

SIZE 2  
A  
B  
C  
D  
E  
F

0471

UNLESS OTHERWISE NOTED: ALL DIMENSIONS IN INCHES: MACHINING DIMENSIONS LIMITED TO FRACTIONAL ± 1/64 ANGULAR ± 1/2°. STRUCTURAL DIMENSIONS LIMITED TO ± 1/16. DO NOT SCALE THIS DRAWING

LITHO PRINT YES  NO

ENG ORDER K-806 4-22-97

REVISIONS

FCSI3891FDB0312FDB0316

51-016-08-88

**CAUTION STATEMENT**

THIS MACHINE IS NOT PERMISSIBLE EXCEPT WHEN USED UNDER THE FOLLOWING CONDITIONS: (DO NOT CHANGE WITHOUT MSHA APPROVAL)

CAUTIONS TO BE OBSERVED FOR ALL MACHINES

**GENERAL SAFETY:** FREQUENT INSPECTIONS MUST BE MADE TO SEE THAT ALL ELECTRICAL PARTS, INCLUDING WIRING, CONNECTORS, HOSE CONDUIT AND CABLE ENTRANCES, ARE IN A SAFE CONDITION. THERE MUST BE NO OPENINGS INTO THE CASINGS OF ELECTRICAL PARTS.

**FASTENINGS:** ALL BOLTS, NUTS, SCREWS, AND OTHER MEANS OF FASTENING MUST BE KEPT IN PLACE, PROPERLY TIGHTENED AND SECURED. ALL SCREW COVERS MUST BE KEPT LOCKED OR SEALED. THE KEY OR SEALING TOOL SHALL BE IN THE CARE OF AN AUTHORIZED PERSON.

**RENEWALS AND REPAIRS:** SPECIAL CARE MUST BE TAKEN IN MAKING RENEWALS OR REPAIRS. LEAVE NO PARTS OFF, USE NEW PARTS EXACTLY LIKE THOSE FURNISHED BY THE MANUFACTURER. WHEN ANY LEAD ENTRANCE IS DISTURBED, THE LEADS MUST BE REPLACED AND FASTENED OR RE-PACKED IN THE APPROVED MANNER.

SPECIFIC CAUTIONS TO BE OBSERVED FOR ALL BATTERY OPERATED MACHINES

**GENERAL SAFETY:** FREQUENT INSPECTIONS MUST BE MADE TO SEE THAT BATTERY WIRING AND CELL CONNECTORS ARE MAINTAINED IN A SAFE CONDITION.

**FASTENINGS:** THE RUNNING PLUGS AND BATTERY BOXES MUST BE KEPT LOCKED OR SEALED.

**RENEWALS AND REPAIRS:** INSPECTIONS, RENEWALS, OR REPAIRS OF ELECTRICAL PARTS MUST NOT BE MADE UNLESS THE MACHINE IS IN A SAFE PLACE.

**CLEANLINESS:** THE BATTERY CELLS, BATTERY CONNECTORS, AND THE BATTERY BOXES MUST BE KEPT FREE FROM ACCUMULATIONS OF ELECTROLYTE, DUST AND DIRT.

SPECIFIC CAUTIONS TO BE OBSERVED FOR ALL NON-BATTERY MACHINES

**GENERAL SAFETY:** THE TRAILING CABLE MUST BE KEPT IN A SAFE CONDITION. A PERMISSIBLE JUNCTION BOX MUST BE USED IN CONNECTING TO THE POWER CIRCUIT UNLESS CONNECTION IS MADE IN PURE INTAKE AIR. TO MAINTAIN THE OVERLOAD PROTECTION ON DIRECT CURRENT MACHINES, THE UNGROUNDED CONDUCTOR OF THE TRAILING CABLE MUST BE CONNECTED TO THE PROPER TERMINAL. THE MACHINE FRAME MUST BE EFFECTIVELY GROUNDED BY A GROUND CONNECTOR OR AN APPROVED GROUND DETECTING SYSTEM THAT REMOVES POWER FROM THE TRAILING CABLE WHEN A GROUND OCCURS ON THE MACHINE. THE OPERATING VOLTAGE MUST NOT EXCEED THE VOLTAGE RATING OF THE MACHINE. WITH TRAILING CABLE ENERGIZED, POWER MAY BE PRESENT ON THE LINE SIDE OF ANY CIRCUIT INTERRUPTING DEVICE EVEN THOUGH THE CIRCUIT INTERRUPTING DEVICE IS OPEN OR IN THE OFF POSITION.

**RENEWALS AND REPAIRS:** INSPECTIONS, RENEWALS OR REPAIRS OF ELECTRICAL PARTS MUST NOT BE MADE UNLESS THE TRAILING CABLE IS ENTIRELY DISCONNECTED FROM THE CIRCUIT FURNISHING THE POWER AND THE CABLE MUST NOT BE CONNECTED AGAIN UNTIL ALL PARTS ARE PROPERLY REASSEMBLED.

**SERVICING:** EXPLOSION-PROOF ENCLOSURES SHALL BE RESTORED TO THE STATE OF ORIGINAL SAFETY WITH RESPECT TO ALL FLAME-ARRESTING PATHS, LEAD ENTRANCES, ETC., FOLLOWING DISASSEMBLY FOR REPAIR OR REBUILDING, WHETHER BY THE OWNER OR AN INDEPENDENT SHOP.

**CABLE REQUIREMENTS:** A FLAME-RESISTANT PORTABLE CABLE BEARING AN MSHA ASSIGNED IDENTIFICATION NUMBER, ADEQUATELY PROTECTED BY AN AUTOMATIC CIRCUIT-INTERRUPTING DEVICE SHALL BE USED. SPECIAL CARE SHALL BE TAKEN IN HANDLING THE CABLE TO GUARD AGAINST MECHANICAL INJURY AND WEAR. SPLICES IN PORTABLE CABLES SHALL BE MADE IN A WORKMANLIKE MANNER, MECHANICAL STRONG, AND WELL INSULATED. ONE TEMPORARY SPlice MAY BE MADE IN ANY TRAILING CABLE. SUCH TRAILING CABLE MAY ONLY BE USED FOR THE NEXT 24-HOUR PERIOD. NO TEMPORARY SPlice SHALL BE MADE IN A TRAILING CABLE WITHIN 25 FEET OF THE MACHINE, EXCEPT CABLE REEL EQUIPMENT. CONNECTIONS AND WIRING TO THE OUTBY END OF THE CABLE SHALL BE IN ACCORDANCE WITH RECOGNIZED STANDARDS OF SAFETY.

**POWER TAKE OFF:** A POWER TAKE OFF SHALL BE USED ONLY FOR THE CONNECTION OF PORTABLE CABLE OF ANOTHER PERMISSIBLE MACHINE.

MATERIAL	
PATTERN NO.	
HEAT TREAT	
HARDNESS	
FINISH SYMBOLS	

SYM.	MICRO INCHES	DESCRIPTION	SYM.	MICRO INCHES	DESCRIPTION
A	4	PRECISION POLISH	F	125	COMMON MACHINE
B	8	FINE POLISH	G	250	ROUGH MACHINE
C	16	COMMON POLISH	H	500	HEAVY ROUGH
D	32	GRIND OR EQUAL	K	1000	EX HEAVY ROUGH
E	63	SMOOTH MACHINE			

**JOY TECHNOLOGIES INC.**  
FRANKLIN, PENNSYLVANIA 15933

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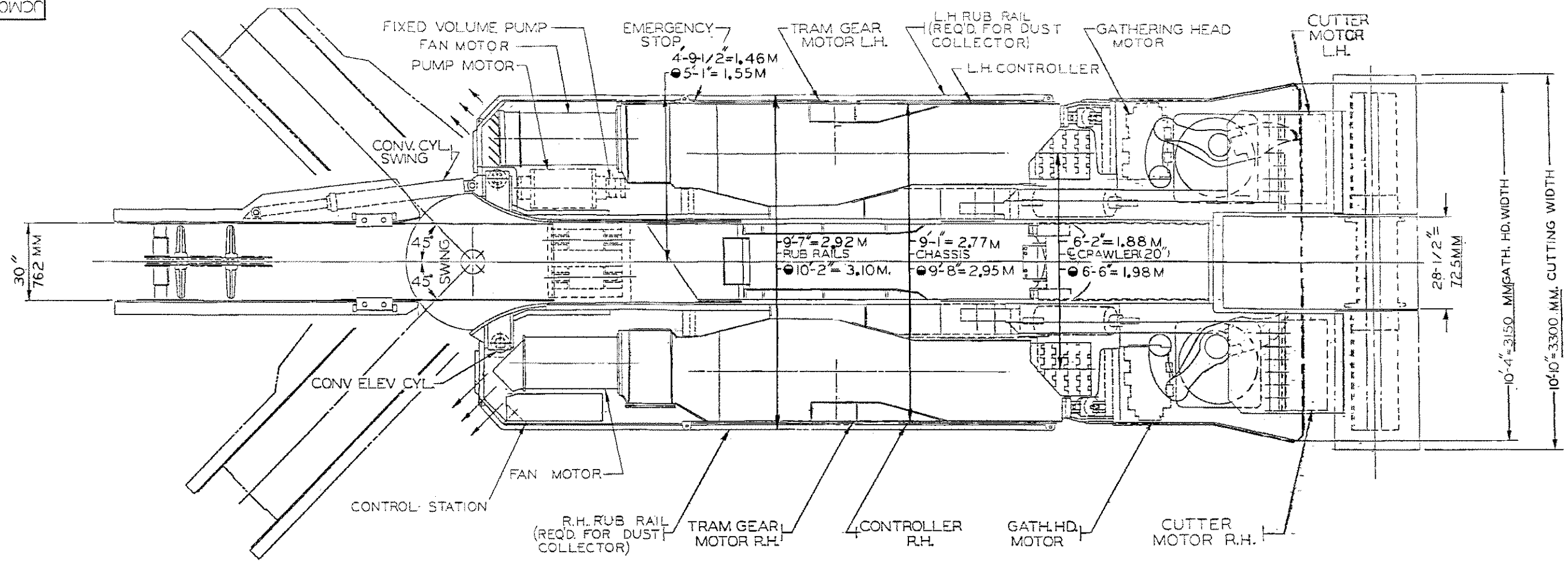
SIMILAR TO REPLACES REPLACED BY

OR C. MOORE  
DATE 1-28-91  
CLASS COAL  
SCALE NA

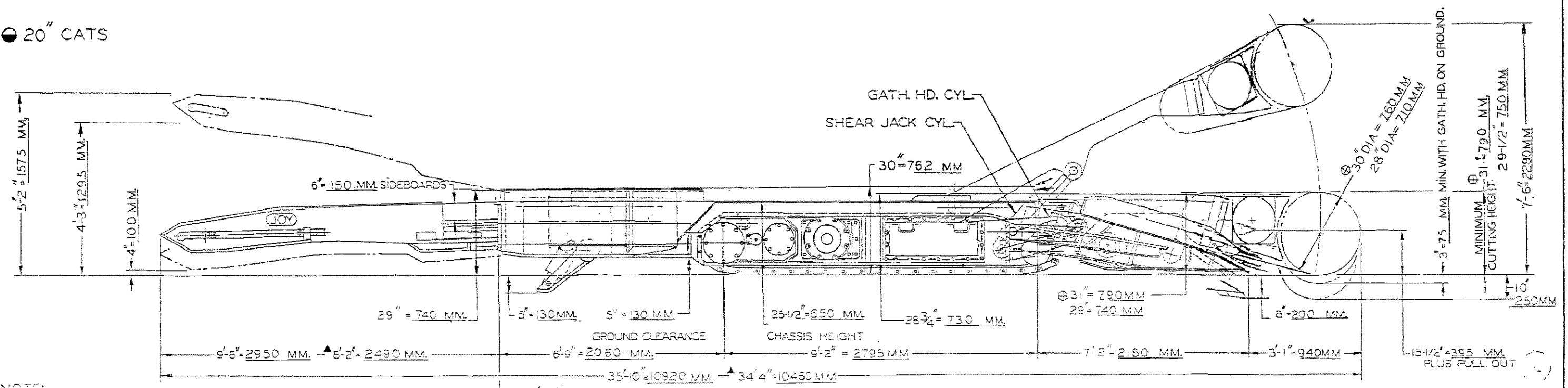
**CAUTION STATEMENT**

IL 46 REPLACES IL 46 SHEET 1 AND 2

IL 46



● 20" CATS



NOTE:  
 DIMENSIONS SHOWN ARE FOR AA MODEL (LOW CHASSIS)  
 ▲ WITH OPTIONAL CONVEYOR  
 ⊕ OPTIONAL CUTTING DIMENSIONS

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JOY MANUFACTURING CO.	
PLANT LOCATION AS INDICATED BELOW	
BIRMINGHAM, AL	LA GRANGE, NC
BUFFALO, NY	MICHIGAN CITY, IN
CAMBRIDGE, ONT., CAN.	NEW PHILADELPHIA, OH
CLAREMONT, NH	
EAST KILBRIDE, SCOT	
FRANKLIN, PA	

14CM10-10AA (DUST COLLECTOR)	
GENERAL ARRANGEMENT	
SIMILAR TO: -0070	(NAME OR INITIAL & DATE)
SUPERSEDED BY:	DR. HANX 6-13-95
REPLACED BY:	TR.
REPLACES:	CK.
REPLACED BY:	APPD.
SCALE: 1/4" = 1'-0"	CLASS: 14CM
JCM00760-0144	

E. O. FDE 8073	REVISIONS
DATE	

# GREASE SPECIFICATIONS

SK025318-0000

	MOBILE MACHINE		ELECTRIC MOTOR GREASE	
JOY GREASE IDENTIFICATION	JL-G	BG-H	BG-M	BG-Y
JOY PART NUMBER	823038	823031	823030	823032
SOAP OR THICKENER	LITHIUM 12 HYDROXY STEARATE	LITHIUM 12 HYDROXY STEARATE	LITHIUM 12 HYDROXY STEARATE, LITHIUM COMPLEX, POLYUREA	LITHIUM COMPLEX, POLYUREA
NLGI GRADE	_____	_____	2	2
PENETRATION MM/10 AT 77°F WORKED 60 STROKES (ASTM D217)	400-500	265-295	265-295	265-295
PENETRATION WORKED 100,000 X (ASTM D217)	_____	_____	NO MORE THAN +15% DEVIATION FROM PUBLISHED WORKED 60 X PENETRATION	NO MORE THAN +15% DEVIATION FROM PUBLISHED WORKED 60 X PENETRATION
ROLL STABILITY/PENETRATION (ASTM D-1831)	_____	_____	NO MORE THAN +15% DEVIATION FROM PUBLISHED WORKED 60 X PENETRATION	NO MORE THAN +15% DEVIATION FROM PUBLISHED WORKED 60 X PENETRATION
DROPPING POINT °F (ASTM D2265)	320	350	385 MIN	470 MIN
<u>MINERAL OIL VISCOSITY</u>				
cSt AT (40°C)	_____	_____	110-160	110-160
cSt AT (100°C) (ASTM D445)	_____	_____	10-15	10-15
SUS AT 100°F (40°C)	1500-2100	500-650	500-800	500-800
SUS AT 210°F (100°C) (ASTM D445 & D2161)	110-130	62-70	60-75	60-75
BOMB OXIDATION STABILTY (ASTM D 942)	5 PSI IS THE MAX. PRESSURE DROP ALLOWABLE FOR A PERIOD OF 100 HOURS.		7 PSI IS THE MAX. PRESSURE DROP ALLOWABLE FOR A PERIOD OF 100 HOURS.	5 PSI IS THE MAX. PRESSURE DROP ALLOWABLE FOR A PERIOD OF 100 HOURS.
WATER RESISTANCE (ASTM D1264)	5% IS THE MAX. GREASE WASHOUT BY WATER AT 100°F AND FOR A PERIOD OF 1 HOUR.		10% IS THE MAX. GREASE WASHOUT BY WATER AT 100°F AND FOR A PERIOD OF 1 HOUR.	5% IS THE MAX. GREASE WASHOUT BY WATER AT 100°F AND FOR A PERIOD OF 1 HOUR.
RUST PROTECTION RATING (ASTM D1743)		I	I	I
TIMKEN OK LOAD-POUNDS (ASTM D2509)	25	40	_____	_____
HI TEMP. BALL BEARING TEST AT 350°F (ASTM D-3336)	_____	_____	500 HOURS MIN.	500 HOURS MIN.
WHEEL BEARING TEST (ASTM D-3527)	_____	_____	200 HOURS MIN.	200 HOURS MIN.
VISCOSITY INDEX (ASTM D-2270)	_____	_____	90 MIN	90 MIN

BG-H THIS IS JOY'S STANDARD GREASE FOR ALL APPLICATIONS OTHER THAN ELECTRIC MOTORS.

JL-G THIS IS A SEMI-FLUID GREASE WHICH WAS USED WHEN A MACHINE WAS EQUIPPED WITH A POWER GREASE PUMP. JL-G IS NOT RECOMMENDED FOR CURRENT JOY MACHINES.

### NO EP TYPE GREASE IS ACCEPTABLE FOR ELECTRIC MOTORS.

BG-Y THIS HIGH TEMPERATURE GREASE SPECIFICATION IS SUITABLE FOR USE IN ALL ELECTRIC MOTOR APPLICATIONS, INCLUDING THOSE OPERATING WITH GREASE TEMPERATURES OVER 350° F.

IT MAY ALSO BE USED AS AN ALTERNATIVE TO BG-H OR BG-M.

BG-M THIS HIGH QUALITY GREASE MAY BE SPECIFIED FOR USE IN ELECTRIC MOTORS OPERATING WITH A GREASE TEMPERATURE LESS THAN 350° F.

IT MAY ALSO BE USED AS AN ALTERNATIVE TO BG-H.

## LUBRICANT SPECIFICATIONS

IMPORTANT: LUBRICANT SPECIFICATIONS ARE ONLY A GENERAL GUIDE TO ASSIST IN LUBRICANT SELECTION. THEY DO NOT MEASURE QUALITY OR PERFORMABILITY. USE QUALITY LUBRICANTS AS RECOMMENDED BY REPUTABLE SUPPLIERS TO INSURE MAXIMUM PERFORMANCE AND MINIMUM DELAYS. ALWAYS BE CONSISTENT IN USING GREASES WITH THE SAME THICKENER. THIS WILL INSURE THAT THE GREASES USED WILL BE COMPATIBLE. FOR MORE INFORMATION SEE SERVICE BULLETIN FG67.

LITHOPRINT THIS DRAWING

EO FCR954  
DATE 7-31-86  
**G** FDE8297  
**H** FDF0501

REVISIONS  
FCS0921  
FCS1025  
**D** FDE2813  
**E** FDE7932  
**F** FDE9611

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### JOY MANUFACTURING CO.

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CAMBRIDGE, ONT. CANADA	NEW PHILADELPHIA, OH
CLAREMONT, NH	
E. KILBRIDE, SCOTLAND	
FRANKLIN, PA	

## GREASE SPECIFICATION CHART

SIMILAR TO \_\_\_\_\_  
SUPERSEDES BY \_\_\_\_\_  
REPLACES BY \_\_\_\_\_

(NAME OR INITIAL & DATE)  
DR. R. LAPE 3-18-86  
TR \_\_\_\_\_  
CK \_\_\_\_\_  
APPD \_\_\_\_\_

SCALE NONE CLASS ALL

SK025318-0000

SK025318-0001

# HYDRAULIC OIL SPECIFICATIONS

JOY HYDRAULIC OIL IDENTIFICATION	HO-A	HO-T	HO-S	HO-T2
ISO GRADE (ISO 3448)	AUTOMATIC TRANSMISSION FLUID DEXRON III		46	150
ASTM GRADE (ASTM 2422)		215	315	700
<b>OIL VISCOSITY</b> cSt AT 40°C (100 °F) cSt AT 100°C (212°F) SSU AT 40°C (100°F) SSU AT 100°C (210°F) (ASTM D445 AND D2161)	35-41 10-11 160-190 45-51	42-51 10-11 195-235 46-50	64-72 11-12 295-335 52-57	144-159 15-18 665-735 71-82
VISCOSITY INDEX (MINIMUM) (ASTM D2270)	140	90	90	90
POUR POINT °C (°F) (MAXIMUM) (ASTM D97)	-40 (-40)	-29 (-20)	-23 (-10)	-12 (10)
FLASH POINT °C (°F) (MINIMUM) (ASTM D92)	160 (320)	210 (410)	215 (420)	215 (420)
ANILINE POINT (MINIMUM) (ASTM D611)	200	200	200	200
OXIDATION STABILITY HOURS (MINIMUM)(ASTM D943)	500	500	500	500
RUST PROTECTION (ASTM D665A AND D665B)	PASS	PASS	PASS	PASS
FOAM SUPPRESSION (ASTM D892)	USE ANTI-FOAMING ADDITIVE			
VICKERS PUMP WEAR TEST (ASTM D2882)	PASS	PASS	PASS	PASS
DEMULSIBILITY TEST (MAXIMUM) (ASTM D1401)	-	10	15	35
COPPER CORROSION TEST (MINIMUM) (ASTM D-130)	1B	1B	1B	1B

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CLAREMONT, NH	
E. KILBRIDE, SCOTLAND	
FRANKLIN, PA	

**HYDRAULIC OIL SPECIFICATION CHART**

SIMILAR TO \_\_\_\_\_  
SUPERSEDES BY \_\_\_\_\_  
REPLACES \_\_\_\_\_  
REPLACED BY \_\_\_\_\_

(NAME OR INITIAL & DATE)  
DR RLAPE 3-18-86  
TR \_\_\_\_\_  
CK \_\_\_\_\_  
APPD \_\_\_\_\_

SCALE NONE CLASS ALL

SK025318-0001

LUBRICANT SPECIFICATIONS

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LITHOPRINT THIS DRAWING

EO FCR954  
DATE 7-31-86

REVISIONS  
 FDF1841  
 FDF3874

# TRANSMISSION OIL SPECIFICATIONS

4000-813520KS

UNLESS OTHERWISE NOTED: ALL DIMENSIONS IN INCHES: MACHINING DIMENSIONS LIMITED TO FRACTIONAL ±1/64, ANGULAR ±1/2°. STRUCTURAL DIMENSIONS LIMITED TO ±1/16 DO NOT SCALE THIS DRAWING.

TRANSMISSION OIL IDENTIFICATION	TO-LEP	TO-MEP	TO-HEP
ISO GRADE (ISO)	68	220	320
AGMA LUBRICANT NUMBER	2 EP	5 EP	6 EP
<b>OIL VISCOSITY</b>			
cSt AT 40° C	68	220	320
cSt AT 100° C (REF.) (ASTM D445)	8.7	18.7	24.0
VISCOSITY INDEX (MINIMUM) (ASTM D2270)	100	100	100
POUR POINT °C(°F)(MAX.) (ASTM D97)	-30(-20)	-20(-5)	-18(0)
FLASH POINT °C(°F) (MIN.) (ASTM D92)	210(410)	227(440)	227(440)
OXIDATION STABILITY (MAXIMUM) (ASTM D 2893)	5.9%	10%	10%
<b>EP ADDITIVES TESTS</b>			
FALEX (ASTM D3233 METHOD B)(lb)	—	3000+	3000+
FOUR BALL (ASTM D2783)	46+	46+	46+
LOAD WEAR INDEX, kg	250+	250+	250+
WELD POINT, kg	12+	12+	12+
FZG GEAR TEST MINIMUM STAGES PASSED	PASS	PASS	PASS
RUST PROTECTION (ASTM D665A AND D665B)	1b	1b	1b
COPPER CORROSION PROTECTION (MAXIMUM) (ASTM D130) I, II, III	75	75	75
FOAM SUPPRESSION ml. (MAXIMUM) SAME FOR TEST SEQUENCES 5 MINUTE BLOW 10 MINUTE REST (ASTM D892)	10	10	10
<b>EMULSIBILITY TEST</b>			
MAXIMUM VOLUME OF WATER (ml)			
1 HOUR	—	0	0
24 HOUR	—	0	0
48 HOUR	—	20	20
(ASTM D1401 MODIFIED)			

**TO-LEP** THIS IS TRANSMISSION OIL WHICH WILL BE SPECIFIED FOR LOW AMBIENT TEMPERATURE, CLUTCHLESS GEARCASE APPLICATIONS."ARCTIC CONDITIONS"

**TO-MEP** THIS TRANSMISSION OIL IS A MEDIUM WEIGHT OIL SPECIFIED FOR CLUTCHLESS APPLICATIONS REQUIRING MODERATE OPERATING VISCOSITY.

**TO-HEP** THIS TRANSMISSION OIL IS A HEAVY DUTY OIL SPECIFIED FOR CLUTCHLESS GEARCASE APPLICATION REQUIRING HIGH OPERATING VISCOSITY.

## LUBRICANT SPECIFICATIONS

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### CAUTION

- MIXING LUBRICANTS SUPPLIED BY DIFFERENT VENDORS IN THE SAME APPLICATION MAY AFFECT LUBRICANT PERFORMANCE. PROPER PRECAUTIONS, SUCH AS FLUSHING OR DRAINING LUBRICANT RESERVOIR, BEFORE USING DIFFERENT SUPPLIER'S LUBRICANTS IS RECOMMENDED TO AVOID PROBLEMS.
- THE ABOVE OILS ARE EP OILS AND ARE NOT RECOMMENDED FOR WET CLUTCH APPLICATIONS. NON EP OILS SHOULD BE USED IN WET CLUTCH APPLICATIONS.

CAD/CAM DRAWING  
MANUAL REVISIONS  
NOT AUTHORIZED.

PATTERN NO. \_\_\_\_\_  
HEAT TREAT \_\_\_\_\_  
HARDNESS \_\_\_\_\_  
CARBURIZE (ECO) \_\_\_\_\_

FINISH SYMBOLS	
SYMBOL	DESCRIPTION
A	PRECISION POLISH
B	FINE POLISH
C	COMMON POLISH
D	GRIND OR EQUAL
E	SMOOTH MACH.

**JOY TECHNOLOGIES INC.**  
FRANKLIN, PENNSYLVANIA 16323

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**TRANSMISSION OIL SPECIFICATION CHART**

SIMILAR TO SK025318-0003  
REPLACES \_\_\_\_\_  
REPLACED BY \_\_\_\_\_





OR TOM ALLEN  
DATE 05-23-95  
CLASS ALL  
SCALE NONE





SK025318-0004

LITHO PRINT YES  NO

ENG ORDER (A) FDE7272

REVISIONS (B) FDE8793

METRIC CAP SCREWS				
CAP SCREW SIZE	METRIC TORQUE VALUE (NEWTON METERS)		IMPERIAL TORQUE VALUE (FOOT POUNDS)	
	 CLASS 10.9 HEX HEAD	 CLASS 12.9 SOCKET HEAD	 CLASS 10.9 HEX HEAD	 CLASS 12.9 SOCKET HEAD
M3	2 Nm	2 Nm	1 FT-LB	2 FT-LB
M4	4 Nm	5 Nm	3 FT-LB	4 FT-LB
M5	9 Nm	10 Nm	6 FT-LB	8 FT-LB
M6	15 Nm	18 Nm	11 FT-LB	13 FT-LB
M8	36 Nm	43 Nm	27 FT-LB	32 FT-LB
M10	72 Nm	87 Nm	53 FT-LB	64 FT-LB
M12	125 Nm	150 Nm	92 FT-LB	111 FT-LB
M16	305 Nm	365 Nm	225 FT-LB	269 FT-LB
M20	590 Nm	710 Nm	435 FT-LB	524 FT-LB
M24	1020 Nm	1220 Nm	752 FT-LB	900 FT-LB
M30	2050 Nm	2450 Nm	1512 FT-LB	1807 FT-LB
M36	3560 Nm	4280 Nm	2625 FT-LB	3157 FT-LB

IMPERIAL CAP SCREWS				
CAP SCREW SIZE	METRIC TORQUE VALUE (NEWTON METERS)		IMPERIAL TORQUE VALUE (FOOT POUNDS)	
	 GRADE 5 HEX HEAD	 GRADE 8 AND SOCKET HEAD	 GRADE 5 HEX HEAD	 GRADE 8 AND SOCKET HEAD
1/4 - 20	12 Nm	18 Nm	9 FT-LB	13 FT-LB
5/16 - 18	26 Nm	35 Nm	19 FT-LB	26 FT-LB
3/8 - 16	45 Nm	64 Nm	33 FT-LB	47 FT-LB
7/16 - 14	72 Nm	102 Nm	53 FT-LB	75 FT-LB
1/2 - 13	108 Nm	156 Nm	80 FT-LB	115 FT-LB
9/16 - 12	156 Nm	224 Nm	115 FT-LB	165 FT-LB
5/8 - 11	217 Nm	305 Nm	160 FT-LB	225 FT-LB
3/4 - 10	386 Nm	542 Nm	285 FT-LB	400 FT-LB
7/8 - 9	617 Nm	875 Nm	455 FT-LB	645 FT-LB
1 - 8	929 Nm	1315 Nm	685 FT-LB	970 FT-LB
1-1/8 - 7	1146 Nm	1871 Nm	845 FT-LB	1380 FT-LB
1-1/4 - 7	1627 Nm	2624 Nm	1200 FT-LB	1935 FT-LB
1-3/8 - 6	2129 Nm	3444 Nm	1570 FT-LB	2540 FT-LB
1-1/2 - 6	2820 Nm	4583 Nm	2080 FT-LB	3380 FT-LB

**INSTRUCTIONS:**

- DETERMINE WHETHER THE CAPSCREWS ARE METRIC OR IMPERIAL. ALL METRIC CAPSCREWS HAVE THE CLASS STAMPED ON THE TOP OR SIDE OF THE HEAD SUCH AS 10.9 FOR CLASS 10.9 OR 12.9 FOR CLASS 12.9. ALL IMPERIAL HEX HEAD CAP SCREWS THAT ARE GRADE 5 HAVE 3 MARKS ON THE HEAD AND GRADE 8 HAVE 6 MARKS. ALL IMPERIAL SOCKET HEAD CAPSCREWS ARE GRADE 8.
- DETERMINE IF THE TORQUE WRENCH INDICATES IN METRIC OR IMPERIAL UNITS. THEN SELECT THE CORRECT PORTION OF THE RECOMMENDED TORQUE VALUES FOR METRIC CAP SCREWS.
- TORQUE THE CAPSCREWS TO THE RECOMMENDED TORQUE.

**EXAMPLE:**

GIVEN AN M12 METRIC SOCKET HEAD CAP SCREW AND TORQUE WRENCH THAT READS IN METRIC, THE CAP SCREW SHOULD BE TORQUED TO 150 NEWTON METERS.








**CAUTIONS:**

- A TORQUE WRENCH CALIBRATED TO AN ACCURACY OF +/- 5% IS TO BE USED.
- USE THESE VALUES FOR TIGHTENING CAP SCREWS UNLESS A VALUE IS ON THE ASSEMBLY DRAWING. THE TORQUE VALUES ON THE DRAWING MAY DIFFER FROM LISTED VALUE DEPENDING UPON SPECIFIC APPLICATION REQUIREMENTS.
- THE TORQUE VALUES IN THESE TABLES APPLY TO CAP SCREWS WITH A LIGHT COATING OF MACHINE OIL (AS RECEIVED CONDITION) OR A LIGHT COATING OF REGULAR OIL. THESE TORQUE VALUES APPLY TO PLATED CAP SCREWS ALSO.
- THE USE OF FRICTION REDUCING LUBRICANTS (I.E. MOLY-DISULFIDE, ETC.) ON THREADS CAN RESULT IN OVER-TORQUING AND BREAKAGE IF USED WITH THE TORQUE VALUES LISTED ON THIS TABLE. DUE TO THE WIDE VARIATION OF FRICTION REDUCTION (POSSIBLE 30-50 PERCENT), USE OF THESE LUBRICANTS SHOULD BE AVOIDED UNLESS A TORQUE WRENCH IS NOT AVAILABLE THAT IS CAPABLE OF THE TORQUE VALUE IN THE TABLE. IN THIS CASE, THE SPECIAL LUBRICANT MUST BE SPECIFIED ON THE DRAWING AND A LOWER TORQUE VALUE MUST BE CALCULATED TO AGREE WITH THE DECREASED COEFFICIENT OF FRICTION.

CAD/CAM DRAWING  
MANUAL REVISIONS  
NOT AUTHORIZED

ENG ORDER FEN0840	REVISIONS ① FDE9598	② FEW0914	③ FCX0245	④ FDC3261	⑤ FDC9194
DATE ISSUED					
MATERIAL	SALES DRAWING NO <input type="checkbox"/> YES <input checked="" type="checkbox"/>				
HEAT TREAT	PATTERN NO				
HARDNESS	DWG. DIMS IMPERIAL <input checked="" type="checkbox"/> METRIC <input checked="" type="checkbox"/>				
CARBURIZE (ECD)					

TOLERANCE TO BE AS SPECIFIED BELOW UNLESS OTHERWISE STATED			
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED			
MACHINING	FABRICATION PLATE & STRUCTURAL WORK	CASTINGS	
± 0.5mm	UP TO 300 mm ± 0.1mm	301 TO 1000 mm ± 0.2mm	1001 TO 2000 mm ± 0.3mm
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE STATED			
MACHINING	FABRICATION PLATE & STRUCTURAL WORK	CASTINGS	
FRACTIONAL DIMENSIONS	UP TO 12" $\frac{1}{16}$ OVER 12" $\frac{1}{32}$	12" TO 36" $\frac{1}{16}$	OVER 36" $\frac{1}{8}$
			WALL THICKNESS $\frac{1}{16}$ TO $\frac{1}{2}$

FINISH SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PRECISION POLISH		COMMON MACHINE
	FINE POLISH		ROUGH MACHINE
	COMMON POLISH		HEAVY ROUGH
	BRITE OR EQUAL		
	SMOOTH MACHINE		

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DATE: 7-19-78	PLANT: FRANKLIN PENNSYLVANIA
CHK'D:	LOCATION:
DATE:	TITLE: VALUES, TORQUE, CAP SCREWS
APP:	SCALE: NO SCALE
DATE:	CLASS: ALL
SIMILAR TO:	DWG. NO. SK024122-0000
REPLACES: SK024122-0001	
REPLACED BY:	

SK21855

PROCEDURE:

1. CLEAN SEALS AND RING SEATS WITH CLEANING SOLVENT.
2. WIPE SEAL FACES CLEAN AND COAT WITH LIGHT OIL. THERE MUST BE NO OIL ON TORIC RING OR RING SEAT.
3. USE PROPER INSTALLER TOOL, WET RING IN SOLVENT, AND PRESS INTO SEAT MAKING SURE IT IS NOT TWISTED.
4. ALWAYS ASSEMBLE SEALS IN MATCHED PAIRS. NEVER ASSEMBLE ONE NEW SEAL AND ONE USED SEAL TOGETHER, OR TWO SEALS THAT HAVE NOT PREVIOUSLY RUN TOGETHER.

L

ENG. ORDER <u>FB0927</u> DATE ISSUED _____	REVISIONS <u>FBM697</u>	<b>JOY MANUFACTURING CO.</b> PLANT LOCATION AS INDICATED BELOW		<b>INSTALLATION INSTRUCTIONS FOR CATERPILLAR SEALS</b>	
		CLAREMONT, N. H.	NEW PHILADELPHIA, O.	DR. R. J. 12-30-68 TR.	CK. _____ APPVD. _____
		DALLAS, TEXAS	ST. LOUIS, MISSOURI	SUPERSEDES _____	SCALE <u>CD</u> CLASS _____
		FRANKLIN, PA.		SUPERSEDED BY _____	<b>SK21855</b>
		GALT, ONTARIO, CAN.		REPLACES _____	
		GREENOCK, SCOTLAND		REPLACED BY _____	
		MICHIGAN CITY, IND.			

SK064073-0000

DWG. SIZE 2

PRECAUTIONS FOR USERS OF JOY CHAIN PRODUCTS

INTRODUCTION:

Chains are by function fast moving items and should be treated with proper respect. If they should come into contact with people, cables, hoses, or other elements, injury could result. While working with chains, safe work habits must be followed. In addition, some specific recommendations to reduce risk of injury are listed below.

BIT CHANGING IN BIT CARRYING CHAINS & ELEMENTS:

Bit changing in chains and other bit carrying elements can be hazardous, if not properly executed. The following precautions should be practiced:

- A. Remove power from the motor driving the cutting element to be worked on.
- B. Safety glasses should be worn.
- C. Stand at the side of ripper or cutter bars, out of the line of chain rotation.
- D. Bits which must be inserted by hammering should be driven with a hammer made of soft material such as lead or leather to reduce the risk of shattering the carbide inserts in bits.
- E. Flying bits can be hazardous. Where setscrew held bits are used, tighten securely to a minimum torque of 200 ft. lbs.

Where quick change type bits are used, check and replace worn keepers or blocks at first sign of excessive looseness.

GENERAL PRECAUTIONS - ALL CHAINS:

- 1. Positively disconnect power before attempting to work on chains, bars, or conveyors.
- 2. Provide slack in chain before attempting to uncouple.
- 3. Do not check line-up of pin holes by inserting finger in hole.
- 4. Do not thread chains on or off machine by using machine power.
- 5. Wear safety glasses when driving pins, inserting locks, cutting locks, or removing side plates.
- 6. Use soft hammer for driving pins to prevent pin from chipping.
- 7. Wear gloves while handling chains.

SPECIAL PRECAUTIONS - CONVEYOR CHAINS:

- 1. Support all machine elements which may move, or drop, while working on chains.
- 2. Chain may fall from tail roller when uncoupled. Support the chain, lower the rear conveyor, and stand clear of this area.
- 3. When bucking bar is used to assemble connector side plates, do not support it with the feet.
- 4. Keep chain tension correctly adjusted. In some applications an improperly adjusted chain may jump the sideboards. A safety tunnel, for operator's protection, should be constructed. (See Joy Service Bulletin FGJ-99 for 8/9/10/11CM Miners).

SPECIAL PRECAUTIONS - CRAWLER CHAINS:

- 1. Support machine on adequate piling before going under it to remove or repair chain.
- 2. Block up chain where it is to be uncoupled and stand clear while removing final pin.

SPECIAL PRECAUTIONS - RIPPER CHAINS:

- 1. Support bar by lowering on blocks under bit rings to prevent idler head from rotating. Also take load off hydraulic system before uncoupling chain.
- 2. Use soft hammer for driving pins to prevent pins from chipping. Pins have a brittle, case hardened surface.
- 3. Do not drive broken bit shanks down into sprocket tooth area of chain.

SPECIAL PRECAUTIONS - CUTTER CHAINS:

- 1. Support cutter head, boom, and bar, such that load is not on the hydraulic system when working on chain or sprocket.
- 2. Use soft hammer for driving pins to prevent chipping. Pins have a brittle, case hardened surface.
- 3. Do not drive broken bit shanks down into sprocket tooth area of chain.

SPECIAL PRECAUTIONS - RIPPERVEYOR CHAINS:

- 1. Support cutter head so that load is not on hydraulic system before working on chain.
- 2. Support chain while uncoupling. Do not stand in front of machine after support is removed, as chain may fall.
- 3. Replacement links are moderately heavy. Use leg power, not back power, when lifting them.

E.O. DATE	FBM0105	REVISONS	JOY MANUFACTURING CO.	
				PLANT LOCATION AS INDICATED BELOW
			BUFFALO, N. Y.	
			CLAREMONT, N. H.	
			FRANKLIN, PA.	
			GALT, ONTARIO, CANADA	
			GREENOCK, SCOTLAND	
			MICHIGAN CITY, IND.	
				NEW PHILADELPHIA, O.
SIMILAR TO			PRECAUTIONS FOR USERS OF JOY CHAIN PRODUCTS	
SUPERSEDED BY				
REPLACES				
REPLACED BY				
DRWS.	7-11-73	SCALE		
TR.		CLASS		
CK.				
APPD.				
SK064073-0000				

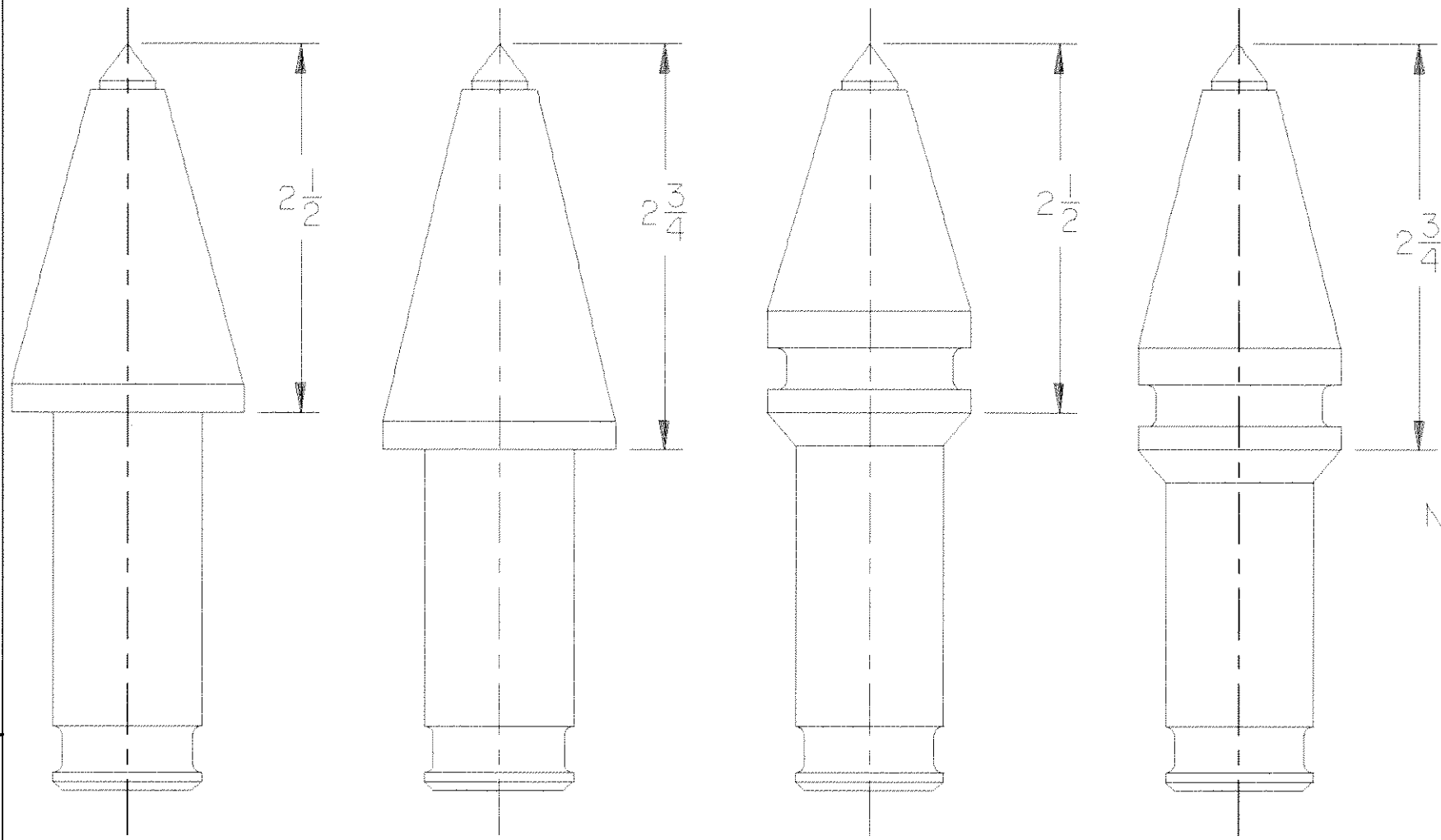
CRYSTAL VILLAGE A.S. SMITH CO. P.O. BOX 774

PR 8028-900



REVISIONS


ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	FCX0574	05/87	
	B	FDC834I	5-8-92	
	C	FDC8667	5-25-93	



NOTES!  
 USE OF BITS LONGER THAN THOSE LISTED IN THE CHART COULD CAUSE INTERFERENCE WITH THE GEAR CASE.

THIS RECOMMENDATION IS FOR 1" (25MM) AND 1-1/8" (28.5MM) SHANK BITS ONLY.

MACHINE MODEL	RECOMMENDED BIT	MAXIMUM BIT
12CM7,10,12,15,18 12ED18 14CM9,15	2-3/4	2-3/4
12CM11 12HM9,12 14CM10,11,12,14 17CM1	2-3/4	2-3/4
15CM1/2/3	2-1/2	2-1/2

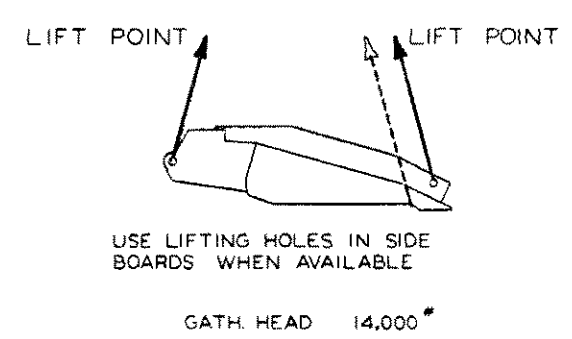
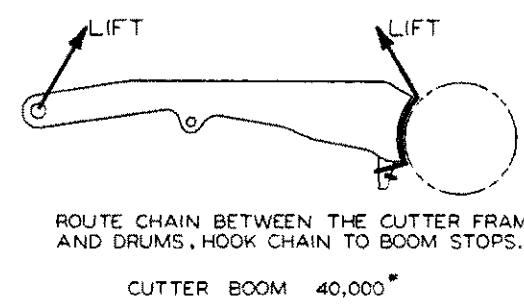
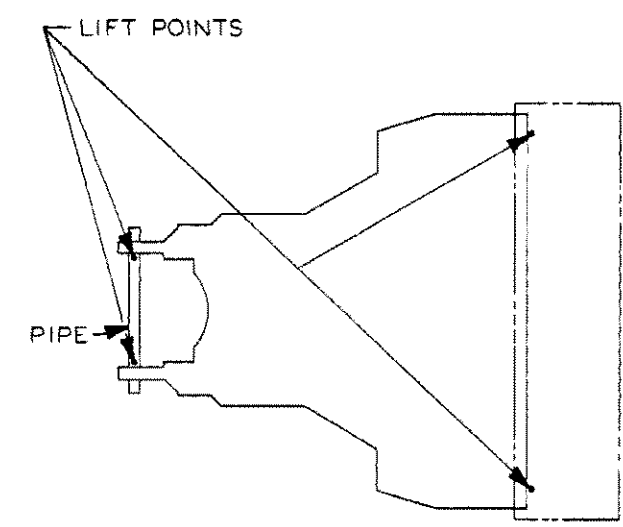
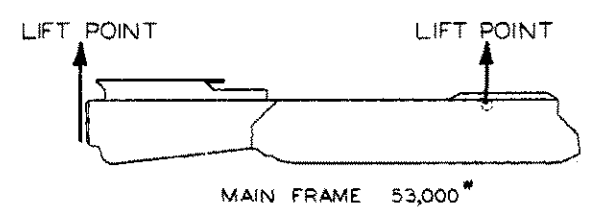
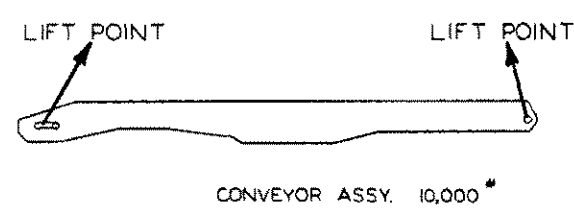
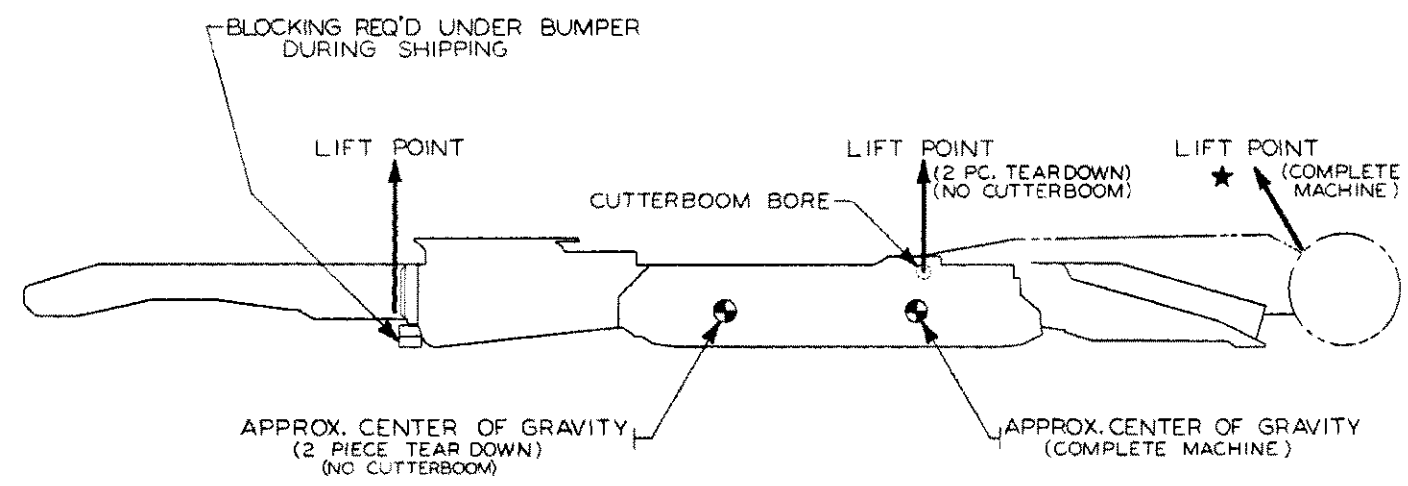
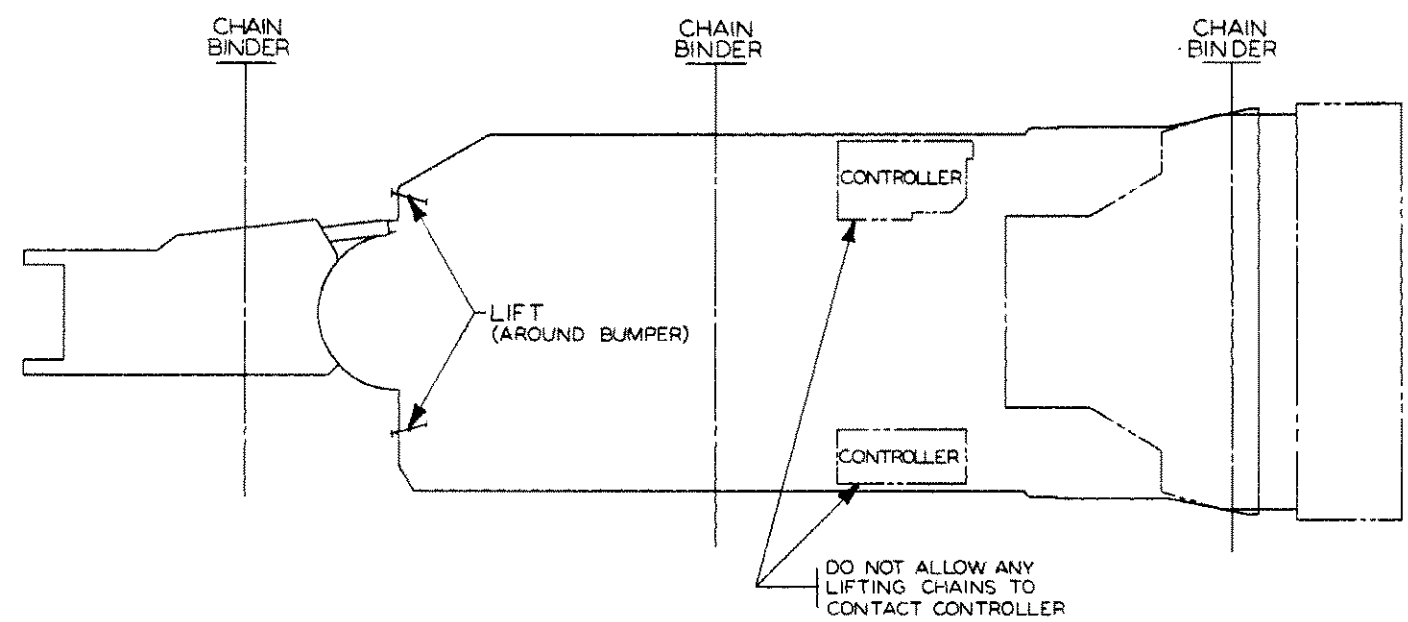
MATERIAL		HEAT TREAT	
		CARBURIZE (ECD)	
		HARDNESS	
LITHO PRINT	CLASS MINER	SIMILAR TO	SK24544
DRAFTER± M.LUKASIAK 05/87	 JOY MANUFACTURING COMPANY FRANKLIN, PENNA. 16323		
CHECKER±			
ENGINEER±	BIT INFO FOR VARIOUS JOY MINERS		
APPROVAL±			
SIZE	FSCM NO.	DWG. NO.	REV
B	75003	SK024544-0001	B
SCALE	FULL	WGT.	SHEET 1

UNLESS OTHERWISE NOTED ALL DIMENSIONS IN INCHES: MACHINING DIMNSIONS LIMITED TO FRACTIONAL ±1/64, DECIMAL ±.005, ANGULAR ±1/2 °; STRUCTURAL DIMENSIONS LIMITED TO ±1/16. DO NOT SCALE THIS DRAWING.

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CAD / CAM DRAWING  
 MANUAL REVISIONS  
 NOT AUTHORIZED

REV. NO.		DESCRIPTION		DATE	APPROVED
A		FXC 2133		9/88	



★WARNING: NOT RECOMMENDED  
LOAD LOCKING SYSTEM WILL CAUSE BOOM TO RAISE WHEN MACHINE IS LIFTED, RESULTING IN THE MACHINE JACK-KNIFING. ENGINEERING SHOULD BE NOTIFIED TO PROVIDE CHANGES TO THE HYDRAULIC CIRCUITRY TO ENABLE THIS TYPE OF LIFT.

NOTES:  
ACTUAL FRAME WEIGHTS MAY BE LESS THAN SHOWN  
COMPLETE MACHINE WEIGHT: 117,000\*  
MACHINE WEIGHT NO CUTTER BOOM: 77,000\*  
PROTECT BORE FINISHES FROM MARRING OR DAMAGE BEFORE LIFTING.

MATERIAL		PATTERN NO.	
YES LITHOPRINT		HEAT TREAT	
DRAWN: SIERLACH		GALVANIZE (EOD)	
CHECKER:		HARDNESS	
ENGINEER:		SIMILAR TO	
APPROVAL:		JOY TECHNOLOGIES INC.	
		FRANKLIN, PENNA. 15052	
		LIFTING & BLOCKING INSTRUCTIONS 14CM	
JOB FROM NO. 75003		JOB NO. JCM00832-0004	
SCALE		SHEET	

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES; DIMENSIONS IN MILLIMETERS LIMITED TO FRACTIONAL 1/16" INCHES; DIMENSIONS IN MILLIMETERS LIMITED TO 1/16". DO NOT SCALE THIS DRAWING.

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DWG. NO. SK025502-0003

DO NOT SCALE

WELDING STANDARD IS ISO METHOD A

PROJECTION THIRD ANGLE

### APPROVED TRAILING CABLE

CABLE SPECIFICATION	CABLE TYPE	DIAMETER	INSULATION	MAXIMUM APPROVED LENGTH	MAX. POWER CENTER BRKR. SETTING
#2/0-3 CONDUCTOR ROUND	SHD-GC, SHD-CGC	1.900-2.160	2000V., 90°C	500 FT	1500 AMP
				750 FT	1355 AMP
				850 FT	1355 AMP
#2/0-3 CONDUCTOR FLAT	SHD	1.131 - 1.231 X 2.910 - 3.070	2000V., 90°C	500 FT	1500 AMP
				750 FT	1355 AMP
				850 FT	1355 AMP
#1/0-3 CONDUCTOR ROUND	SHD-GC, SHD-CGC	1.767-2.009	2000V., 90°C	500 FT	1250 AMP
				750 FT	1210 AMP
#1-3 CONDUCTOR ROUND	SHD-GC, SHD-CGC	1.672-1.901	2000V., 90°C	500 FT	1000 AMP
#4/0-3 CONDUCTOR ROUND	SHD-GC, SHD-CGC	2.194-2.495	2000V., 90°C	500 FT	1500 AMP
				750 FT	1355 AMP
				1000 FT	1355 AMP

CERTIFIED ASSEMBLY  
 Certification Reference Drawing  
 Australia:  
 United Kingdom:  
 United States: 00571390-3455  
 South Africa:

ENG ORDER FDE0724	REVISIONS B FDF3196	TOLERANCE TO BE AS SPECIFIED BELOW UNLESS OTHERWISE STATED				FINISH SYMBOLS				DR L. MAIER	PLANT LOCATION FRANKLIN, PA	
DATE ISSUED FEB 16, 1993		ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED				ALL DIMENSIONS IN INCHES UNLESS OTHERWISE STATED				DATE 02/16/93		TITLE: LIST, TRAILING CABLE, APPROVED (14CM)(950V)
MATERIAL	LITHOPRINT YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	MACHINING		FABRICATION PLATE & STRUCTURAL WORK		CASTINGS		WALL THICKNESS		DESCRIPTION		
HEAT TREAT	PATTERN NO	UP TO 100 MM 10.15 MM		UP TO 300 MM 11 MM		301 TO 1000 MM 12 MM		1001 TO 2000 MM 12 MM		A 4 NS 0.1 PRECISION POLISH		DATE
HARDNESS	DWG. DIMS. IMPERIAL <input type="checkbox"/>	UP TO 101 TO 300 MM 10.4 MM		301 TO 1000 MM 10.8 MM		WALL THICKNESS 1/16-1/8"		B 8 NS 0.2 FINE POLISH		F 125 NS 5.2 COMMON MACHINE		DATE
CARBURIZE (ECD)	METRIC <input type="checkbox"/>	UP TO 12" 3/164 OVER 12" 1/32		UP TO 12" 1/32		12" TO 26" 1/16		C 16 NS 0.4 COMMON POLISH		G 250 NS 6.3 ROUGH MACHINE		DATE
		UP TO 36" 1/8		OVER 36" 1/4		WALL THICKNESS 1/2-1/2"		D 32 NS 0.8 GRIND OR EQUAL		H 500 NS 12.5 HEAVY ROUGH		SIMILAR TO
								E 63 NS 1.6 SMOOTH MACHINE		K 1000 NS 25 EX HEAVY ROUGH		REPLACES
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											A2	DWG. NO. SK025502-0003

1000-112520X5  
SK025211-0001

TWICE  
EACH  
SHIFT

TAP COAL PARTICLES OUT OF FILTER.  
FLUSH FILTER.

DAILY

FLUSH INLETS AND DUCTWORK WITH FILTER  
IN PLACE AND FILTER COVER OPEN.

WEEKLY

BACKFLUSH JET PUMP (IF SO EQUIPPED) FOR 15 SECONDS  
BY CLOSING HAND VALVE AT JET PUMP.  
OPEN SUMP DRAINS.  
FLUSH MIST ELIMINATOR.  
FLUSH SUMP.  
RETURN FILTER TO POWER CENTER TO DRY  
BEFORE TAPPING OUT COAL PARTICLES.

LETSPRINT THIS DRAWING

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**JOY MANUFACTURING CO.**  
PLANT LOCATION AS INDICATED BELOW

BUFFALO, N. Y.	NEW PHILADELPHIA, O.
CLAREMONT, N. H.	
FRANKLIN, PA.	
SALT, ONTARIO, CANADA	
GREENOCK, SCOTLAND	
MINNERS CITY, OH.	

RECOMMENDED MAINTENANCE FOR  
FLOODED BED DUST COLLECTOR

SIMILAR TO \_\_\_\_\_  
SUPERSEDED BY \_\_\_\_\_  
SUPERSEDED BY \_\_\_\_\_  
REPLACES \_\_\_\_\_  
REPLACES BY \_\_\_\_\_

NAME OF INITIAL & DATE  
DR. REBLAUSER  
TR. 9/2/88  
CK \_\_\_\_\_  
APP. \_\_\_\_\_

SCALE CLASS MINER  
SK025211-0001

E. O. FDA0857 REVISIONS