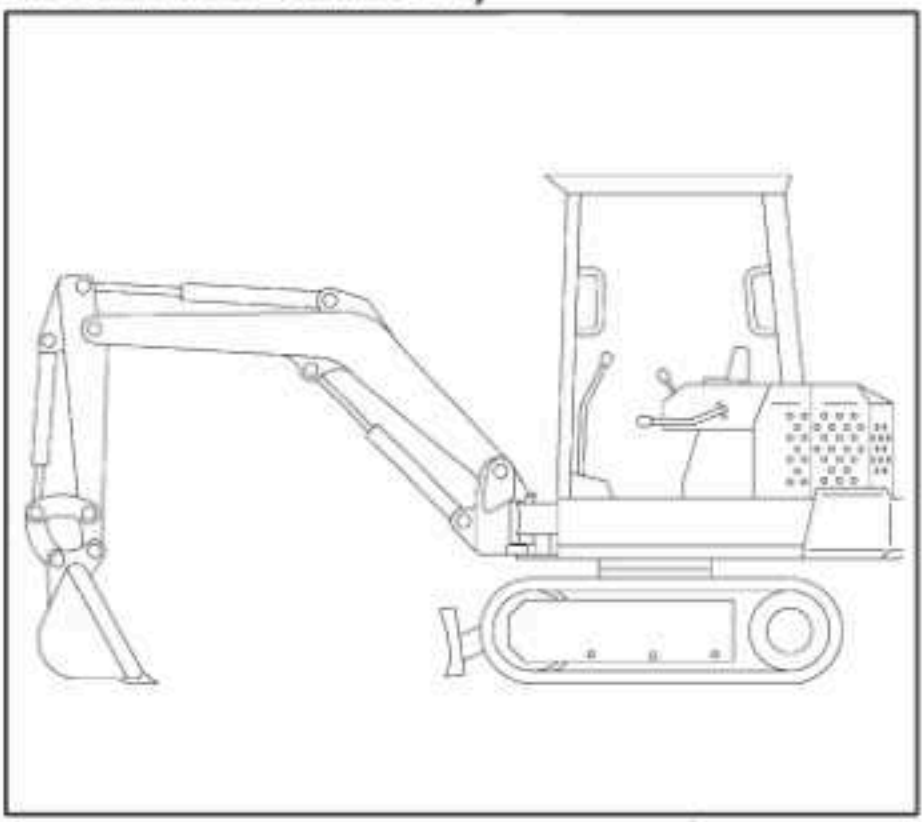
X 231

Excavator

Operation & Maintenance Manual

(S/N 508912001 & Above)



MELROE
INGERSOLL-RAND
6720943 (6-93) Revised (9-98)

Printed in U.S.A.

bobcat

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CALIFORNIA
PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

REFERENCE INFORMATION

Write the correct information for YOUR Bobcat Hydraulic Excavator in the spaces below. Always use these numbers when referring to your Hydraulic Excavator.

Bobcat Hydraulic Excavator
Serial Number ..... _____
Engine Serial Number ..... _____
_____
_____
_____

NOTES: _____
_____
_____
_____
_____
_____

YOUR BOBCAT EXCAVATOR DEALER: _____
ADDRESS: _____
PHONE: _____

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BOOM SWING PEDAL

Raise the pedal lock/footrest (Item 1) **[A]** to operate the boom swing pedal. Push the pedal (Item 2) **[A]** on the right side to swing the boom to the right and push the pedal on the left side to swing the boom to the left.

NOTE: The purpose of the boom swing pedal is to offset the boom with respect to the upperstructure.

AUXILIARY OPERATION PEDAL AND LOCK/ FOOTREST

Raise the pedal lock/footrest (Item 3) **[A]** to operate the auxiliary operation pedal.

The auxiliary operation pedal (Item 4) **[A]** controls optional equipment when mounted on the arm.

The excavator is equipped with 2–way flow auxiliary lines. Push pedal (Item 4) **[A]** to activate hydraulic function. Right side of pedal is hydraulic pressure/flow to the female coupler and left is hydraulic pressure/flow to the male coupler.

⚠ WARNING

AVOID INJURY OR DEATH

Before moving the auxiliary flow control knob:

- **Lower the blade to the ground.**
- **Lower the bucket to the ground.**
- **Stop the engine.**

W–2198–0595

The flow control knob (Item 1) **[B]** is located in front of the excavator frame by the boom swing cylinder.

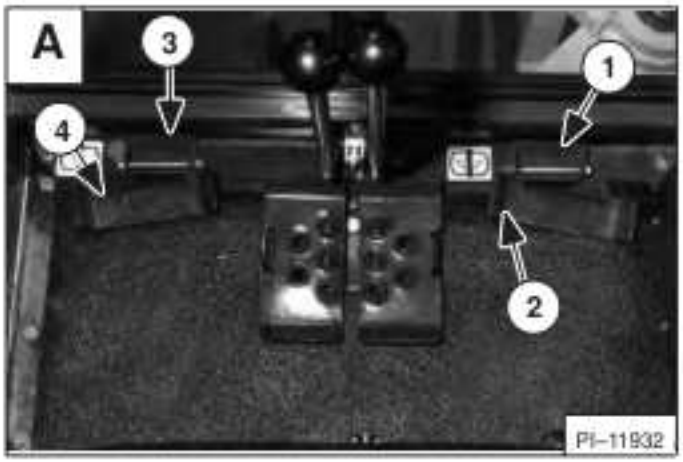
To change to 1–way flow for hydraulic breaker operation (for reduced back pressure to tank) pull the knob (Item 1) **[B]**. The pedal will now supply fluid when pushed to right side only.

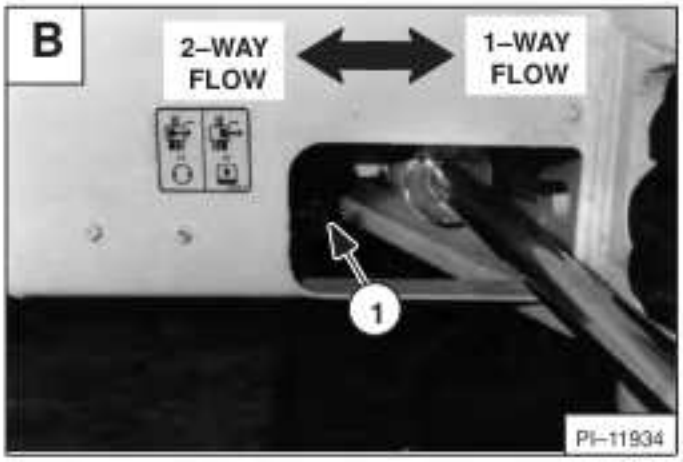
During two way flow operations, the female coupler (Item 1) **[C]** is pressure when the pedal is pushed to the right and the male coupler (Item 2) **[C]** is pressure when the pedal is pushed to the left.

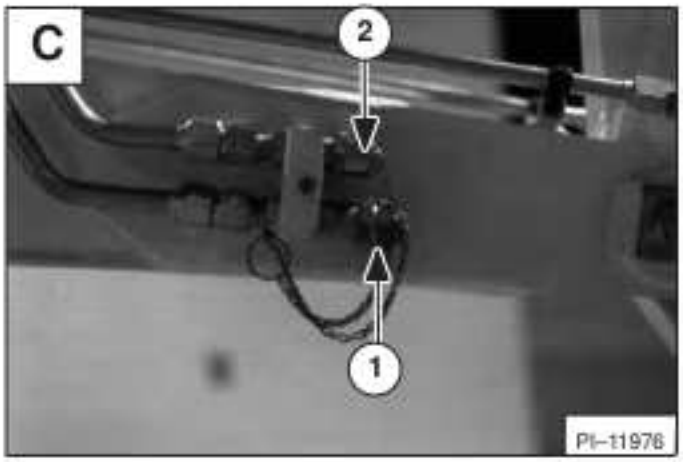
BLADE CONTROL LEVER

The lever (Item 1) **[D]** is used to raise and lower the blade.
Position A – Push Forward – Lowers the blade.
Position B – Neutral – Blade is stopped and held in position.
Position C – Pull Back – Raises the blade.

NOTE: Keep the blade lowered when digging.





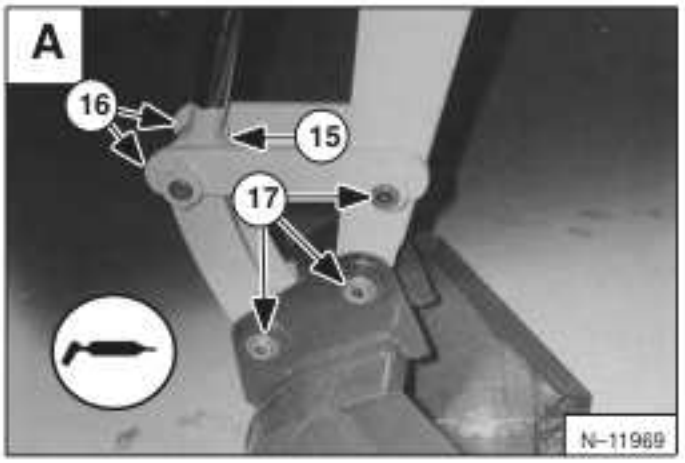




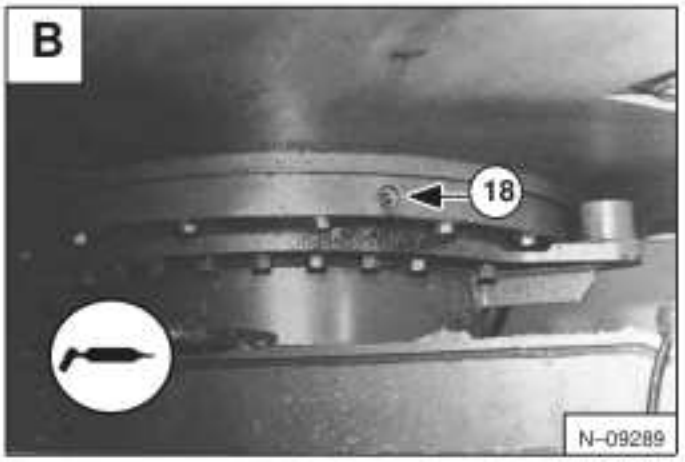
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LUBRICATION OF THE HYDRAULIC EXCAVATOR (Cont'd)

Ref.	Description (# of Fittings)
15.	Bucket Cylinder end, every 8–10 hours (1) **[A]**.
16.	Bucket Link Pivots, every 8–10 hours (2) **[A]**.
17.	Bucket Pivots, every 8–10 hours (3) **[A]**.

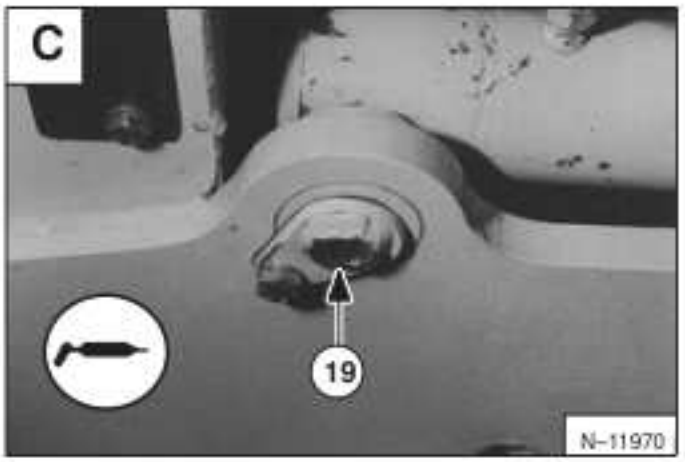


18. Swing Circle Ball Bearings, every 50 hours (2) **[B]**.



NOTE: Do not over grease the swing circle or damage to the seals could result. Install four to five pumps of grease from a grease gun into each of the two grease fittings. Rotate the upper structure 90° and install four to five pumps of grease into each of the two grease fittings.

19. Boom Swing Cylinder Base End, every 8–10 hours (1) **[C]**. (Under the right side of upperstructure)



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Lifting Capacity With Blade Off Ground (Model 231 with Canopy)

⚠ WARNING

- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radii and height.
- The weight of slings and auxiliary lifting devices must be deducted from the rated load to determine the net load that may be lifted.
- Overload will cause the machine to tip and can result in injury or death.

MODEL 231 With Canopy

Where applicable specifications conform to I.S.O. Standards.

Specifications are subject to change without notice.

Lift Point is bucket hinge point W/bucket 80.0 kg (176 lbs.) fully curled.

*Rated Hydraulic Lift Capacity



Lift Point Height h mm (in.)	(r) LIFT RADIUS - mm (in.) RATED LIFT CAPACITY OVER END Blade Down - kg (lbs.)						(r) LIFT RADIUS - mm (in.) RATED LIFT CAPACITY OVER END Blade Up - kg (lbs.)						(r) LIFT RADIUS - mm (in.) RATED CAPACITY OVER SIDE Blade Up - kg (lbs.)					
	2500 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.	2000 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.	3000 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.
3000 (118.1)				448* (983)		474* (1044)				448* (983)		474* (1044)				438* (966)		458 (1008)
2500 (98.4)			434* (957)	474* (1044)		483* (1088)			434* (957)	474* (1044)		483* (1086)			464* (1001)	462* (1018)		385 (846)
2000 (78.7)		804* (1331)	580* (1236)	533* (1175)	552* (1218)	459* (1013)		610 (1135)	488 (1013)	438 (990)	391 (863)	391 (863)			545* (1301)	517* (1140)	361 (795)	327 (720)
1500 (59.1)		888* (1958)	703* (1548)	602* (1327)	582* (1283)	552* (1218)		714 (1575)	578 (1278)	503 (1110)	442 (975)	391 (863)		492* (1836)	667* (1470)	483* (998)	367 (810)	320 (706)
1000 (39.4)		1109* (3438)	829* (1827)	667* (1614)	612* (1348)	582* (1308)		865 (1890)	660* (1600)	487 (1073)	426 (940)	374 (825)		721 (1590)	568 (1253)	448 (983)	357 (788)	317 (698)
500 (19.7)		1204* (2654)	908* (2001)	769* (1740)	691* (1436)	631 (1392)		873 (1485)	683 (1065)	617 (1140)	442 (975)	378 (833)		899 (1636)	648 (1208)	432 (953)	351 (773)	323 (713)
Ground	1687* (3741)	1342* (2958)	1014* (2236)	836* (1844)	691* (1523)	671* (1478)	1088 (2325)	793 (1748)	596 (1313)	480 (1060)	406 (900)	351 (773)	909 (2003)	691 (1523)	538 (1186)	425 (938)	347 (765)	340 (750)
-500 (-19.7)	1855* (4089)	1413* (3116)	1046* (2306)	906* (2001)		670* (1479)	1167 (2550)	782 (1726)	623 (1373)	484 (1068)		416 (916)	969 (2115)	680 (1500)	521 (1148)	422 (930)		357 (788)
-1000 (-39.4)	1815* (4002)	1343* (2958)	1038* (2282)	809* (1784)		765* (1883)	1225 (2700)	880 (1076)	644 (1200)	490 (1068)		476 (1050)	9384 (3070)	691 (1523)	541 (1192)	425 (936)		401 (885)
-1500 (-59.1)	1648* (3632)	1263* (2784)	900* (1984)			868* (1914)	1504 (2213)	816 (1800)	585 (1290)			562 (1306)	1041 (2285)	721 (1590)	544 (1200)			507 (1118)
-2000 (-78.7)												880 (1500)	1081 (2340)	738 (1620)				732 (1613)

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Lifting Capacity With Blade Off Ground (Model 231 with Cab)

⚠ WARNING

- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radii and height.
- The weight of slings and auxiliary lifting devices must be deducted from the rated load to determine the net load that may be lifted.
- Overload will cause the machine to tip and can result in injury or death.

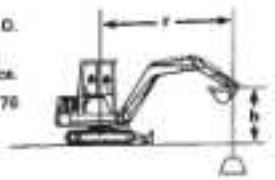
MODEL 231 With Cab

Where applicable specifications conform to I.S.O. Standards.

Specifications are subject to change without notice.

Lift Point is bucket hinge point W/bucket 80.0 kg (176 lbs.) fully curled.

*Rated Hydraulic Lift Capacity



Lift Point Height h mm (in.)	(r) LIFT RADIUS - mm (in.) RATED LIFT CAPACITY OVER END Blade Down - kg (lbs.)						(r) LIFT RADIUS - mm (in.) RATED LIFT CAPACITY OVER END Blade Up - kg (lbs.)						(r) LIFT RADIUS - mm (in.) RATED CAPACITY OVER SIDE Blade Up - kg (lbs.)					
	2000 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.	2000 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.	2000 (78.7)	2500 (98.4)	3000 (118.1)	3500 (137.8)	4000 (157.5)	Max.
3000 (118.1)				442* (974)		462* (1018)				442* (974)		454* (1000)				458* (1009)		454* (1001)
2500 (98.4)			430* (948)	446* (983)	529* (1166)	485* (1070)			411* (905)	446* (983)	434* (1044)	469* (1035)			428* (940)	455* (1044)		
2000 (78.7)		687* (1290)	533* (1175)	521* (1148)	517* (1140)	517* (1140)		580* (1279)	525* (1157)	506* (1114)	484* (1068)	416* (918)		694* (1531)	541* (1192)	513* (1131)	388 (878)	367 (788)
1500 (59.1)		888* (1914)	679* (1496)	592* (1306)	560* (1235)	552* (1218)		821* (1810)	663* (1462)	578* (1270)	442* (976)	405* (893)		817* (1801)	671* (1479)	576* (1270)	395 (848)	395 (870)
1000 (39.4)		1101* (2427)	805* (1775)	675* (1488)	604* (1331)	588* (1296)		830 (1830)	609* (1343)	472 (1043)	446 (983)	430* (948)		788 (1656)	609 (1320)	473 (1043)	381 (840)	337 (743)
500 (19.7)		1265* (2787)	924* (2036)	746* (1644)	691* (1436)	624* (1375)		783 (1748)	564 (1508)	534 (1178)	406 (900)	401 (885)		746 (1650)	582 (1283)	483 (1020)	374 (825)	337 (743)
Ground	1792* (3950)	1369* (3019)	1014* (2236)	846* (1863)	703* (1543)	656* (1444)	1157 (2550)	871 (1920)	664 (1463)	534 (1178)	425 (938)	422 (930)	957 (2175)	748 (1650)	588 (1263)	442 (975)	354 (803)	340 (750)
-500 (-19.7)	1834* (4176)	1385* (3054)	1073* (2366)	852* (1879)		718* (1583)	1160* (2556)	788 (1673)	670* (1476)	486* (1028)		463* (998)	1027 (2265)	732 (1613)	548 (1208)	459 (1013)		335 (790)
-1000 (-39.4)	1847* (4072)	1381* (3048)	1109* (2446)	856* (1888)		766* (1688)	1262 (2193)	762 (1680)	648 (1429)	531 (1170)		468 (1028)	1034 (2280)	748 (1650)	578 (1276)	459 (1013)		438 (960)
-1500 (-59.1)	1626* (3584)	1371* (2801)	994* (2192)			905* (1775)	1238 (2730)	805 (1995)	573 (1485)			516 (1358)	1056 (2325)	788 (1995)	575 (1268)			534 (1178)
-2000 (-78.7)	1417* (3133)	958* (2106)	804* (1992)			884* (1949)							1287* (2792)	900* (1984)				

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BEFORE OPERATING THE BOBCAT HYDRAULIC EXCAVATOR

Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

WARNING

Operator must have instructions before operating Bobcat loader or excavator and approved attachment. Untrained operators can cause injury or death.

W–2253–0996



B–10731

The Excavator must be in good operating condition before use. Check all of the items on the Service Schedule under the 8–10 hour column or as shown in this manual.

WARNING

For your safety, warnings are on the machine and in the Operation & Maintenance manual. Failure to obey warnings can cause injury or death.

W–2044–1285

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.

I–2019–0284

SAFE OPERATION NEEDS A QUALIFIED OPERATOR*

A QUALIFIED OPERATOR MUST DO THE FOLLOWING:

- UNDERSTAND THE WRITTEN INSTRUCTIONS, RULES AND REGULATIONS
  - The written instructions from Melroe Company include the Delivery Report, Operation & Maintenance Manual, Operator Handbook, and machine signs (decals).
  - Check the rules and regulations at your location. The rules may include an employer's work safety requirements. Regulations may apply to local driving requirements or use of Slow Moving Vehicle emblem. Regulations may identify a hazard such as a utility line.
- HAVE TRAINING WITH ACTUAL OPERATION
  - Operator training must consist of a demonstration and verbal instruction. This training is given by your excavator dealer before the excavator is delivered.
  - The new operator should start in an area without bystanders and use all the controls until he can operate safely under all conditions of the work area.
  - The Compact Excavator Operator Training Course is available in English and Spanish. The course provides information for safe and efficient operation. See your dealer for availability.
- KNOW THE WORK CONDITIONS
  - For each material to be handled, the operator must know how to avoid exceeding the rated lift capacity of the excavator. For example, you should not use the excavator for lifting heavy objects.
  - The operator must know any prohibited uses or work areas, for example, he needs to know about excessive slopes.
  - Know the location of any underground lines. Call local utilities or the TOLL FREE phone number found in the *SAFETY INSTRUCTIONS* Section of this manual.
  - Wear tight fitting clothing. Always wear safety glasses when maintaining or servicing excavator. Safety glasses, hearing protection or an excavator special application kit are required for some work. See your dealer about Melroe Safety equipment.

* For an operator to be qualified, he must not use drugs or alcoholic drinks which impair his alertness or coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he can safely operate a machine.

SI23–0598

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