	14 Backhead	MBR701BH01
	15 Spring	MB503SP01
	16 Check Valve	MD802CV01
	17 Choke Blank	MB506CH01
	18 Inner Cylinder	MBR708IC01
19	19 Wear Sleeve	MBR711WS01
	Service Kit	MBR826SK01
	10 Circlip	MP618CP01
	12 O Ring	MBR820OR01
	15 Spring	MB503SP01
	17 Choke Blank	MB506CH01
	Air Diverter Plug	MHS409DP01

Specifications

	Metric	Imperial
Hammer Outside Diameter	165mm	6.5"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1301mm	51.2"
Backhead Spanner Flat Size	150mm	5.91"
Drill Bit Shank Type	HDD70PR	
Hammer Weight (Less Bit)	136Kgs	301Lbs
Piston Weight	15.9 Kgs	35 Lbs
Make Up Torque (Chuck and Backhead)	6610 – 8813 NM	4875 – 6500 FT Lbs
Make Up Torque (Transmission shaft)	4068 – 5423 NM	3000 – 4000 FT Lbs
Make Up Torque (Rod Adaptor)	3050 – 4068 NM	2250 – 3000 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	425 l/s @ 24.1 Bar	900 cfm @ 350 psi
Recommended Minimum Air Package (>250ft Bore Length)	590 l/s @ 24.1 Bar	1250 cfm @ 350 psi

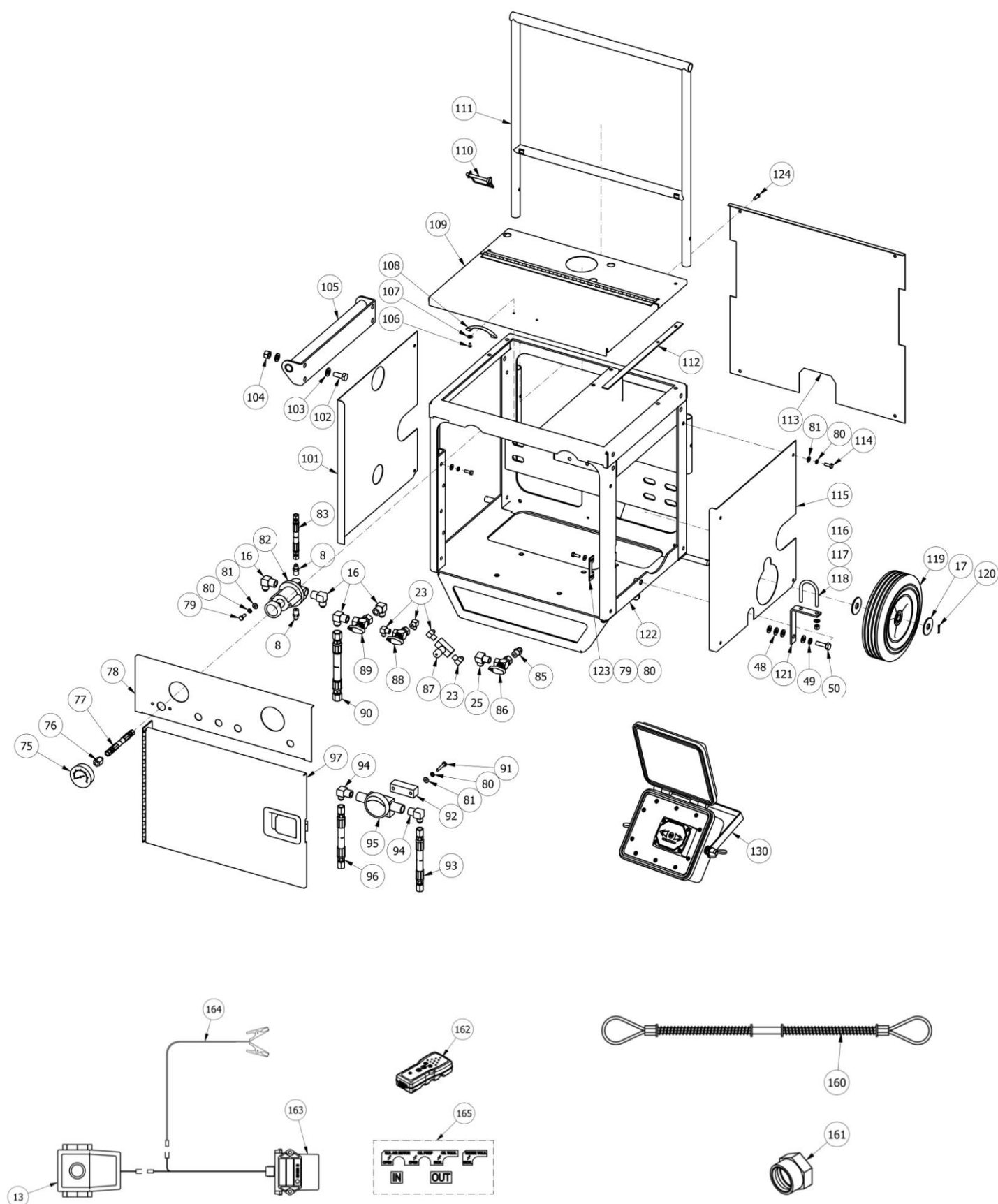
This exploded view diagram illustrates the assembly of a mechanical component, likely a pump or valve. The components are numbered 1 through 20:

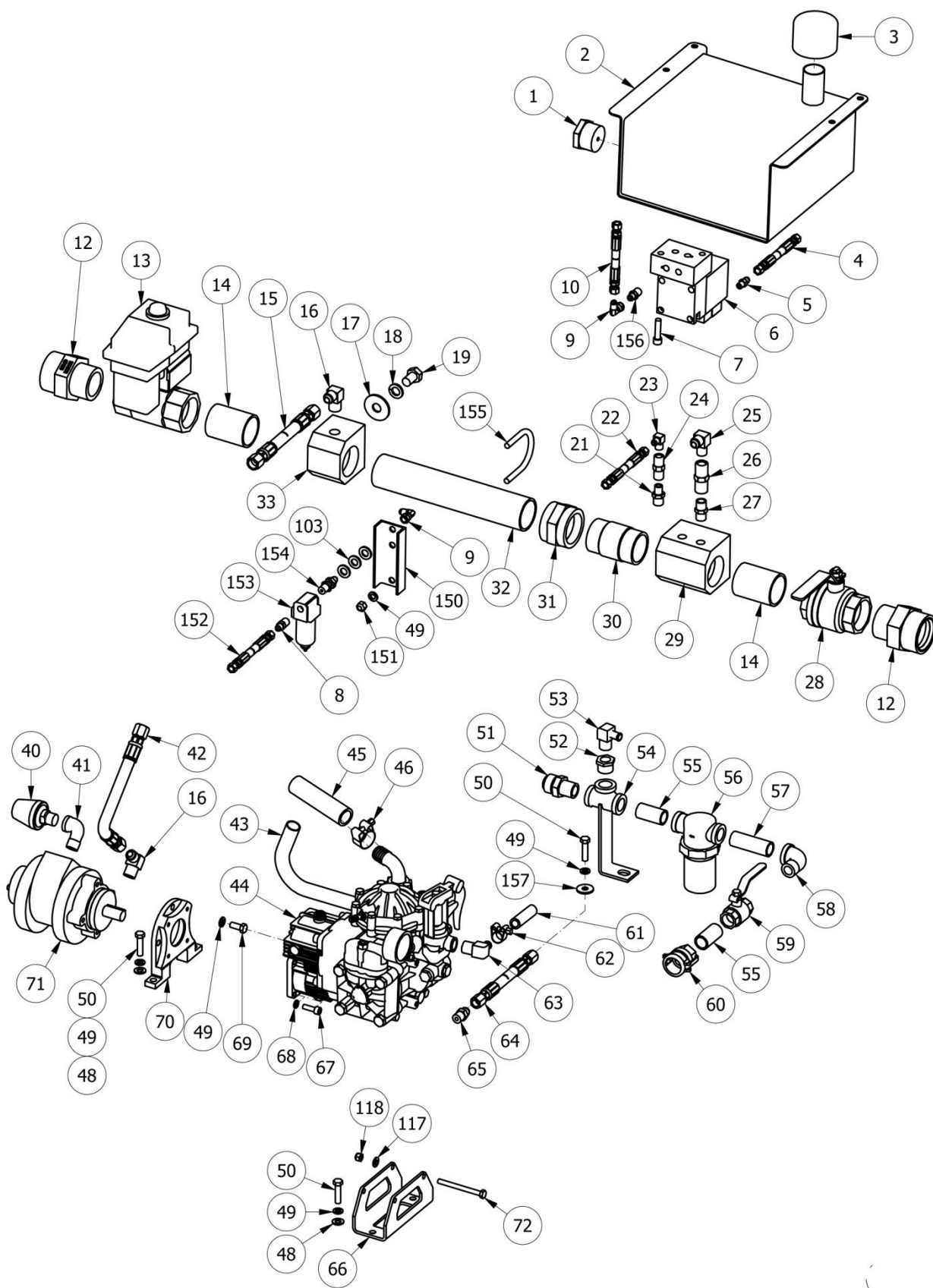
- 1:** A grey, cylindrical component with a flange and a central opening.
- 2:** A brown, circular O-ring.
- 3:** A blue, cylindrical component with a flange and a central opening.
- 4:** A grey, cylindrical component with a flange and a central opening.
- 5:** A blue, cylindrical component with a flange and a central opening.
- 6:** A small grey, cylindrical component with a flange and a central opening.
- 7:** A brown, circular O-ring.
- 8:** A long, grey, cylindrical component with a threaded end.
- 9:** A brown, circular O-ring.
- 10:** A small grey, cylindrical component with a flange and a central opening.
- 18:** A brown, circular O-ring.
- 20:** A small grey, cylindrical component with a flange and a central opening.

The assembly is shown in a disassembled state, with the components arranged in a way that shows their relative positions and how they fit together. The components are color-coded: grey for the main body and flange, blue for the outer casing, and brown for the O-rings.

Specifications	Metric	Imperial
Hammer Outside Diameter	230mm	9.09"
Hammer Length (Sonde Backhead Shoulder to Chuck)	1550mm	61"
Backhead Spanner Flat Size	150mm	5.91"
Drill Bit Shank Type	HDD80PR	
Hammer Weight (Less Bit)	184.5Kgs	406Lbs
Piston Weight	26.3Kgs	58Lbs
Make Up Torque (Chuck and Backhead)	9152 – 12202 NM	6750 – 9000 FT Lbs
Make Up Torque (Transmission shaft)	5342 – 7118 NM	3940 – 5250 FT Lbs
Make Up Torque (Rod Adaptor)	3560 – 4745 NM	2625 – 3500 FT Lbs
Recommended Minimum Air Package (<250ft Bore Length)	425 l/s @ 24.1 Bar	900 cfm @ 350 psi
Recommended Minimum Air Package (>250ft Bore Length)	590 l/s @ 24.1 Bar	1250 cfm @ 350 psi

6 Mincon Support Station Parts Breakdown





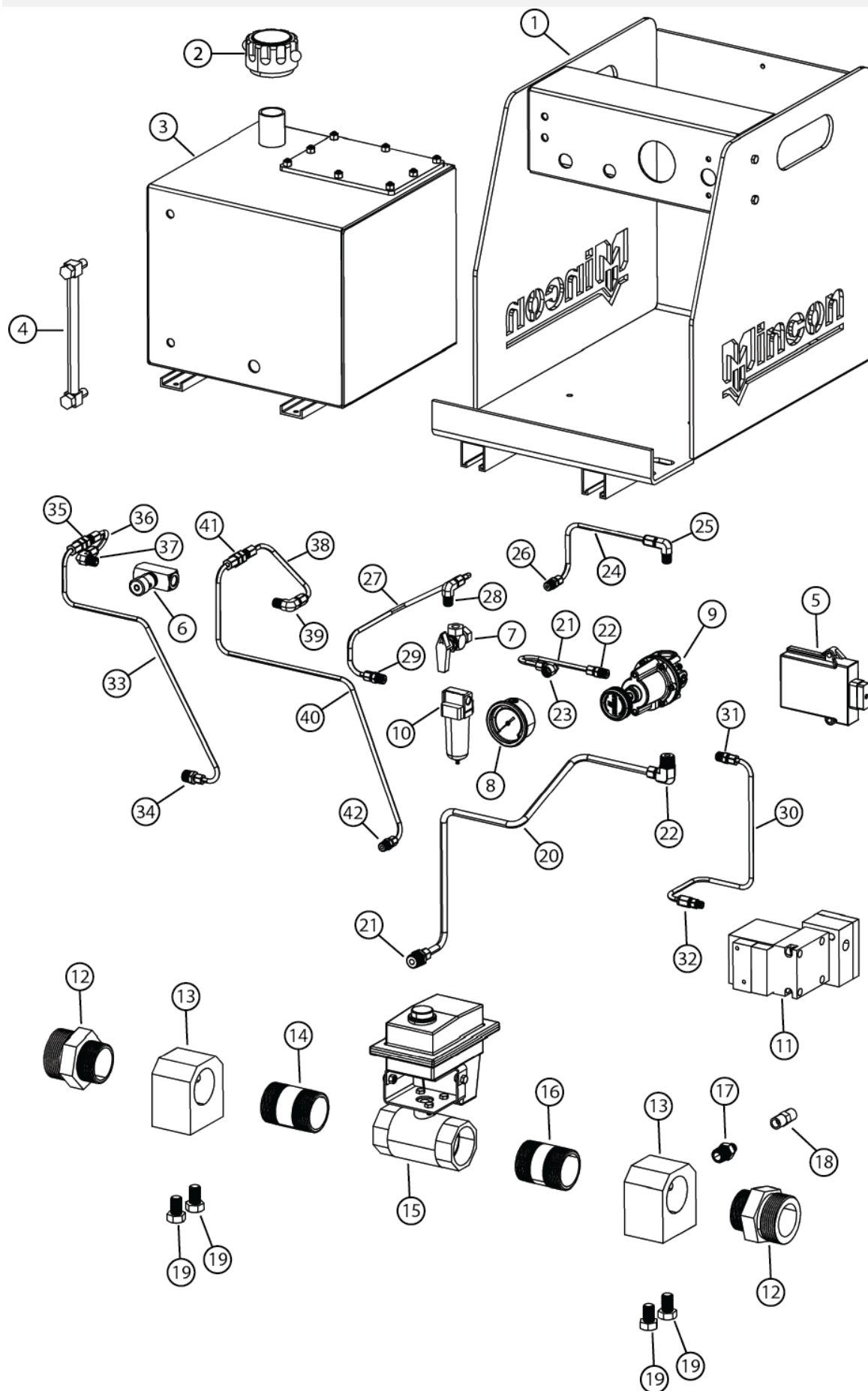
ITEM	PART NO.	QTY	DESCRIPTION
1	M103 036 90	1	Mincon Support Station
	M103 038 01	1	Sight Glass

2	M103 036 66	1	Oil Tank
3	M103 038 42	1	Tank Cap
4	M103 038 51	1	Hose Assy
5	M103 038 02	1	Fitting
6	M103 036 60	1	Oil Pump
7	M103 038 03	2	3/8"-UNF X 1.5" Socket HD
8	M103 020 19	3	Fitting
9	M103 033 61	2	Fitting
10	M103 038 52	1	Hose Assy
11	M103 050 22	1	1/4" Close Nipple Strainer
12	M103 020 10	2	Adaptor
13	M103 020 11	1	Electirc Valve
14	M103 038 04	2	2" Nipple
15	M103 038 53	1	Hose Assy
16	M103 020 26	6	Fitting
17	M103 020 61	8	Washer
18	M103 002 33	4	M16 Lockwasher
19	M103 038 06	4	HHCS M16X25
21	M103 036 39	1	Fitting
22	M103 038 54	1	Hose Assy
23	M103 020 06	5	Fitting
24	M103 038 76	1	Check Valve
25	M103 038 09	2	Fitting
26	M103 038 75	1	Check Valve
27	M103 038 10	1	Fitting
28	M103 020 16	1	2" Ball Valve
29	M103 036 76	1	2" Manifold - R
30	M103 036 11	1	2" Check Valve
31	M103 036 10	1	Coupling
32	M103 038 11	1	Nipple
33	M103 036 75	1	2" Manifold - L
40	M103 020 24	1	Muffler
41	M103 009 63	1	1/2" 90 Deg Elbow
42	M103 038 55	1	Hose Assy
43	M103 038 72	1	Hose Assy
44	M103 036 57	1	Water Pump
45	M103 036 14	1	Water Inlet Hose
46	M103 038 15	2	Clamp
48	M103 038 71	8	3/8" Flat Washer
49	M103 038 12	8	3/8" Lockwasher
50	M103 038 63	6	HHCS 3/8"-UNC X 1.5"L
51	M103 038 64	1	Fitting
52	M103 009 14	1	Fitting
53	M103 038 19	2	Fitting
54	M103 038 65	1	3/4" Tee C/W Mounting Bracket
55	M103 038 22	2	Nipple
56	M103 036 70	1	Water Inlet Strainer
57	M103 038 69	1	Nipple
58	M103 038 23	1	3/4" 90 Deg Elbow
59	M103 038 24	1	3/4" Ball Valve
60	M103 020 35	1	Camlock
61	M103 038 26	1	Hose
62	M103 038 27	2	Clamp
64	M103 038 56	1	Hose Assy
65	M103 038 29	1	Fitting
66	M103 036 89	1	Water Pump Mt Bracket
67	M103 038 31	4	M8 X 25 Socket HD Screw
68	M113 001 30	4	M8 Lockwasher
69	M103 038 13	3	HHCS 3/8"-16 UNC X 7/8"
70	M103 036 88	1	Motor Mt Bracket
71	M103 036 56	1	Air Motor
72	M103 038 90	2	HHCS 5/16"-UNC X 3.5"L
75	M103 020 67	1	200 PSI Gauge
76	M103 020 90	1	Fitting
77	M103 038 57	1	Hose Assy
78	M103 036 85	1	Front Panel
79	M103 020 41	2	HHCS 1/4"-20 X 5/8"
80	M103 020 42	9	1/4" Lockwasher
81	M103 020 43	27	1/4" Flat Washer
82	M103 020 40	1	Regulator
83	M103 038 58	1	Hose Assy
85	M103 038 35	1	Fitting
86	M103 036 69	1	Panel Valve
87	M103 038 34	1	Needle Valve



88	M103 038 66	1	Panel Valve
89	M103 038 67	1	Panel Valve
90	M103 038 59	1	Hose Assy
91	M103 038 36	2	HHCS 1/4"-20 X 1.5"
92	M103 036 92	2	Spacer
93	M103 038 60	1	Hose Assy
94	M103 038 37	2	Fitting
95	M103 036 61	1	Water Flow Meter
96	M103 038 61	1	Hose Assy
97	M103 036 86	1	Door
101	M103 036 77	1	Side Cover - L
102	M103 038 38	8	HHCS M12X30
103	M113 001 19	19	M12 Flat Washer
104	M103 002 56	8	M12 Lock Nut
105	M103 036 78	2	Side Handle
106	M103 009 66	2	#8-32 X 3/8" Screw
107	M103 009 82	2	#8 Flat Washer
108	M103 009 67	1	Handle
109	M103 036 79	1	Top Cover
110	M103 020 59	2	Pin
111	M103 036 87	1	Handle
112	M103 036 84	1	Spacer
113	M103 036 80	1	Back Cover
114	M103 038 70	22	HHCS 1/4"-UNC X 7/8"L
115	M103 036 81	1	Side Cover - R
116	M103 009 68	1	U-Clamp
117	M103 020 38	4	5/16" Flat Washer
118	M103 020 57	4	5/16" Lock Nut
119	M103 020 62	2	Wheel
120	M103 020 60	2	Cotter Pin
121	M103 036 82	1	Valve Mt Bracket
122	M103 036 83	1	Frame
123	M103 020 81	1	Sp Striker Plate
124	M103 038 68	2	1/4"-UNC X 3/4" Socket HD Screw (LOW HD)
150	M103 051 03	1	Clamp Channel
151	M103 051 04	2	3/8"-UNC Nut
152	M103 051 05	1	1/4" Hose Assy
153	M103 038 92	1	Filter
154	M103 051 02	1	1/4"MNPT X #4MJIC Bulkhead STR
155	M103 051 01	1	Clamp U-Bolt
156	M103 033 86	1	#4 MJIC x #6 Morb STR.
157	M103 051 06	1	M10 Fender Washer
160	M103 020 71	4	Safety Whip Check
161	M103 020 72	2	Adaptor
162	M103 036 28	1	Controller Wireless
163	M103 036 29	1	Receiver
164	M103 036 30	1	Battery Cable
165	M103 036 93	1	Label Set
Optional			
130	M103 009 73	1	Control Box
	M103 009 89	1	Tri Lite Harness

7 Mincon Remote Control Oiler Parts Breakdown



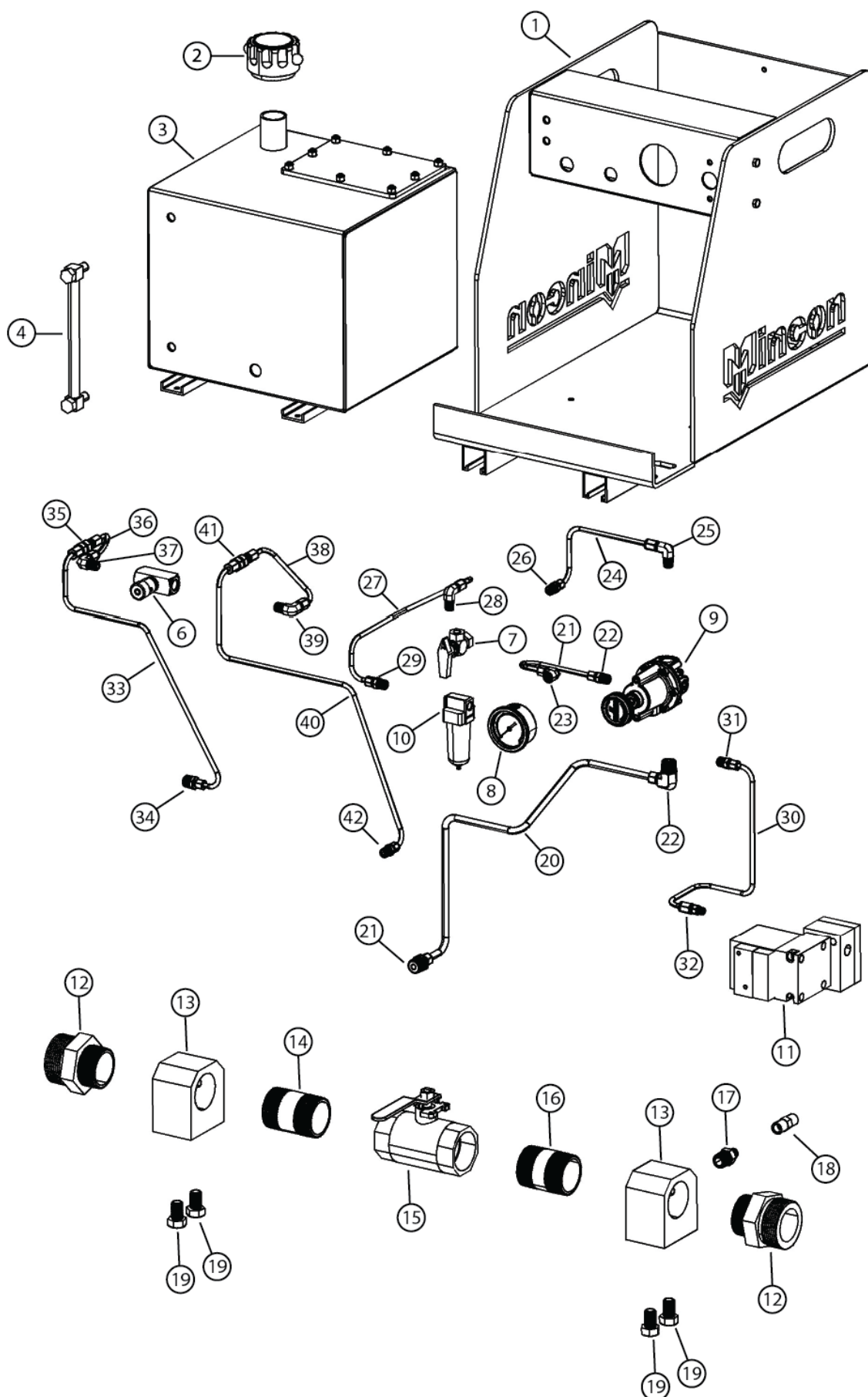
ITEM	PART NO.	QTY	DESCRIPTION
	M103 072 04	1	Mincon Oiler with Electric Valve



1	M103 072 03	1	Frame
2	M103 038 42	1	Oil Cap
3	M103 072 04	1	Oil Tank
4	M113 006 04	1	Sight Glass
5	M103 036 29	1	Receiver
6	M103 038 34	1	Needle Valve
7	M103 038 66	1	Panel Valve
8	M103 020 67	1	Pressure Gauge
9	M103 020 40	1	Regulator
10	M103 038 92	1	Air Filter
11	M103 036 60	1	Oil Pump
12	M103 020 10	2	Adaptor
13	M103 072 05	1	Manifold Block
14	M103 036 11	1	Check Valve
15	M103 020 11	1	Electric Valve
16	M103 038 04	1	Pipe Nipple
17	M103 036 39	1	Fitting - 1/2" Male NPT x 1/4" Male NPT Straight
18	M103 036 71	1	Check Valve
19	M103 072 07	4	Manifold Block Bolts (5/8"-11 x 1")
20	M103 072 08	1	Hard Line - Manifold Block to Regulator
21	M103 038 35	1	Fitting - 1/2" Male NPT x -6 JIC Male Striaight
22	M103 038 37	1	Fitting - 1/2" Male NPT x -6 JIC Male 90 Degree
21	M103 072 09	1	Hard Line - Regulator to Pressure Gauge
22	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
23	M113 015 02	1	Fitting - 1/4" Female NPT x -4 Male JIC 90 Degree
24	M103 072 10	1	Hard Line - Regulator to Panel Valve
25	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
26	M103 020 06	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree
27	M103 072 11	1	Hard Line - Panel Valve to Air Filter
28	M103 020 06	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree
29	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
30	M103 072 12	1	Hard Line - Air Filter to Oil Pump
31	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
32	M113 015 03	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree Long
33	M103 072 13	1	Hard Line - Pump to Control Panel
34	M113 015 01	1	Fitting - -6 Male SAE x -4 Male JIC Straight
35	M103 019 33	1	Fitting - -4 Male JIC x -4 Male JIC Straight Bulkhead
36	M103 072 14	1	Hard Line - Control Pane to Needle Valve In
37	M103 020 06	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree-Zinc Coated
38	M103 072 15	1	Hard Line - Needle Valve Out to Control Panel
39	M103 020 06	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree-Zinc Coated
40	M103 072 16	1	Hard Line - Control Panel to Check Valve
41	M103 019 33	1	Fitting - -4 Male JIC x -4 Male JIC Straight Bulkhead
42	M103 020 06	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree-Zinc Coated
Not Shown on Exploded View			
	M103 038 43	1	2" x 20' x 1000psi High Pressure Air Hose
	M103 038 44	1	2" x 30' x 1000psi High Pressure Air Hose
	M103 020 71	4	Safety Whip Check
	M103 036 28	1	Controller Wireless
	M103 036 30	1	Battery Cable
	M113 015 05	2	1/4" Male NPT Muffler (Oil Pump)
Fasteners			
Receiver			
	M103 038 36	2	1/4-20x1 1/2" Hex Head Bolt
	M113 009 61	2	1/4-20 Nut
	M103 020 42	2	1/4-Lock Washer
	M103 020 43	2	1/4-Flat Washer
Regulator			
	M113 018 02	2	1/4-20x 3/4" Hex Head Bolt
	M103 020 43	2	1/4-Flat Washer
Attaching Control Panel to Frame			
	M113 018 02	4	1/4-20x 3/4" Hex Head Bolt
	M103 020 43	4	1/4-Flat Washer
Attaching Manifold Blocks to Frame			
19	M103 072 07	4	5/8"-11 x 1" Bolts
	M113 016 54	4	5/8" Flat Washers
	M103 005 24	4	5/8" Lock Washers
Oil Tank Access Panel			
	M103 039 07	8	1/4-20 x 3/4" Pem Stud

M113 009 61	8	¼-20 Nut
M103 020 42	8	¼-Lock Washer
M103 020 43	8	¼-Flat Washer
Sight Glass		
M103 039 09	2	½-20 nut
M103 022 15	2	½-20 Flat Washer
Hydronic Pump		
M103 039 08	2	3/8"-24x1.5" Socket Head Cap Screw
Frame		
M103 039 12	6	¼-20 x ¾" Pem Stud
M113 009 61	6	¼-20 Nut
M103 020 42	6	¼-Lock Washer
M103 020 43	6	¼-Flat Washer

8 Mincon Manual Oiler Parts Breakdown



ITEM	PART NO.	QTY	DESCRIPTION
	M103 072 02	1	Mincon Manual Control Oiler
1	M103 072 03	1	Frame
2	M103 038 42	1	Oil Cap
3	M103 072 04	1	Oil Tank
4	M113 006 04	1	Sight Glass
6	M103 038 34	1	Needle Valve
7	M103 038 66	1	Panel Valve
8	M103 020 67	1	Pressure Gauge
9	M103 020 40	1	Regulator
10	M103 038 92	1	Air Filter
11	M103 036 60	1	Oil Pump
12	M103 020 10	2	Adaptor
13	M103 072 05	1	Manifold Block
14	M103 036 11	1	Check Valve
15	M113 800 04	1	Ball Valve
16	M103 038 04	1	Pipe Nipple
17	M103 036 39	1	Fitting - 1/2" Male NPT x 1/4" Male NPT Straight
18	M103 036 71	1	Check Valve
19	M103 072 07	4	Manifold Block Bolts (5/8"-11 x 1")
20	M103 072 08	1	Hard Line - Manifold Block to Regulator
21	M103 038 35	1	Fitting - 1/2" Male NPT x -6 JIC Male Striaight
22	M103 038 37	1	Fitting - 1/2" Male NPT x -6 JIC Male 90 Degree
21	M103 072 09	1	Hard Line - Regulator to Pressure Gauge
22	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
23	M113 015 02	1	Fitting - 1/4" Female NPT x -4 Male JIC 90 Degree
24	M103 072 10	1	Hard Line - Regulator to Panel Valve
25	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
26	M103 020 06	1	Fitting - 1/4" Male NPT x - 4 Male JIC 90 Degree
27	M103 072 11	1	Hard Line - Panel Valve to Air Filter
28	M103 020 06	1	Fitting - 1/4" Male NPT x - 4 Male JIC 90 Degree
29	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
30	M103 072 12	1	Hard Line - Air Filter to Oil Pump
31	M103 020 19	1	Fitting - 1/4" Male NPT x -4 Male JIC Straight
32	M113 015 03	1	Fitting - 1/4" Male NPT x -4 Male JIC 90 Degree Long
33	M103 072 13	1	Hard Line - Pump to Control Panel
34	M113 015 01	1	Fitting - -6 Male SAE x -4 Male JIC Straight
35	M103 019 33	1	Fitting - -4 Male JIC x -4 Male JIC Straight Bulkhead
36	M103 072 14	1	Hard Line - Control Pane to Needle Valve In
37	M103 020 06	1	Fitting - 1/4" Male NPT x - 4 Male JIC 90 Degree-Zinc Coated
38	M103 072 15	1	Hard Line - Needle Valve Out to Control Panel
39	M103 020 06	1	Fitting - 1/4" Male NPT x - 4 Male JIC 90 Degree-Zinc Coated
40	M103 072 16	1	Hard Line - Control Panel to Check Valve
41	M103 019 33	1	Fitting - -4 Male JIC x -4 Male JIC Straight Bulkhead
42	M103 020 06	1	Fitting - 1/4" Male NPT x - 4 Male JIC 90 Degree-Zinc Coated
			Not Shown on Exploded View
	M103 038 43	1	2" x 20' x 1000psi High Pressure Air Hose
	M103 038 44	1	2" x 30' x 1000psi High Pressure Air Hose
	M103 020 71	4	Safety Whip Check
	M113 015 05	2	1/4" Male NPT Muffler (Oil Pump)
			Fasteners
			Receiver
	M103 038 36	2	1/4-20x1 1/2" Hex Head Bolt
	M113 009 61	2	1/4-20 Nut
	M103 020 42	2	1/4-Lock Washer
	M103 020 43	2	1/4-Flat Washer
			Regulator
	M113 018 02	2	1/4-20x 3/4" Hex Head Bolt
	M103 020 43	2	1/4-Flat Washer
			Attaching Control Panel to Frame
	M113 018 02	4	1/4-20x 3/4" Hex Head Bolt
	M103 020 43	4	1/4-Flat Washer
			Attaching Manifold Blocks to Frame
19	M103 072 07	4	5/8"-11 x 1" Bolts
	M113 016 54	4	5/8" Flat Washers
	M103 005 24	4	5/8" Lock Washers
			Oil Tank Access Panel
	M103 039 07	8	1/4-20 x 3/4" Pem Stud
	M113 009 61	8	1/4-20 Nut
	M103 020 42	8	1/4-Lock Washer



M103 020 43	8	¼-Flat Washer
Sight Glass		
M103 039 09	2	½-20 nut
M103 022 15	2	½-20 Flat Washer
Hydronic Pump		
M103 039 08	2	3/8"-24x1.5" Socket Head Cap Screw
Frame		
M103 039 12	6	¼-20 x ¾" Pem Stud
M113 009 61	6	¼-20 Nut
M103 020 42	6	¼-Lock Washer
M103 020 43	6	¼-Flat Washer

9 Drilling Fluids

9.1 Mincon Envirosafe Rock Drill Oil

Mincon Envirosafe RDO is a high performance, environmentally safe rock drill oil. It is a unique lubricant developed for all sizes of DTH hammers, to reduce wear and improve performance. Mincon Envirosafe RDO can be used in all in-line lubricators and has proprietary lubricating compounds that are resistant to being washed off in acidic water, salt water, and foam environments, thus reducing rust on the internal and external parts of the hammer even after the equipment is not in use. It creates a lubricant film on the internal parts that prevents piston scuffing and heat build-up. Wear of internal hammer parts is reduced dramatically increasing the life of your hammer and rate of penetration which increases your profitability.

Mincon Envirosafe RDO reduces the potential of surface or groundwater environmental concerns during mining production, mineral exploration, horizontal directional drilling, quarrying, and water well drilling. It has a viscosity that allows the lubricant to flow freely to areas requiring lubrication and also removes the requirement to switch between heavy and light oil as the seasons change. Lubrication can be better controlled and consumption reduced when using Mincon Envirosafe RDO. Mincon Envirosafe RDO is an environmentally safe, biodegradable product that lubricates more efficiently than conventional Rock Drill Oils while reducing contamination of surface and groundwater. Particularly suited for drilling uncontaminated water wells and monitor wells in sensitive areas such as adjacent to streams and lakes, or where groundwater protection is important. Mincon RDO is available in 5 Gallon pails (18L), 55 Gallon drums (205L), 1000L and 1200L IBC Totes.

Specification

Viscosity @ 100°C	8.42 Cst.
Viscosity @ 40°C	46.0 Cst.
Specific Gravity @ 25°C	0.907
Pour Point	-36°C
VI	214
Flash Point	292°C
Heavy Metals	None
Active Ingredients	5 - 10 %
LC50	10,000 ppm+





9.2 Mincon Hole Control

Mincon Hole Control is a unique cost saving fluid formulated to speed up hole collaring, reduce collar sloughing and stabilize the bore hole. Hole control can be used with air-rotary tri-cone, down the hole hammers and all types of top hammer drills (surface and underground). Mincon Hole Control reduces re-drilling of a borehole, due to hole collapse or transference between adjacent bores through cracks and voids in the rock. It aids in eliminating regrinding of cuttings, thus creating bigger chips for sampling purposes and increasing penetration rates. Using Mincon Hole Control leaves a sticky, neatly stacked cuttings pile that is not prone to sloughing prior to loading the hole. It acts as a dust suppressant and reduces wind-blown fines. Hole Control allows blast holes to be fully loaded, helping to optimize blasting operations and creating a clean smooth floor. Mincon Hole Control speeds up borehole collaring, thereby increasing production.

The approximate mix ratio to achieve tank mix suitable for most drilling and borehole conditions is approximately 1-2 quart(s) of HOLE CONTROL to 250 US gallons of water (or 1-2 Liter(s) of HOLE CONTROL to 1000 Liters of water). Naturally acidic water sources will require more Hole Control additive to achieve the required viscosity.



9.3 Mincon Envirosafe Foamer ES

Mincon Envirosafe Foamer ES is an environmentally acceptable foaming agent to be used in mineral exploration, oil and gas exploration and water well drilling operations. It has also been used as a drilling aid for monitoring wells. Mincon Envirosafe Foamer ES has an excellent half-life comparable to the leading foams on the market. It develops immediate tight foam (compact bubbles) with good lifting characteristics. Mincon Envirosafe Foamer ES can be enhanced by the addition of Mincon Hole Control to create significantly stiffer foam if required. The suggested dosage under normal drilling conditions is 0.5% – 1.0% by volume and 2.0% – 3.0% by volume when there is excessive water influx. Dosages will depend on chemical make-up of the drilling water, volume of water used, and the depth of the hole.



NOTES





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