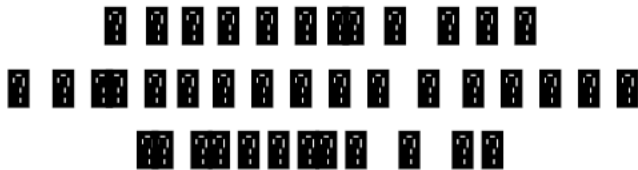


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BRODERSON MFG. CORP.
LENEXA, KANSAS 66215



OWNER: _____

SOLD AND SERVICED BY: _____

MODEL NO. _____ SERIAL NO. _____

WARRANTY

WARRANTY

Broderson Manufacturing Corp. ("BMC") warrants its products to be free from defects in material or workmanship at the date of shipment from BMC. This warranty shall be effective only when validated by the return to BMC of its standard form of Warranty Validation Certificate, duly completed and signed by the original purchaser from BMC and any subsequent purchaser who buys a BMC product as a new product, and then only as to defects reported to BMC in writing within 1 year or 2000 hours, whichever occurs first, from the date a product is placed in service, as evidenced by such warranty validation certificate. **THIS WARRANTY IS LIMITED TO DEFECTS IN MATERIAL OR WORKMANSHIP AT THE DATE OF SHIPMENT FROM BMC. IT DOES NOT COVER DEFECTS RESULTING FROM MISUSE, NEGLIGENCE, ACCIDENT OR OTHER EXTERNAL FORCES WHICH MAY HAVE CAUSED OR ACCENTUATED ANY APPARENT FAILURE OF SUCH PRODUCTS TO CONFORM TO THE WARRANTY HEREIN MADE.** **THE SOLE WARRANTIES, IF ANY, WITH RESPECT THERETO BEING THOSE MADE BY THE RESPECTIVE MANUFACTURERS THEREOF.**

THE REMEDIES INCLUDE LABOR IN CONNECTION WITH THE REMOVAL OF DEFECTIVE PARTS AND THE INSTALLATION OF THEIR REPLACEMENTS, AS WELL AS THE COST OF DELIVERY AND TRANSPORTATION OF DEFECTIVE PRODUCTS OR PARTS AND THE REPLACEMENTS THEREOF. THE SOLE PURPOSE OF THESE REMEDIES IS TO PROVIDE THE PURCHASER WITH FREE REPLACEMENT OF DEFECTIVE PARTS OR, IN THE LIMITED CIRCUMSTANCES SPECIFIED, REPLACEMENT OF THE ENTIRE PRODUCT OR A REFUND OF THE PURCHASE PRICE. THESE EXCLUSIVE REMEDIES SHALL NOT BE DEEMED TO HAVE FAILED OF THEIR ESSENTIAL PURPOSE SO LONG AS BMC IS WILLING AND ABLE TO REPLACE DEFECTIVE PARTS OR THE ENTIRE PRODUCT OR TO REFUND THE PURCHASE PRICE. THE REMEDIES HEREIN PROVIDED SHALL BE AVAILABLE ONLY IF BMC IS GIVEN REASONABLE ACCESS TO THE PRODUCT, INCLUDING ALL ALLEGEDLY DEFECTIVE PARTS, PROMPTLY AFTER THE DEFECT IS DISCOVERED. BMC SHALL HAVE THE RIGHT TO RETURN ANY ALLEGEDLY DEFECTIVE PARTS TO ITS PLANT OR ANY OTHER LOCATION SELECTED BY IT, FOR INSPECTION AND TESTING TO DETERMINE WHETHER THEY WERE DEFECTIVE AT THE DATE OF SHIPMENT, PRIOR TO REPLACEMENT THEREOF.

The warranty herein made is extended only to the original purchaser from BMC and any subsequent purchaser who buys a BMC product as a new product. **FOR PURPOSES HEREOF, A BMC PRODUCT SHALL CONCLUSIVELY BE DEEMED "USED" AFTER THE EXPIRATION OF TWELVE (12) MONTHS FROM ITS PLACEMENT IN SERVICE, AS EVIDENCED BY A DULY COMPLETED AND SIGNED WARRANTY VALIDATION CERTIFICATE ACTUALLY RECEIVED BY BRODERSON, OR AFTER SUCH EARLIER TIME AS IT HAS BEEN OPERATED FOR MORE THAN ONE HUNDRED (100) HOURS. BMC SHALL HAVE NO LIABILITY HEREUNDER WITH RESPECT TO PRODUCTS WHICH HAVE BEEN SUBJECTED TO MISUSE, NEGLIGENCE, ACCIDENT OR OTHER EXTERNAL FORCES WHICH MAY HAVE CAUSED OR ACCENTUATED ANY APPARENT FAILURE OF SUCH PRODUCTS TO CONFORM TO THE WARRANTY HEREIN MADE.**

BMC does not warrant any of its products to meet any state, local or municipal law, ordinance, code, rule or regulation. The purchaser must assume the responsibility for maintaining and operating the products which are the subject of this warranty in compliance with such of the foregoing as may be applicable, and BMC shall not be liable for the purchaser's failure to meet such responsibility.

NO PERSON IS AUTHORIZED TO ACT ON BEHALF OF BMC IN MODIFYING THE WARRANTY HEREIN MADE OR IN MAKING ANY ADDITIONAL OR OTHER WARRANTY.

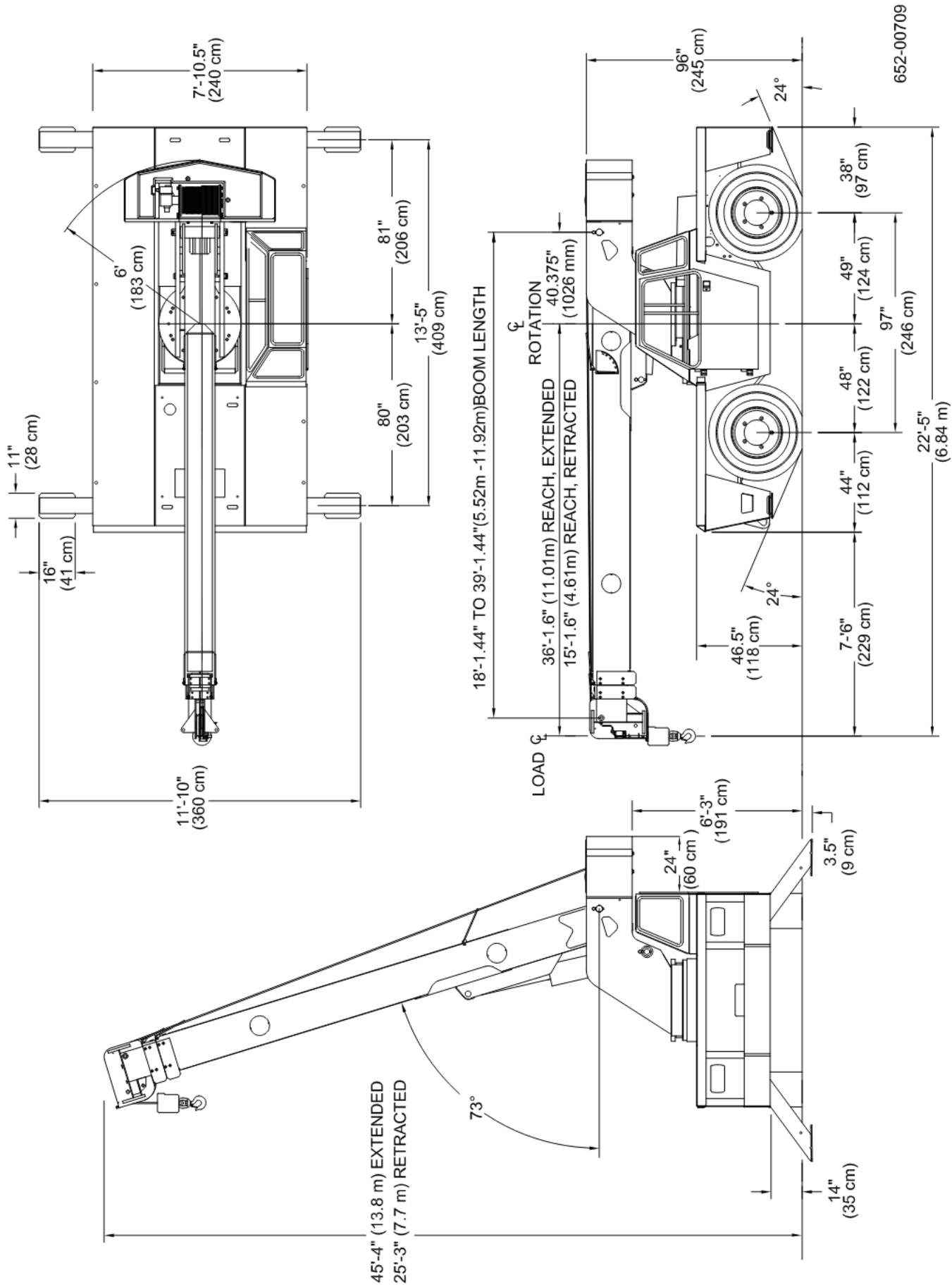
THIS EXCLUSION OF INCIDENTAL AND CONSEQUENTIAL DAMAGES IS INTENDED TO BE INDEPENDENT OF ALL OTHER PROVISIONS OF THIS STATEMENT OF WARRANTY AND SHALL BE GIVEN FULL EFFECT NOTWITHSTANDING THE UNENFORCEABILITY OR FAILURE OF THE ESSENTIAL PURPOSE OF ANY OTHER PROVISION OF THIS STATEMENT OF WARRANTY.

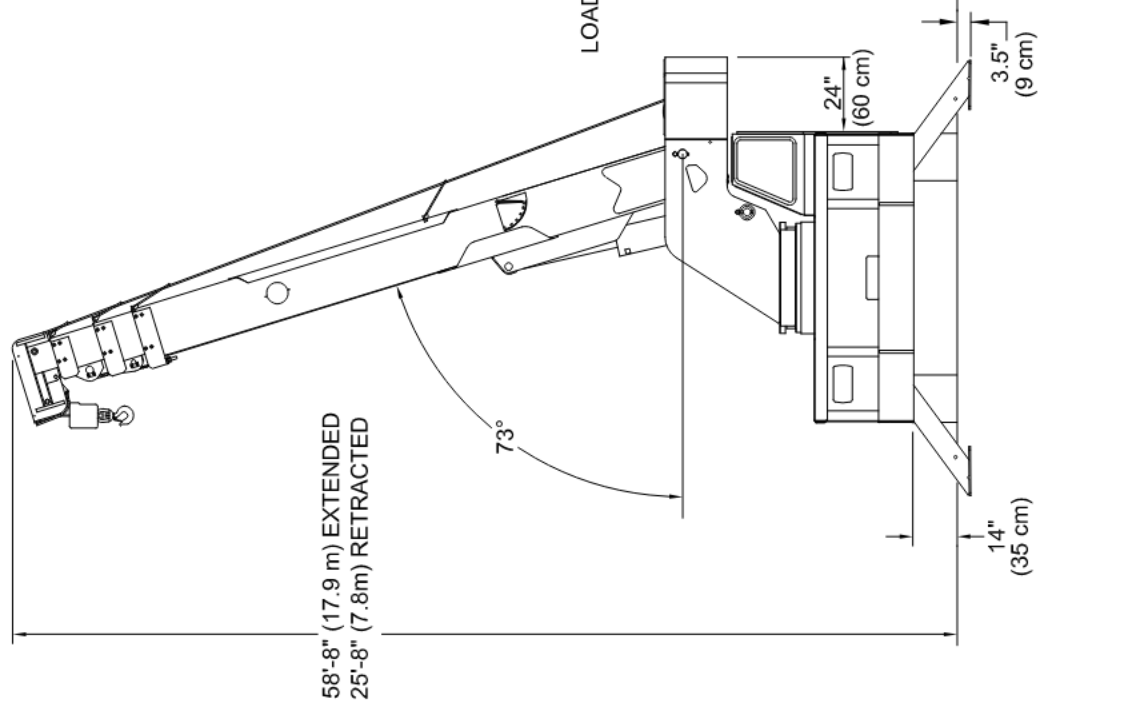
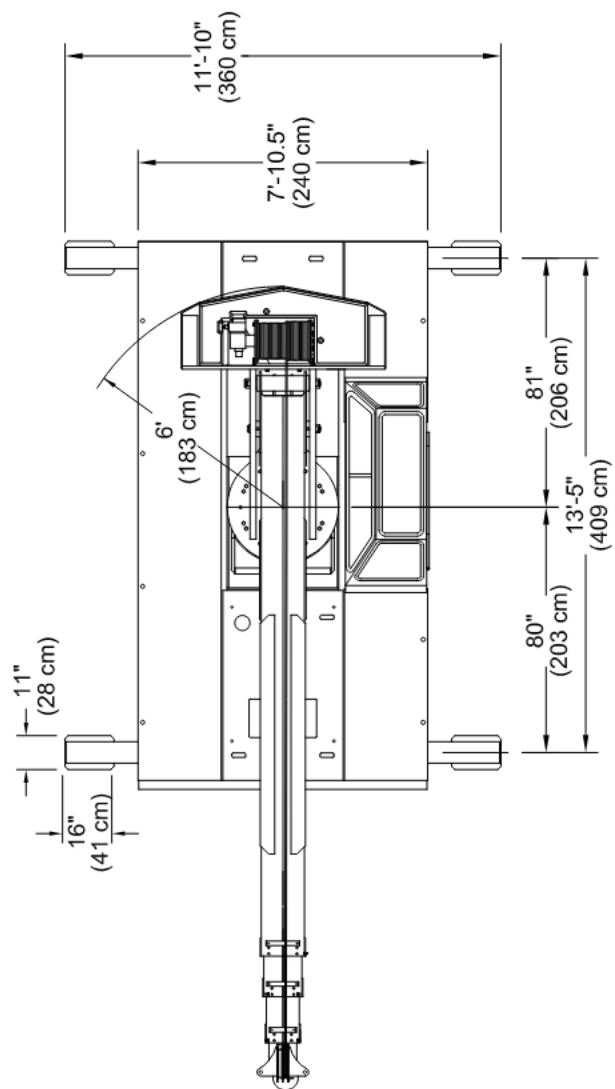
THE FOREGOING DISCLAIMERS OF WARRANTIES AND DISCLAIMER OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SHALL BE EFFECTIVE REGARDLESS OF WHETHER THE EXPRESS WARRANTY CONTAINED HEREIN BECOMES EFFECTIVE AS PROVIDED IN THE FIRST PARAGRAPH HEREOF.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

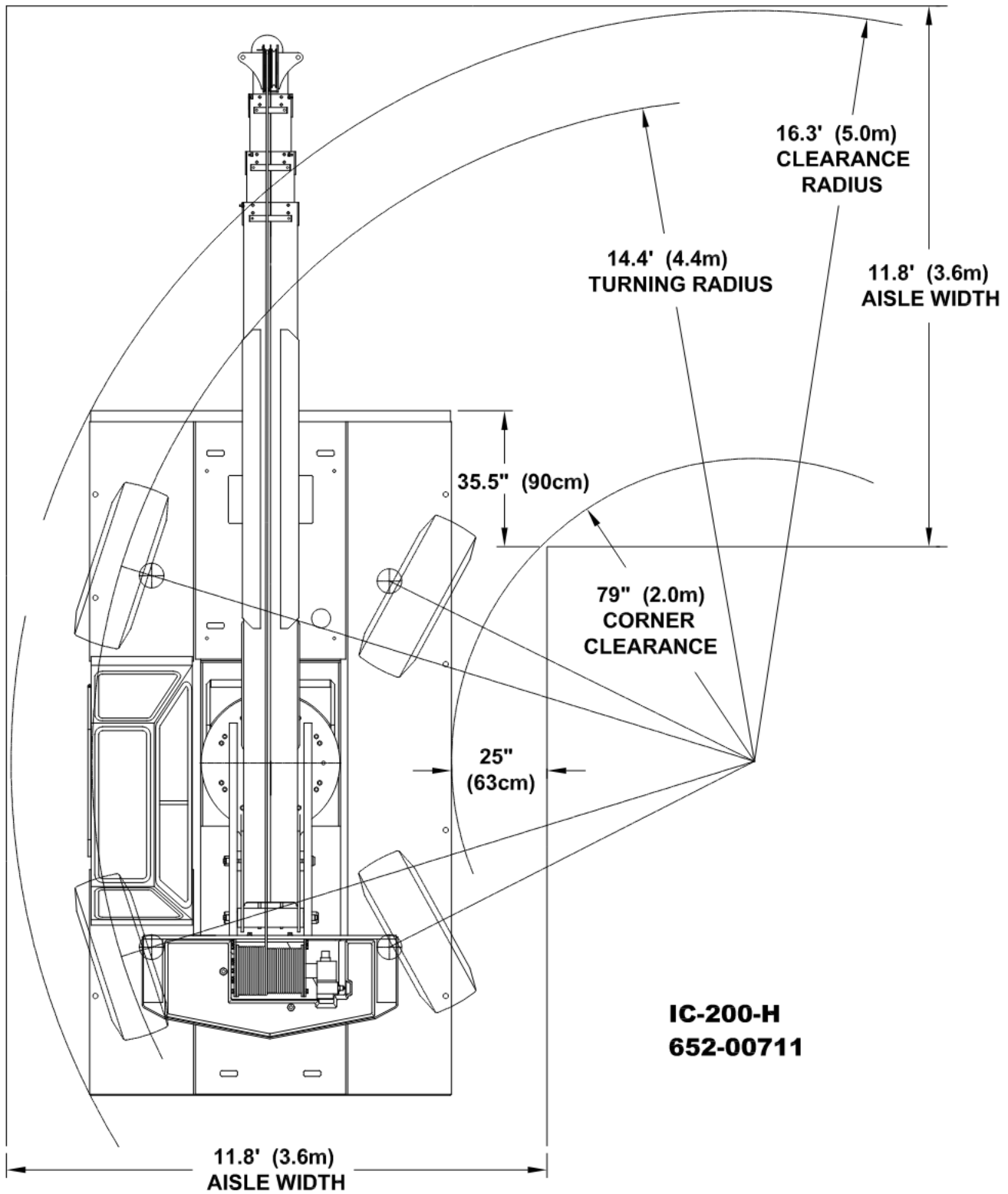
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652-00710



IC-200-H

3-Section Hydraulic Boom

The IC-200-H is a self-propelled Industrial Crane designed for material handling and installation, maintenance and repair of equipment, with special features of self-loading cargo decks, 4-wheel steer, and front-wheel drive (4-wheel drive optional). The basic unit consists of a chassis and hydraulic boom assembly. The chassis includes a frame, four hydraulic independently controlled outriggers, engine, torque converter, powershift 4-speed transmission, front planetary drive/steer axle and rear steer-only axle, fuel tank, hydraulic tank, control station, power steering and dual power brakes. The boom assembly includes a hydraulic powered continuous rotation turret, 3 or 4-section telescopic boom, hydraulic boom elevating cylinder, hydraulic boom telescope cylinders and hydraulic powered hoist. A Rated Capacity Limiter is standard.

3-Section Hydraulic Boom

3-section hydraulically extended boom with capacity of 30,000 pounds (13600 kg) at a 6-foot (1.8 m) load radius. Horizontal reach of 36 feet (11.0 m) and vertical reach of 45 feet (13.7 m).

4-Section Hydraulic Boom

4-section proportional hydraulically extended boom with capacity of 30,000 pounds (13600 kg) at a 6-foot (1.8 m) load radius. Horizontal reach of 50 feet (15.2 m) and vertical reach of 58 feet (17.7 m).

Weights

Weights

Front Axle
Rear Axle
Total

Weights

13,960 pounds (6340 kg)
14,540 pounds (6600 kg)
28,500 pounds (12940 kg)

Weights

15,390 pounds (6,990 kg)
15,690 pounds (7,120 kg)
31,080 pounds (14,110 kg)

Dimensions

Overall
Chassis

22 feet 6 inches (6.86 m)
14 feet 11 inches (4.55 m)

22 feet 10 inches (6.96 m)
14 feet 11 inches (4.55 m)

Dimensions

7 feet 10.5 inches (2.40 m)

Dimensions

Overall
Deck

8 feet (2.45 m)
47 inches (1.19 m)

Dimensions

97 inches (2.46 m)

Dimensions

11 inches (349 mm)

Dimensions

24 degrees

General Specifications

Working Angle

24 degrees

Spread

11.8 feet (3.61 m)

Penetration

3.5 inches (89 mm)

4-Wheel Steering

14.4 feet (4.42 m)

11.8 feet (3.61 m)

11.8 feet (3.61 m)

Rear Steer, Round Steer, Crab Steer

Rear Steer, Round Steer, Crab Steer

18 MPH (29.0 km/h)

18 MPH (29.0 km/h)

54 percent (28 degrees) 1

54 percent (28 degrees) 1

15 percent (9 degrees) 1

15 percent (9 degrees) 1

1) Calculated values based on GM 4.3L Gasoline Engine.
(Wheels may spin before these values are reached.)

Rotation

Elevation

Telescope

Continuous

0 to 73 degrees

21 feet (6.40 m)

Continuous

0 to 73 degrees

34.5 feet (10.52 m)

Rotation

Elevation

Extension

1.7 RPM

20 seconds

33 seconds

1.7 RPM

20 seconds

50 seconds

W/O Boom Extension

With Boom Extension

45 feet 4 inches (13.8 m)

59 feet 6 inches (18.10 m)

58 feet 8 inches (17.90 m)

73 feet 8 inches (22.40 m)

W/O Boom Extension

With Boom Extension

36 feet (11.0 m)

51 feet (15.5 m)

50 feet (15.2 m)

66 feet (20.1 m)

Engine

GM Model 4.3L V-6 industrial gasoline engine with multiport electronic fuel injection, dual fuel, catalytic converter, and engine management system. Water cooled, 262 CI (4.3L) displacement, 4-inch (102 mm) bore, 3.48-inch (88 mm) stroke, 93 HP (69 kW) at governed speed of 2500 RPM. Maximum torque 206 ft-lbs (279 Nm) at 1650 RPM. Includes special exhaust valves, seats and valve rotators for use with LPG, 70-amp alternator, 30-gallon (113L) fuel tank and 43-pound (19.5 kg) LPG tank. High temperature and low oil pressure shutdown is included in engine management system. Throttle control switch for setting engine speed at 1200 or 1800 RPM.

GM Model 4.3L V-6 industrial gasoline engine with multiport electronic fuel injection, dual fuel, catalytic converter, and engine management system. Water cooled, 262 CI (4.3L) displacement, 4-inch (102 mm) bore, 3.48-inch (88 mm) stroke, 93 HP (69 kW) at governed speed of 2500 RPM. Maximum torque 206 ft-lbs (279 Nm) at 1650 RPM. Includes special exhaust valves, seats and valve rotators for use with LPG, 70-amp alternator, 30-gallon (113L) fuel tank and 43-pound (19.5 kg) LPG tank. High temperature and low oil pressure shutdown is included in engine management system. Throttle control switch for setting engine speed at 1200 or 1800 RPM.

GM Model 4.3L V-6 industrial gasoline engine with multiport electronic fuel injection, dual fuel, catalytic converter, and engine management system. Water cooled, 262 CI (4.3L) displacement, 4-inch (102 mm) bore, 3.48-inch (88 mm) stroke, 93 HP (69 kW) at governed speed of 2500 RPM. Maximum torque 206 ft-lbs (279 Nm) at 1650 RPM. Includes special exhaust valves, seats and valve rotators for use with LPG, 70-amp alternator, 30-gallon (113L) fuel tank and 43-pound (19.5 kg) LPG tank. High temperature and low oil pressure shutdown is included in engine management system. Throttle control switch for setting engine speed at 1200 or 1800 RPM.

STEERING

Front Axle

Planetary drive/steer front axle with 15.78 to 1.0 ratio. Differential equipped with "limited slip" feature. Driving effort is applied to wheel that has traction. Front axle mounted rigidly to frame.

Weight Distribution

Front

Weight Distribution

Rear

1st	17,000*	3
2nd	8,900*	5
3rd	5,100*	10
4th	2,700*	18

*Calculated for GM 4.3L engine. Wheels will spin in 1st or 2nd gear before these values are reached with 2-wheel drive.

STEERING

Steering Axle

Steering axle with 1½ degree oscillation in either direction.

Rear Axle

Planetary drive/steer axle with 24.98 to 1.0 ratio. Differential is not "limited slip" in rear axle. 1½ degree oscillation in either direction. (Axle ratio compatible with 4WD transmission output for front axle match.) Net Weight: 160 pounds (73 kg)

STEERING

Steering Unit

Hydraulic steering unit with two, 3-inch (7.6 cm) cylinders attached to each axle. Allows limited steering when engine is not running. Rear axle is the primary steer. An electric switch in the operator's compartment is used to select rear-wheel steering, four-wheel round steering or crab steering. Electronic sensors and control box automatically align the steering when a new mode is selected.

STEERING

Brakes

Split-system, four-wheel hydraulically-boosted multiple-plate wet disc brakes. Uses mineral oil. Hand lever actuated disc-type parking brake on transmission.

STEERING

Tires

15x22.5, 16-ply rating.

Tires

Weight Distribution

385/65D22.5 16-ply rating Net Weight: 20 pounds (9 kg)

Tires

Foam filling of four IC-200 tires. Net Weight: 2000 pounds (907 kg)

Extra Wheel

Extra wheel with standard tire (15X22.5, 16-ply) mounted, ready for service. Net Weight: 350 pounds (159 kg)

Extra wheel with Non-Marking tire (385/65D22.5, 16 ply) mounted, ready for service. Net Weight: 350 pounds (159 kg)

Deck Area

Deck Area

Deck Area

Total Deck Area: 66 Square Feet (6 m²). A maximum of 17,000 pounds (7700 kg) may be carried on the deck at creep speed when centered over or between axles. Seven stake pockets are provided along edges of deck for 1-inch (25 mm) pipe stakes. Stakes furnished. Cargo decks have skid resistant coating.

Lifting Rings

Consists of four rings, one at each corner of the load deck, so sling can be attached for lifting crane. Rings hang below deck surface when not in use.

Access Step

A step is located on each front corner providing access to deck area.

Outriggers

Four hydraulic outriggers of box-beam construction. Independent control for each outrigger. Hydraulic cylinders are equipped with direct-connected holding valves. Pad dimensions: 11 inches (28 cm) x 16 inches (41 cm).

Front Bumper

Two heavy eyes in front bumper provide for attachment of hook block so main winch line can be used for pulling loads at or near floor level. Also for anchoring tag lines from load on hook.

Rear Bumper

Two holes in the rear bumper (in conjunction with the pulling eyes) provide tie down locations for transporting crane by truck or cargo container.

Storage Box

Consists of front deck plate with removable and lockable cover, and box for carrying sheave block and other items. Storage box is 14 inches (35 cm) deep x 10½ inches (26 cm) wide x 36½ inches (93 cm) long.

Protective Grilles

Consists of welded steel protective grilles for headlights and taillights. Easily removable for replacing bulbs.

Optional Winch

Optional Winch

Optional worm gear winch, mounted behind front bumper, with a single lever control at the operator's console. Hydraulic powered to provide bare drum line pull of 10,000 pounds (4540 kg) at 33 feet per minute (10.2 m/min). Winch drum is 3½ inches (90 mm) in diameter by 10 inches (250 mm) long. This winch includes 115 feet (35 m) of 7/16-inch (11.1 mm) wire rope, hook and 4-way roller guide. This rope can pull 5800 pounds (2630 kg) with a safety factor of 3.5:1. Net Weight: 250 pounds (113 kg)

6000-Pound Tongue Hook

T-60-AOL Holland pintle hook mounted on rear frame member, provides capacity for 6000-pound (2700 kg) tongue weight and 30,000-pound (13600 kg) trailer weight. Net Weight: 15 pounds (7 kg)

30,000-Pound Trailer Hook

T-60-AOL Holland pintle hook mounted on front frame member, provides same capacity as rear pintle hook. Net Weight: 45 pounds (20 kg)

Right-Hand and Left-Hand Mirrors

One right-hand and one left-hand mirror, 6 inches (152 mm) wide x 16 inches (406 mm) high, mounted on deck stakes. Pivot out of way when contacted by obstacle at side of deck. Net Weight: 12 pounds (5 kg)

Operator Control Station

Operator Control Station

Operator control station provides one-position access to all chassis and crane functions. Includes adjustable operator's seat and retracting seat belt, fire extinguisher, and bubble level.

Hoist Drum Rotating Feedback Device

Provides tactile feedback to operator when hoist drum is rotating. Feedback device attached to hoist control handle. Feedback is proportional to hoist speed.

Operator Compartment Protection System

Operator Compartment Protection System

Tubular steel weldment with heavy expanded steel mesh top section, bolts over the operator's compartment. Operator Guard is not designed, rated or certified as a Falling Objects Protection System (FOPS) or Rollover Protection System (ROPS). Net Weight: 60 pounds (27 kg)

Hinged Door

Hinged door covers operator compartment side opening. Has latch handle outside and knob inside. Rubber gasket contacts chassis. Net Weight: 40 pounds (18 kg)

Operator Compartment Canopy

Consists of rigid mounted canopy section and removable hinged door with safety glass. Rugged canopy structure with laminated glass front and top. Door is equipped with a keyed lock to protect operator's station. Includes defroster fan, dome light, 12,400 BTU heater with 2-speed fan, and 12V electric windshield wiper. There are sliding windows in the door and right-hand side. Net Weight: 220 pounds (98 kg)

Heater

Provides 12,400 BTU heater with 2-speed fan for units without All Weather Cab. Net Weight: 12 pounds (5 kg)

Windshield Washer

Provides reservoir, pump and nozzle for windshield washer.

Vinyl Mat

Vinyl mat with foam backing covers floor, front wall, and lower portion of right hand wall of operator's compartment. Net Weight: 5 pounds (2 kg)

7 7 7 7 7 7 7 7 7 7 7 7 7 7

Vinyl seat with a small suspension built in. Net Weight: 15 pounds (7 kg)

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Deluxe seat with upholstery springs provides additional operator comfort. Net Weight: 15 pounds (7 kg)

2 2 22 2 2 22 2 2 22 2 2 22 2 2 22 2

Includes vinyl floor mats and control valve cover and side panels of foam-backed, perforated vinyl for noise reduction. Net Weight: 15 pounds (7 kg)

1 2 3 4 5 6 7 8 9

Complete system using R134a coolant has combination cooling and heating unit in cab. Net Weight: 125 pounds (57 kg)

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

1 2 3 4 5

Gas Units: Group 27 with 540 CCA rating.

Diesel Units: Group 31 with 950 CCA rating.

1 2 3 4 5 6 7 8 9 10

Consists of two 12V lamps, with high and low beams for driving; tail, brake and turn signal lights and back up lights in rear; front turn signals; and emergency flasher switch at operator's station. 12V horn actuated by button located on shifting control.

22 2 222 2 22 2 2 22 2 2 2

Located at operator's station, includes fuel gauge and hourmeter, which records hours only during actual engine operation. Also included are warning lights for low oil and transmission pressure, check engine, high coolant and transmission temperature, turn signals, high beams, hazard lights, parking brake and four-wheel drive.

1 2 3 4 5 6 7 8 9 10

Provides pulsating sound from a 102 dB alarm when ignition is on and transmission is in reverse. Conforms to SAE J994B.

0 0 22:2 0 0 0 0 22:22 0 0 0 22:22 0 0

102 dB alarm with alternating two-tone sound is act uated by a switch when the OUTRIGGER DOWN controls are operated.

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1 222 2 2 2 53 2 22 2

Two yellow strobe lights, one on each side of turret weight box, for high visibility all around crane. Flashes 60- 120 times per minute. Each strobe draws only one-half amp. Includes operator controlled switch. Net Weight: 5 pounds (2 kg)

0 0 0 0 0 0 00 0 00 0 00 0

Two halogen flood lights mounted between the grille bars in the rear bumper. Includes switch at operator station. Net Weight: 10 pounds (5 kg)

WORK LIGHTS

Two halogen work lights, one on left side of boom to light boom tip, and one on right side of the turret to light ground under boom tip. Includes switch at operator's station. Net Weight: 10 pounds (5 kg)

HYDRAULIC SYSTEM

HYDRAULIC PUMP

Tandem pump, direct-driven by engine, delivers 29 GPM (110 L/min) at 2600 PSI (179 bar) and 34 GPM (129 L/min) at 2500 PSI (172 bar) at 2500 RPM governed engine speed. System protected by relief valves, suction line strainer and 10-micron return line filter. 54-gallon (204 L) reservoir equipped with breather and locking filler cap. (Maximum pressure on IC-200-3G is 3000 PSI on the 29 GPM (204 L) section of the pump.)

HYDRAULIC CYLINDERS

BOOM CYLINDER

Three or four-section, high strength steel construction, equipped with bearing pads for efficient support and extension. Double-acting hydraulic cylinder telescopes booms. The telescope cylinder and the double-acting boom elevation cylinder are equipped with direct-connected holding valves. The four sections on the 3H telescope proportionally. Boom angle indicator is on side of boom.

HYDRAULIC CYLINDERS

SWING CYLINDER

Heavy-duty bearing swing gear with external teeth supports boom. Rotation is powered by hydraulic motor and worm gear drive. Swing gearbox may be adjusted as wear occurs to minimize backlash. Boom is attached by high strength steel weldment.

HYDRAULIC CYLINDERS

HOIST CYLINDER

Turret-mounted planetary gear hoist is hydraulically powered to provide a bare-drum line pull of 10,000 pounds (4536 kg) at a speed of 100-feet-per-minute (30 m/min). Hoist drum is 9 7/8-inch (251 mm) diameter by 16 1/2 inches (419 mm) long. The hoist includes 240 feet (73 m) of wire rope for 2H and 291 feet (89 m) of wire rope for 3H. Wire rope is 1/2-inch (13 mm) diameter. 125-pound (57 kg) downhaul weight and swivel hook are included.

HYDRAULIC CYLINDERS

BOOM CYLINDER

BOOM CYLINDER

Prevents damage to hoist rope and/or machine components from accidentally pulling sheave block or downhaul weight against boom tip. Consists of trip arm at boom tip, which is moved upward by sheave block or downhaul weight as hook approaches boom tip. Trip arm actuates electric switch that is connected through cable reel mounted on boom to solenoid dump valve in the hydraulic circuit. This valve will dump the HOIST RAISE, TELESCOPE EXTEND, BOOM LOWER, SWING LEFT and SWING RIGHT circuits. No other circuits are affected. These circuits are returned to normal operation by operating the HOIST LOWER, BOOM RAISE or TELESCOPE RETRACT control. There is also an override keyswitch under the dashboard.

Operational aid that warns operator of impending overload with audible and visual signals. Has read-outs for load, boom angle, boom length and load radius. In the event of an overload, dumps the following boom functions: HOIST RAISE, TELESCOPE EXTEND, BOOM LOWER, SWING LEFT and SWING RIGHT. These circuits are returned to normal by lowering load to a safe resting place with hoist or by retracting or raising boom to a shorter load radius. There is also an override switch under the dashboard.

Double sheave block for 4-part-line requirements. 10- inch (254 mm) O.D. sheaves for ½-inch (13 mm) diameter wire rope. Swivel hook with safety latch. 200-pound (95 kg) weight provides positive overhaul. Includes bar on top to actuate trip arm of Anti-Two-Block device.

Provides 15 feet (4.6 m) of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds (180 kg) from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block device. Net Weight: 520 pounds (236 kg)

Provides 15 feet (4.6 m) of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds (180 kg) from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block device. Boom extension will tilt through three positions, in line, 15 degree offset and 30 degree offset. Net Weight: 670 pounds (304 kg)

Provides 16 feet (5 m) of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block device. Boom extension will tilt through 3 positions, in line, 15 degree offset and 30 degree offset. Net Weight: 550 pounds (249 kg)

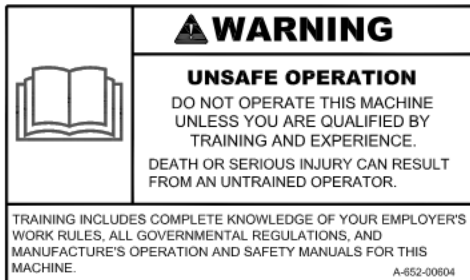
Single sheave block for 2-part-line requirements. Block is specially designed to reduce height, 23 inches (58 cm) from top to saddle of load hook. 10-inch (254 mm) O.D. sheave for 1/2-inch (13 mm) rope. Swivel hook with safety latch. Includes bar on top to actuate trip arm of Anti-Two-Block device. Net Weight: 124 pounds (56 kg) for 2H and 200 pounds (91 kg) for 3H

5000 pound capacity hook bracket is attached to the front of the boom tip with 4 pins through the boom extension attachment lugs. A hook with latch is pinned to the tip of the bracket. Net Weight: 65 pounds (29 kg)

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1. Since the manufacturer has no direct control over machine application and operation, conformance with good safety practice is the responsibility of the user and his operating personnel.

2.

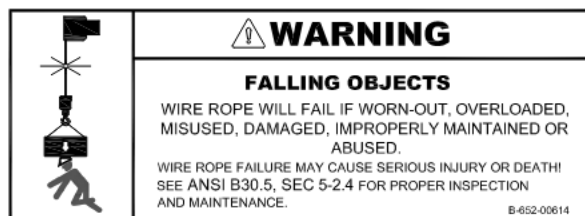


3.

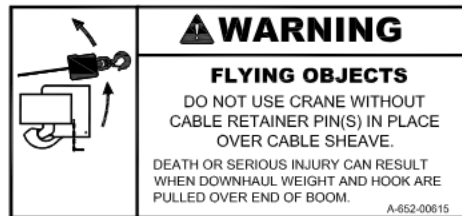
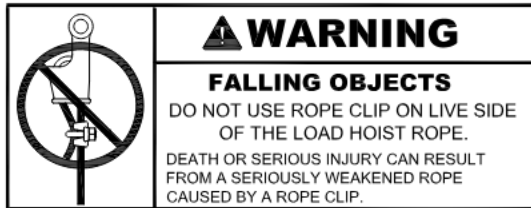


4. The operator shall be responsible for those operations under his direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.
5. The operator shall not engage in any practice which will divert his attention while actually operating the crane.
6. Do not run the engine in an enclosed area or indoors without adequate ventilation.
7. Do not use ether for starting. Ether is highly flammable and can be ignited by the intake manifold heater grid, causing engine damage or operator injury.
8. This list of rules is only a supplement to all federal, state, and local safety rules that may apply.

1. Before beginning operation each day, thoroughly inspect the entire crane to be sure it is in good operating condition.
2. Inspect load hoist rope and wedge socket daily. We recommend rope inspection, replacement and maintenance in accordance with ANSI B30.5, Sec. 5-2.4.



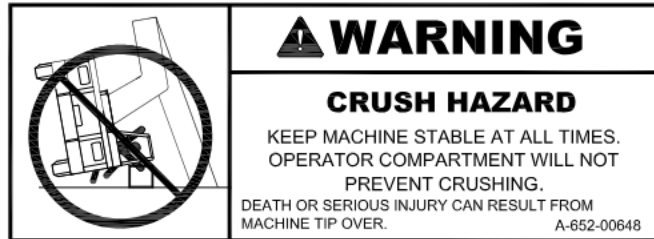
3. Keep operator's compartment and decks free of mud and grease.
4. If crane is equipped with a cab, keep all window glass clean. Keep gauges clean.
5. Tools, lubricants, or rags on the crane should be kept in a secured toolbox.
- 6.
- 7.



8. The Rated Capacity Limiter must be checked before each shift and after each setup for the proper operating configuration on the display. It must be inspected before each shift and tested with a known load at least once a month as described in the RCL operation manual.

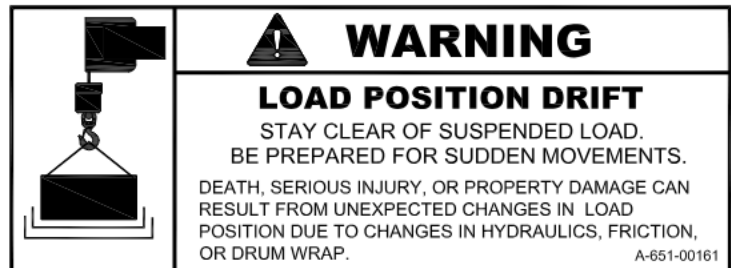


1. Always refer to Crane Capacity Chart in operator's compartment before handling load. Do not exceed load ratings. Under some conditions the standard capacity ratings cannot be recommended and must be adjusted downward to compensate for special hazards, such as weak supporting ground, wind, hazardous surroundings, operator inexperience, etc. The weight of the load should always be known.



2. Be careful to prevent load swinging. A swinging load can cause instability or loss of control of the load. Be aware that the Anti-Two-Block System and the Rated Capacity Limiter can cause sudden stopping of boom movement, which can cause the load to swing. Swing the boom slowly whenever these systems might stop the boom.

3. Do not allow anyone to put any part of his body under a load. The load may lower or fall if there are damaged parts in the crane. Also, the load may drop a short distance due to thermal contraction of the hydraulic oil in the cylinders.



4. Do not use crane to drag loads sideways. Do not use crane to raise grounded or fixed load by using Boom Raise function.

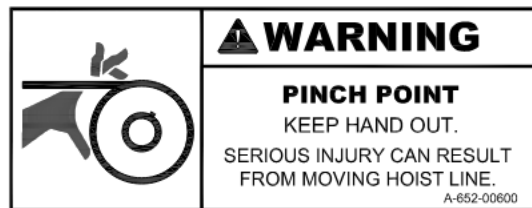


7. Level the crane before lifting. A small incline will significantly reduce the capacity. Use appropriate cribbing under the outriggers for leveling. All outriggers must be fully extended and tires must clear the ground to use the ON OUTRIGGERS ratings.
8. Always use outriggers if possible. If you must lift on rubber, keep the load as close to the ground as possible to prevent tipover. Move the load very slowly and use tag lines to prevent load swinging.

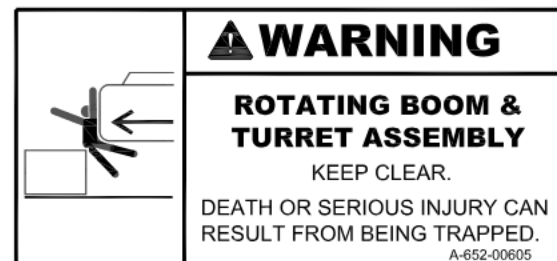
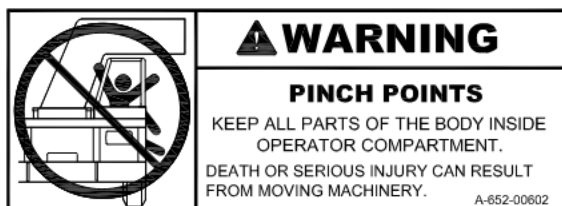
9. Crane may tip at less than rated loads if the surface is uncompacted or wet dirt, or soft soil with frozen crust, thin or cracked pavement, or surface near a hole or ledge. Always use adequate outrigger floats and/or cribbing. See page 2-14.



10. The operator shall not leave the controls while the load is suspended.
11. Always use adequate parts of load hoist line for lifting heavy loads.
12. Always be sure the rope is properly seated and wound evenly on hoist drum.
13. Keep hands away from load hoist rope when hoist is being operated.



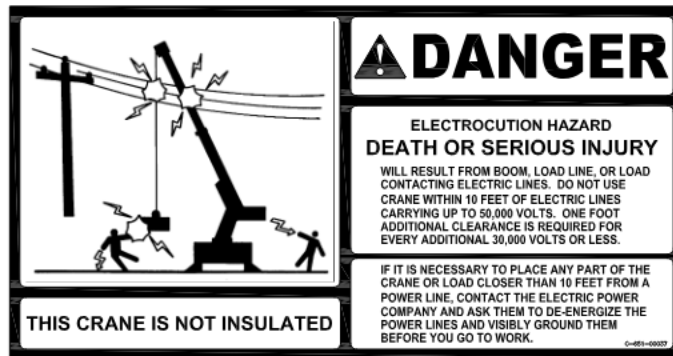
14. Be sure at least three wraps of rope are left on the hoist drum to ensure against rope pulling out of its anchor.
15. Never wrap the hoist rope around a load. Always use approved rigging.
16. Avoid pinch points such as between a rotating turret and the cab, or in access holes of a telescoping boom, or between the two-block mechanism.



17. Avoid two-blocking.

- Stop raising hoist line before downhaul or hook block strikes boom tip plates.
- Pay out hoist line while extending boom.
- Maintain clearance between downhaul weight or hook block and boom tip while booming down.

18. The amount of counterweight supplied with this crane should never be changed. Unauthorized addition of counterweight in the field to increase lifting ability constitutes a safety hazard.
19. Always keep crane boom at least 10 feet (3 m) away from electric power lines. (See chart on side of turntable for boom clearance).



REQUIRED CLEARANCE FOR NORMAL VOLTAGE IN OPERATION NEAR HIGH VOLTAGE POWER LINES AND OPERATION IN TRANSIT WITH NO LOAD AND BOOM OR MAST LOWERED		
Normal Voltage, kV (Phase to Phase)	Minimum Required Clearance	
	ft	(m)
Operation Near High Voltage Power Lines		
to 50	10	(3.05)
Over 50 to 200	15	(4.60)
Over 200 to 350	20	(6.10)
Over 350 to 500	25	(7.62)
Over 500 to 750	35	(10.67)
Over 750 to 1000	45	(13.72)
Operation in Transit With No Load and Boom or Mast Lowered		
to 0.75	4	(1.22)
Over 0.75 to 50	6	(1.83)
Over 50 to 345	10	(3.05)
Over 345 to 750	16	(4.87)
Over 750 to 1000	20	(6.10)

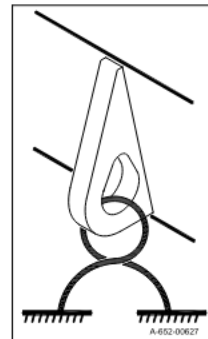
REF. ASME/ANSI B30.5 - 1989 B-651-00097

20. If boom should accidentally contact a power line, keep ground personnel away from crane. Stay in the crane until the power source is de-energized. Move the crane away from electrical hazard if this does not cause new hazards. If it is absolutely necessary to leave the crane, **step** clear of the crane with both feet together. Hop away from the crane with feet together. The ground surface may be energized.
21. Do not operate outside during thunderstorms. Avoid all lightning strike opportunities. Consult local weather reports during inclement weather conditions.

22. Crane has four lifting rings, one at each corner of load deck, for lifting the crane. Use proper slings and rigging methods to keep the load balanced during the lift. Do not lift by the boom. Proper lifting and securing practices are the responsibility of the rigger in charge.



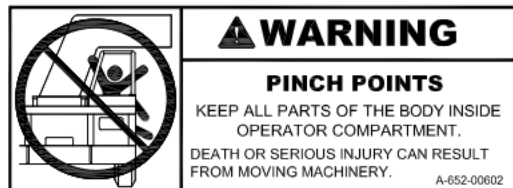
23. When transporting the crane, be sure it is properly secured to the vehicle. Utilize the tie-down anchors as indicated on the crane to stabilize the load and prevent shifting during transport. Use caution to not over-tighten the chains and binders when securing the crane to the transport vehicle. Proper securement and prudent shipping practices are the responsibility of the carrier.





1. For Pick and Carry operation: Traveling with suspended loads involves so many variables, such as ground conditions, boom length and vehicle acceleration, that it is impossible to devise a single standard rating procedure with any assurance of safety. For such operations, the user must evaluate prevailing conditions and determine safe practices using precautions, such as the following:
 - A. The boom shall be centered over front axle.
 - B. Use shortest boom practical.
 - C. Carry load as close to ground as practical.
 - D. Reduce travel speed to suit conditions (2 MPH (3 km/h) maximum).
 - E. Maintain specified tire pressures and lug nut torques.
 - F. Avoid sudden starts and stops.
 - G. Provide tag or restraint lines to snub swinging of the load.
 - H. Hand-held tag lines should be nonconductive.
 - I. Do not carry heavy boom loads and deck loads at the same time.
 - J. Do not pick and carry with boom extension installed.
 - K. Do not exceed the OVER FRONT, ON RUBBER capacity.
2. When raising the boom or moving the unit with boom elevated, be sure there is adequate overhead clearance for boom.
3. For carrying loads on decks:
 - A. Boom must be retracted, centered and lowered as close as possible.
 - B. 2 MPH (3km/h) maximum road speed. Reduce speed below 2 MPH (3km/h) to properly match condition of road surface and deck load stability.
 - C. Remove load hook from load before traveling.
4. Cranes with rear steering require close watch because of "tail swing" when the chassis is turned in tight quarters.

5.



6. Every effort has been made to make the BMC Industrial Crane a stable vehicle. However, with the rigid front axle and the unsprung oscillating rear axle suspension, the operator must take care to control the vehicle speed to be compatible with conditions of rough roads or uneven terrain.
7. When this crane is to be parked on a grade, set parking brake and block wheels or extend outriggers fully.
8. Shut off engine before refueling, and remove fuel cap slowly. Vapor pressure in tank can cause a burst of fuel and vapor when the cap is removed. Always refuel with proper fuel and into proper tank.
9. Know your visibility limitations. Loads being carried on the deck or hanging on the hook can add further limitations to visibility during travel. Always use a signal person when in doubt.



The IC-200 instrument panel is equipped with a fuel gauge, an hour meter and a bubble level. Also included are warning lights for low oil and transmission pressure, check engine, high coolant and transmission temperature, turn signal, high beam, hazard lights, parking brake and optional four-wheel drive.

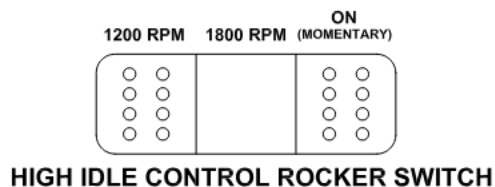
The ignition switch is key operated and has OFF, RUN and START positions. The ignition switch should always be turned off and the key removed when the vehicle is left unattended. A horn button is on the shifting control.

The BMC IC-200 is equipped with a standard lighting package. An on-off switch and a high beam indicator are on the instrument panel. The dimmer switch is located on the left hand steering column control. Stop lights are controlled by operating the foot brakes. The turn signal control is located on the left side of the steering column. Moving the lever down indicates a left turn; up indicates a right turn. The emergency flasher lights are actuated by a toggle switch on the instrument panel near the turn signal lever.

The hand brake lever is located on the right side of the operator's seat. To apply, lift the lever until the over-center position is reached. When adjustment is required, turn the knurled knob on the end of the lever clockwise to tighten. The brake must be released before adjustment can be made. A warning light shows when the hand brake is applied. The brake and accelerator pedals are located and operated as they are in other vehicles already familiar to the operator.

A lever on the steering column controls the powershift transmission. Moving the lever upward engages the transmission clutch for forward travel. Rotating the handle of the lever selects the gear that is desired (first through fourth) and engages the clutch for that gear. To put the transmission in reverse, the machine should be brought to a stop. The lever then is pulled downward, through the neutral position, into reverse. The transmission and drive train components can be damaged by shifting from forward to reverse or vice versa while the unit is in motion, or while the engine speed is above 1000 RPM. A neutral safety switch prevents starting the engine with the transmission engaged. The shift lever must be in neutral to start the engine. A parking brake interlock switch prevents driving with the brake on.

Normal engine speed control uses the foot accelerator pedal. A three position switch on the right dash panel provides preset engine speeds. Parking brake must be set to activate system. Press the high idle control switch temporarily to the right, the engine will lock into the preset levels. The center position of the switch enables the engine to dwell at 1,800 RPM. The left switch position will lower the engine speed to 1,200 RPM. To restore the foot accelerator, either temporarily release the parking brake fully or turn the engine off.



The optional four-wheel drive is controlled by a switch on the instrument panel. Select four-wheel drive when extra traction is needed. It is recommended to operate in two-wheel drive except when wheel slip is likely.

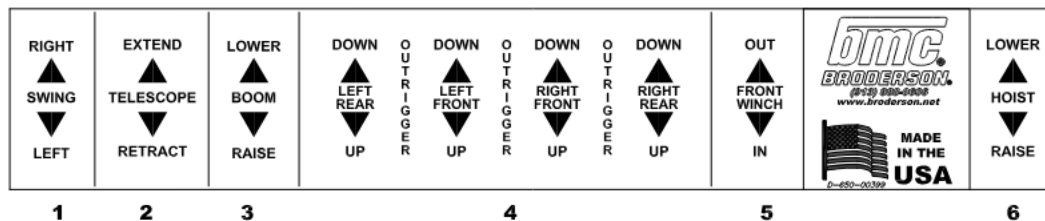
Steering Modes

The IC-200-G is equipped with three-mode steering: four-wheel round steering can be used for making tight turns; two-wheel rear steering should be used for traveling long distances; crab steering can be used for maneuvering in tight places. A switch on the dashboard sets the mode. Electronic sensors and controls automatically align the wheels when a new mode is selected, as the wheels are steered past the centered position. The steering wheel is directly mounted to the steering control unit of the all-hydraulic power steering system. The steering system will provide limited steering even if the engine stops running.

The Rated Capacity Limiter display and input panel are mounted on the dashboard. Instructions are in the RCL Operation Manual and additional information is in the Operating the Crane section, the Crane Capacity section and Maintenance Section of this manual.

Operating the Crane

The controls for operating the outriggers, boom rotation, boom elevation, boom extension and hoist are located along the forward dashboard area. The control handles are directly connected to the 3-position hydraulic valves. The placard located next to these handles identifies the function and direction resulting from each handle movement.



- Pulling back on the lever will rotate the boom to the operator's left; pushing forward will rotate it to the operator's right.
- Pulling back on the lever will retract the boom; pushing forward will extend the boom.
- Pulling back will raise the boom; pushing forward will lower it.
- The four outrigger levers may be operated simultaneously or individually. Special attention must be given to avoid hitting personnel or obstacles
- Optional Pulling back will pay winch line in; pushing forward will pay winch line out.
- Pulling back on the lever will raise the load line; pushing forward will lower the load line.

All controls may be used for simultaneous operation to achieve combinations of movements. Some controls must be used together. For instance, the boom telescope and the hoist controls must be used together to maintain clearance between boom and load line hook.

Avoid holding a control lever in the open position after the function has reached the end of its travel. This will impose unnecessary stresses on the components and heat the hydraulic system.

CRANE OPERATION

CRANE OPERATION

The following procedure is recommended for driving the vehicle:

1. Perform the daily inspection and test. (See Page 3-4)
2. Apply park brake.
3. Place transmission control lever in neutral.
4. Start engine and allow a warming period.
5. While warming the engine, set up the Rated Capacity Limiter configuration.
6. Stow boom over front.
7. Pull hoist line snug.
8. Retract outriggers.
9. Step on the brake pedal.
10. Release park brake lever.
11. Shift transmission to desired gear.
12. Place forward/reverse lever in desired position.
13. Release brake and press on accelerator pedal.
14. Slow down when making turns.
15. Set park brake and lower outriggers or chock wheels to park.

CRANE OPERATION

CRANE OPERATION

CRANE OPERATION

The following procedure is recommended for placing the crane in operation:

1. Perform daily inspection and test. (See Page 3-4)
2. Apply park brake.
3. Place transmission control lever in neutral.
4. Start engine and allow a warming period at low RPM.
5. While warming the engine, set up the Rated Capacity Limiter configuration.
6. Move accelerator pedal to medium to full speed.
7. Set all outriggers fully down on firm, level surface. Use timber or steel plate cribbing under outrigger shoes as needed on soft or uneven surfaces. Outriggers should remain set during all crane operations except for pick and carry.
8. Meter the controls when beginning or ending movement. This prevents suddenly starting or stopping, which causes unsafe load swinging and shock loads on the equipment. The control should be slightly actuated to begin movement and then slowly increased to desired speed. Metering can be improved by coordinating with the accelerator pedal.
9. You may use the throttle control switch to set the engine speed to 1200 or 1800 RPM when the park brake is on. Return to idle by releasing park brake momentarily.
10. Release accelerator during idle time and shut off engine, if practical.

CRANE OPERATION

Level Indicator: Do not operate crane if it is not level.

Fuel: Do not allow fuel tank to become empty. The engine will be difficult to restart and may require "bleeding" of diesel injectors. Keep fuel tank full when idle to prevent condensation in tank.

2-11 RCL

A rated capacity limiter is installed on the crane to assist the operator in estimating loads and measuring load radii. Please read the RCL Operation Manual for complete instructions on operation of the system. Following are some additional operating tips.

Operating Tips

A rated capacity limiter is installed on the crane to assist the operator in estimating loads and measuring load radii. Please read the RCL Operation Manual for complete instructions on operation of the system. Following are some additional operating tips.

Always be aware that the RCL can stop boom movement at capacity load conditions and in two-blocking conditions. Use good judgment in controlling the speed of boom movements to prevent shock loads and swinging loads.

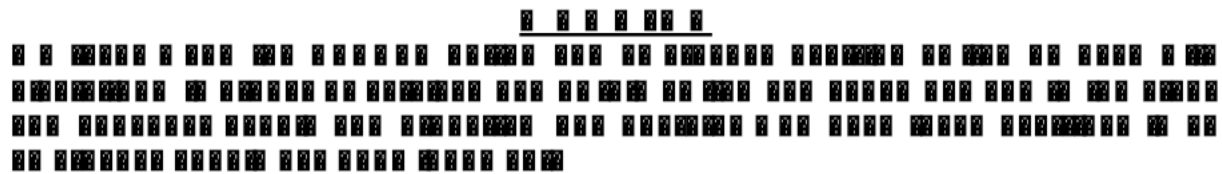
If the RCL system stops the crane movement there are various remedies that may be used to restart operation. If the hook is two-blocked, it should be lowered using the hoist control, if safe. The boom raise and telescope retract may also be used if this is safer. In some unusual circumstances it may be necessary to swing the boom before lowering the load. If you are sure this will not cause an overload, you can press and hold the CANCEL button on the RCL control and swing the boom to a safer position.

If the load is the maximum for the loadline or attachment, the load should be set down in a safe place using the hoist lower control and the load or attachment changed. Telescope retract may also be used and swing may be used, if safe, as described in the preceding paragraph. **DO NOT USE THE BOOM RAISE CONTROL** as this may increase the overload.

If the load is at the maximum allowable load radius, the boom can be raised or retracted to a safe radius or the load may be lowered to a safe place using the hoist control. If the boom extension is at its angle limit, the boom must be raised or the load hoisted down.

If the boom is fully lowered until it stops, (about 0°) the RCL will show an overload condition because the boom lift pressure sensors cannot read a useful pressure in this condition. To remedy this, raise the boom slightly. Or, if the boom is fully raised, (about 73°) the RCL may show an overload condition because the trapped pressure in the boom lift cylinder is sensed to be an overload. To correct this condition, the CANCEL button on the RCL control can be pushed and held and the boom lowered just slightly. Then check for other conditions before lowering further.

If there is a malfunction of the RCL or Anti-Two-Block system that causes loss of boom movement and cannot be remedied by the procedures above, the override keyswitch under the dashboard may be required to move the boom.



There is a light on the dashboard to warn that one or more outriggers is not fully extended when using the ON OUTRIGGERS setup on the RCL. Check the light daily when the outriggers are down and there is no load on the hook by raising and lowering each outrigger about three inches. The light should come on when an outrigger is up.



Before lifting loads, the operator must read the **RCL Load Capacity Chart** and adhere to the load capacities and radii of handling given. The information provided on this chart is based on stability, structural strength and hydraulic capacity.

To operate the crane safely, the operator must know the weight of the load and handling devices and the radius of the lifting operation. The crane must not be loaded beyond the specifications of the capacity chart except for test purposes as provided in ASME B30.5 Section 5-2.2. The person responsible for the lift must be sure that the load does not exceed the crane ratings at any radius at which the load may be during the entire lifting operation. The weights of the hooks, blocks, downhaul weights, slings, and other handling devices must be added with the load.

The **RCL Load Capacity Chart** on the crane is intended to assist the operator in estimating loads and measuring load radii and to alert the operator to impending overload conditions. The use of the Rated Capacity Limiter does not replace the requirements of the preceding paragraph. Verified weights and measured radii must take precedence over the Rated Capacity Limiter readings. Please read the RCL Operation Manual.

The Rated Capacity Limiter displays a load, load radius and boom angle that are obtained from electronic calculations using readings from pressure, length and angle sensors. These readings cannot be exact and should be treated as estimates. In general, the smaller the load and the higher the boom angle, the larger the percent of error.

Be aware that the electronic and mechanical components cannot be 100% fail-safe. Do not consider the system as a substitute for good judgment, training, experience or accepted safe operating practices. The operator is solely responsible for operation of the crane. Setting the Rated Capacity Limiter for the configuration of the crane is necessary before starting a lift. If incorrectly set, the system will not alert the operator to an impending overload, possibly resulting in the loss of life or destruction of property.

If the Rated Capacity Limiter is inoperative or malfunctioning, repair or recalibration of the unit must be done as soon as reasonably possible. The person responsible for lifts must establish procedures for determining load weights and radii and conduct the lifts according to the second paragraph above.

The Rated Capacity Limiter is designed to stop crane functions at the limitations of the capacity chart. These are: BOOM LOWER, TELESCOPE EXTEND, HOIST RAISE, SWING LEFT and SWING RIGHT. Great care must be exercised when handling a load near capacity or near a two-blocking condition. If the boom is being lowered or swung, the load will tend to swing if the Rated Capacity Limiter stops the boom movement. If the load is moving too fast, the sudden stopping by the system can cause dangerous load swinging, which can cause death or injury to personnel or property damage by impact with the load or by the crane tipping.

W A R N I N G

DO NOT OPERATE CRANE WITH LOAD NEAR CAPACITY LIMITS. IF THE BOOM IS BEING LOWERED OR SWUNG, THE LOAD WILL TEND TO SWING IF THE RATED CAPACITY LIMITER STOPS THE BOOM MOVEMENT. IF THE LOAD IS MOVING TOO FAST, THE SUDDEN STOPPING BY THE SYSTEM CAN CAUSE DANGEROUS LOAD SWINGING, WHICH CAN CAUSE DEATH OR INJURY TO PERSONNEL OR PROPERTY DAMAGE BY IMPACT WITH THE LOAD OR BY THE CRANE TIPPING.

CRANE OPERATOR MUST ALWAYS BE AWARE OF LOAD CAPACITY CHART:

The load radius is the horizontal distance from the centerline of boom rotation (the center of the turntable when it is level), to the vertical load line with the load suspended. Because of deflections of the boom and carrier, the load radius increases when a load is hoisted from its resting place. The load radius may be measured with a measuring tape. If the desired load radius falls between two load radii on the chart, it is recommended to use the load radius with the lower capacity and not try to interpolate between the numbers.

Load capacity ratings on this equipment are given on the basis that operations are to be conducted on firm and level terrain and in a safe environment. These capacity ratings are reduced in proportion to the deviation from the prescribed conditions. Any unfavorable environmental condition, such as soft, sloping or uneven terrain, high wind, or hazardous surroundings constitutes a deviation.

The main boom capacities are given in direct relation to the radius at which the load is being handled. Boom extension capacities depend on the boom angle as well as the load radius. The capacities shown on the capacity chart are the maximum allowable at the indicated radius. The greatest load that may be handled by the BMC IC-200 is 30,000 pounds (13600 kg), but only at a 6 foot (1.8 m) radius and on outriggers. All variances of loads and radii of handling are shown on the crane capacity chart. A metal chart is attached near the operator's seat and a laminated chart is included in the literature compartment for the express purpose of informing the operator when a load can or cannot be safely handled.

The capacities shown in the 360° ROTATION columns of the capacity chart apply to the entire 360 degree rotation of the boom and are maximum allowable at the indicated radius. The capacities OVER FRONT are limited to the work area sectors on the placard.

Note that the 360° ROTATION capacities at some load radii are much less than the OVER FRONT capacities. The least stable position of the boom is over the side of the crane. Use great care when swinging a load from the front or rear of the crane toward the side of the crane. The load must be known in order to assure that the crane will not tip.

OUTRIGGER LIMITATIONS

Outriggers should be used whenever possible. If the outriggers are not all the way DOWN, they are not all the way OUT. Crane will tip at less than rated capacity when load is lifted on downhill side. Outriggers extended to a surface that appears to be firm, but is unable to support the outrigger pad at full rated loads. Examples of this type of surface are:

- A. Outriggers only partially extended and resting on curbing, shoring, etc. If the outriggers are not all the way DOWN, they are not all the way OUT.
- B. Crane operated on a hill or sloping surface. Crane will tip at less than rated capacity when load is lifted on downhill side.
- C. Outriggers extended to a surface that appears to be firm, but is unable to support the outrigger pad at full rated loads. Examples of this type of surface are:
 1. Thin or cracked blacktop or concrete.
 2. Dirt that appears dry and firm on top but is moist or unpacked beneath the surface.
 3. Dirt with a frozen but thin crust.

LOADING THE CRANE WITH A LOAD ON THE DECK

Refer to the IC-200-H capacity chart on the preceding page. A load 5' X 5' X 5' (1.5 m x 1.5 m x 1.5 m) and weighing 14,000 pounds (6350 kg) is to be lifted onto the deck of the crane for transport to a new location. We see on the chart that 7500 pounds (3400 kg) is the maximum load on one-part line, so the sheave block is required. The charts show the weight of the standard sheave block to be 210 pounds (96 kg). The rigger says that two slings are required, weighing a total of 50 pounds (23 kg). The total load is $14,000 + 210 + 50 = 14,260$ (6350 + 96 + 23 = 6469 kg).

Looking at the 360° ROTATION, ON RUBBER column we see that we can lift 16,000 pounds (7250 kg) at a 6-foot (1.8 m) load radius. However, this radius is less than the distance from the center of rotation to the center of the load, with the crane parked next to the load, so the load cannot be lifted this way. This leaves the ON OUTRIGGERS columns. The outriggers should always be used whenever possible anyway. We see that we can lift up to 18,500 pounds (8520 kg) at a 10-foot (3.0 m) load radius, either over the front or over the side. If possible, position the crane to lift the load over the front. This is the best position for stability. Checking the chart again, we see that the load is within the deck load limit of 17,000 pounds (7700 kg) and that the travel speed with the load must be limited to creep speed. Creep speed is less than 2 MPH (3 km/h) and not to exceed 200 feet (60 m) in a 30 minute period. This is an approved relationship between load, tire pressure and speed.

LOADING THE CRANE WITH A LOAD ON THE DECK

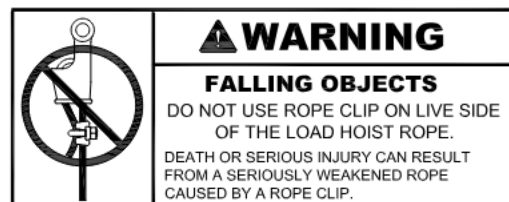
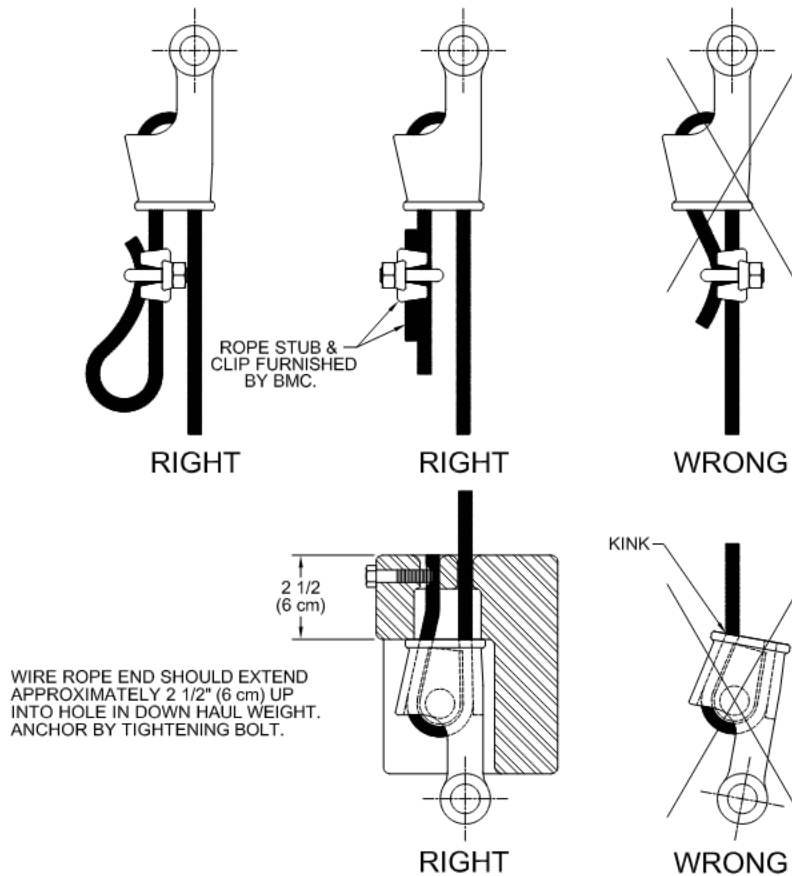
Refer to the IC-200-H capacity chart on the preceding page. A load 5' X 5' X 5' (1.5 m x 1.5 m x 1.5 m) and weighing 14,000 pounds (6350 kg) is to be lifted onto the deck of the crane for transport to a new location. We see on the chart that 7500 pounds (3400 kg) is the maximum load on one-part line, so the sheave block is required. The charts show the weight of the standard sheave block to be 210 pounds (96 kg). The rigger says that two slings are required, weighing a total of 50 pounds (23 kg). The total load is $14,000 + 210 + 50 = 14,260$ (6350 + 96 + 23 = 6469 kg).



The capacity chart shows the approved hoist rope arrangements. The downhaul weight and sheave blocks supplied by Broderson are specially designed to operate the Anti-Two-Block system. Other blocks or downhauls may bypass this system and create a dangerous condition. Notice the load limit for each hoist rope arrangement.

The keeper pins that pass through the sheave plates must be locked in place with cotters to hold the line on the sheaves. The load line must pass through the center of the downhaul, through the wedge socket, and the dead end clamped in the block as shown in the figure below.

WIRE ROPE INSTALLATION

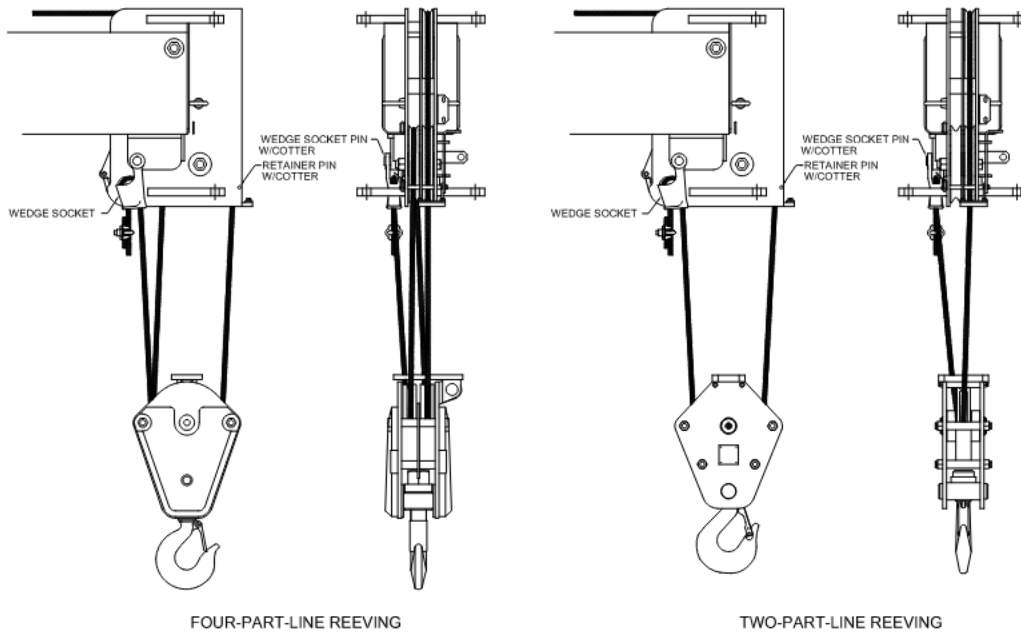


When resting the downhaul or sheave block on the ground for changing it, use the following procedure to prevent fouling the load line on the hoist. Raise the boom about 5 feet (1.5 m) and lower the hoist until the hook nearly touches the ground. Then lay the hook on the ground by lowering the boom, not the hoist.

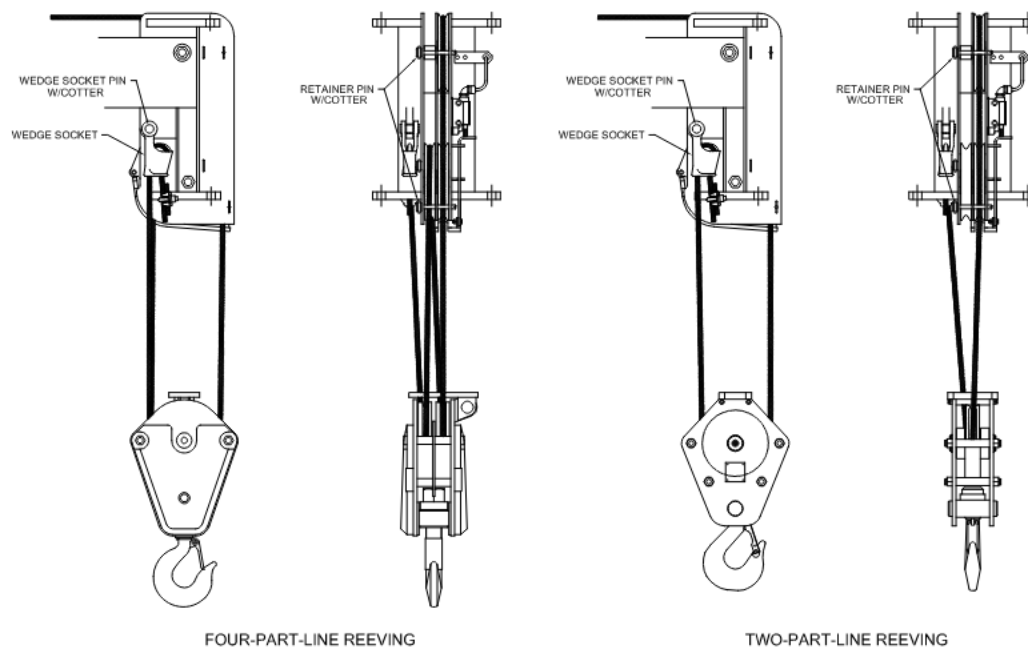


For loads above 7500 pounds (3400 kg) the sheave block must be used. The 4-part-line sheave block can be used for loads up to 30,000 pounds. The optional 2-part-line sheave block can be used for loads up to 15,000 pounds. The wedge socket should be pinned to the wedge socket anchor as shown in the figure. The dead end of the rope in the wedge socket should be clamped as shown in the figures. **DO NOT** use the wedge socket to clamp the rope. This will seriously weaken the rope. The sheave block should hang straight, and the top of the block should meet the boom sheave plates squarely when pulled up snugly.

IC-200-2



IC-200-3



SAFETY DEVICES

There are certain safety devices on the IC-200 that are designed to maintain control of a load even if power or hydraulic line failure should occur. The operator should understand the function and operation of these devices so that a continual check on their performance can be made.

OUTRIGGER CREEP VALVE

A double-acting check valve is integrally mounted on each of the outrigger cylinders. This valve holds the outrigger in the extended position should power or hydraulic line failure occur. This valve has no adjustment. If an outrigger creeps up while supporting a load, there is an internal leak in the valve or in the outrigger cylinder piston seal. In either case, maintenance is required.

BOOM HOLDING VALVE

A single-acting holding valve is integrally mounted on the cylinder barrel. This valve holds the boom in the elevated position should power or hydraulic pressure line failure occur. This valve is adjustable to hold the desired load. If the boom creeps down with loads up through maximum capacity, this valve should be adjusted. If adjustment fails to correct the problem, there is an internal leak in the holding valve or the hydraulic cylinder. Refer to the maintenance instructions.

HOIST BRAKE AND HOLDING VALVE

The hoist has an automatic brake in the gearbox and a holding valve mounted directly on the hoist motor to hold the load. A clutch in the gearbox allows the winch to turn freely in the RAISE direction. The brake is pilot released in the LOWER direction and should allow smooth stops of a load on the hoist.

BOOM CREEP VALVE

A single-acting holding valve is flange-mounted to the cylinder rod end. This valve holds the cylinder in the extended position should power or hydraulic pressure line failure occur. This valve is adjustable to hold the desired load. If the boom creeps in under load, this valve should be adjusted. If adjustment fails to correct the problem, there is an internal leak in the holding valve or the hydraulic cylinder. Refer to the maintenance instructions.

BOOM TIP PROTECTION

This system prevents damage to the hoist rope and machine components from accidentally pulling the load hook against the boom tip. A pivot arm-actuated electric switch is connected through a cable reel mounted on the boom to a solenoid dump valve in the hydraulic circuit. This valve will dump the HOIST RAISE, TELESCOPE EXTEND, BOOM LOWER, SWING LEFT, and SWING RIGHT circuits. No other circuits are affected. These circuits are returned to normal operation by operating the HOIST LOWER or TELESCOPE RETRACT control. An emergency override switch is provided so the boom can be operated in case of system failure. This key-operated switch is located under the left side of the instrument panel.

OPERATION

The IC-200 is a self-contained unit that can be used in a variety of applications. It is designed to be used in a variety of applications. The operator should understand the function and operation of these devices so that a continual check on their performance can be made.

MAINTENANCE

The IC-200 is a self-contained unit that can be used in a variety of applications. It is designed to be used in a variety of applications. The operator should understand the function and operation of these devices so that a continual check on their performance can be made.



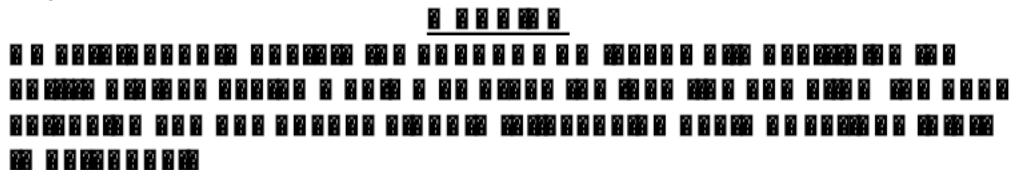
Use appropriate ladders/steps to gain access to the boom tip and deck to perform this installation.



1. Set the outriggers.
2. Raise and extend the boom about 30 feet (9 m) above the ground, paying out load line until hook is just above ground.
3. Position boom over front, lower and retract boom, leaving the load line on the ground.
4. If the sheave block is installed, remove it.
5. Remove load line from tip sheaves and lay over side of boom opposite of the stowed boom extension.
6. Make sure the front stow pin is in place and the attach pins are removed from the lugs on the boom tip and the mating lugs on the boom extension.
7. Remove the rear locking pin and swing the boom extension away from the rear end of the boom until the attaching lugs mesh on the right-hand side of the boom.
8. Insert the attach pins in the right-hand lugs and retain them with the hairpin cotters.
9. Remove the front stow pin and swing the boom extension around to the front until the left hand lugs mesh.
10. Insert the attach pins in their outer lugs and retain them with hairpin cotters. To insert the fourth pin, it may be necessary to rock boom extension side to side, or up and down.
11. Replace the rear stow pin and front stow pin in their brackets for storage and insert their hairpin cotters.
12. Lay the load line over the main boom and extension tip sheaves and insert the cable retainer pins and cotters.
13. Install the downhaul weight, wedge socket and swivel hook on the load line if they are not already installed.
14. Disconnect the anti-two-block wiring cable from the switch on the main boom tip and connect it to the cable connector on the boom extension base.
15. Check the Anti-Two-Block system for proper operation and Set Rated Capacity Limiter.
16. Stow the Boom Extension by performing steps 1-3 and by reversing steps 14-7, and then follow steps 17-20.

17. Lay the load line back in the boom tip sheaves and insert both retainer pins & cotters.
18. Replace all of the pins in their lugs for storage and insert their hairpin cotters.
19. Install the sheave block on the load line, if desired.
20. Check the Anti-Two-Block system for proper operation, and set Rated Capacity Limiter configuration.

1. The boom extension must be installed on the main boom tip and the load line, downhaul weight and wedge socket installed on the boom extension and secured with all of the retainer pins.
2. Draw the load line taut with the hoist by pulling the downhaul weight against the bottom of the tip sheave plates while holding the anti-two-block override switch under the control panel.



3. Remove the offset index pin from the boom extension knuckle. To loosen the pin it may be necessary to rock the boom extension tip up and down manually while maintaining the proper tension in the load line.
4. Lower or raise the load line with the hoist until the 0, 15, or 30 degree offset holes align in the knuckle.
5. Insert the index pin in the knuckle and retain it with the hairpin cotter.
6. Set Rated Capacity Limiter configuration.

***** :

1. If the boom extension is offset to 15 or 30 degrees, return it to the zero offset position as described above.
2. Perform steps 16-20 of the boom extension installation and stowing procedure.
3. Set Rated Capacity Limiter configuration.



The BOOM EXTENSION ANGLE and the LOAD RADIUS capacity charts must both be considered when using the boom extension. The smaller capacity specified by the 2 charts must be used. Refer to the IC-200-3H, Capacity Chart on page 2-15 for the following examples:

In this first example the boom is elevated to 30° over the side of the crane. The boom extension is offset to 15°, and the load radius is 32 feet (10.0 m). The outriggers are fully extended on concrete pavement and the crane is level. The column for BOOM EXTENSION, ON OUTRIGGERS 360° shows the capacity at the 32 foot (10.0 m) load radius to be 4550 pounds (2010 kg). The column for BOOM EXTENSION, MAIN BOOM ANGLE 30° shows the capacity at the 15° boom extension angle to be 3000 pounds (1369 kg). Since 3000 pounds (1369 kg) is less than 4550 pounds (2010 kg), the load (including the downhaul weight and slings) must be limited to 3000 pounds (1360 kg).

In the second example the boom is elevated to 40° over the side of the crane. The boom extension is offset to 0°, and the load radius is 38 feet (12.0 m). The outriggers are fully extended on concrete pavement and the crane is level. The column for BOOM EXTENSION, ON OUTRIGGERS 360° shows the capacity at the 38 foot (12.0 m) load radius to be 3500 pounds (1500 kg). The column for BOOM EXTENSION - STRAIGHT OR OFFSET, MAIN BOOM ANGLE 40° shows the capacity at the 0° boom extension angle to be 3900 pounds (1770 kg). Since 3500 pounds (1500 kg) is less than 3900 pounds (1770 kg), the load must be limited to 3500 pounds (1500 kg).





The front auxiliary winch is mounted behind the front bumper and is controlled from the operator compartment. The winch has 115' (35 m) of 7/16" (11 mm) diameter 6x36 EIP-IWRC wire rope (20,200 pound (91 kn) minimum breaking force) and a 5-ton (4.5 metric ton) hook. Limit pulls to 5000 pounds (22 kn). It has a single-part-line pull of 10,000 pounds (4540 kg) on the bare drum.

The front auxiliary winch is designed for the following uses:

1. As a tag line for restraining loads on the boom load line during pick-and-carry operation.
2. To drag loads on the ground to a position where they may be safely lifted with the boom.
3. To pull the crane out of mud or other obstacles.
4. To pull a smaller vehicle that is stuck.



The front winch is not designed for lifting personnel or loads. Observe the following safety rules:

1. Never lift or carry personnel with the winch and wire rope.
2. Do not allow anyone to stand near or under the load being moved.
3. Be sure the cable is securely anchored in the drum and that at least 5 wraps of rope remain on the drum to insure against the rope pulling out of its anchor.
4. Stand clear of a loaded winch cable. If it breaks, it can be very dangerous.
5. Keep hands clear of the winch and any sheaves that the cable passes over when the winch is being operated.



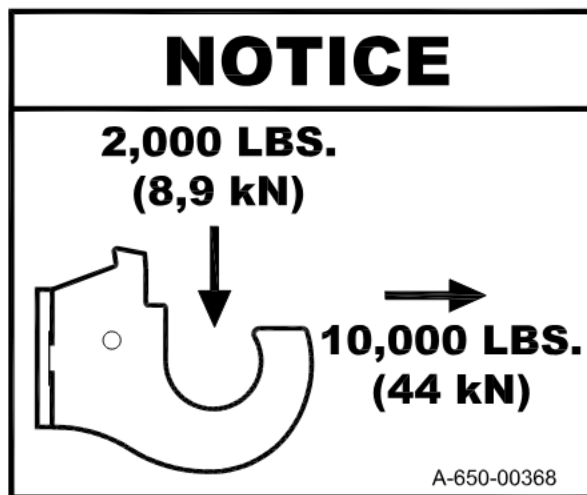


Available Pintle Hooks allow the crane to tow other disabled vehicles and trailers, and drag loads.

1. Observe the capacity ratings marked near the hook when towing.
2. Exceeding the capacities can damage the drivetrain.
3. Use slow and smooth motions to avoid shock loads or overrunning loads. Make sure other vehicle is occupied and controlling the vehicle being towed.

Pintle Hooks also allow the crane to be towed.

1. Use appropriately sized straps or chains.
2. Place transmission in Neutral. Utilize an Operator to activate brakes as needed and steer the crane while being towed.
3. Do not exceed a towing speed of 5 mph (8 kph).





The following list shows the symbols used to label switches and indicators on BMC cranes. Most symbols are derived from the ISO 3767-1:1998(E) standard. Not all symbols will be included on your BMC crane.

	On/Start		Windshield washer switch
	Off/Stop		Windshield defroster switch
	Battery not charging		Heater switch
	Hour meter		Air conditioner switch
	Read operator's manual		Ventilation fan switch
	Sound level notification		Parking brake is set
	Headlights (main/high beam)		4-wheel (round) steer
	Work light		Rear-wheel steer
	Hazard lights		Crab steer
	Rotating beacon or strobe lights		2-wheel drive
	Turn signals left/right		4-wheel drive
	Windshield wiper switch		Tire pressure

	Lift point
	Tie-down point
	Transmission oil fill location
	Transmission oil pressure
	Transmission oil temperature
	Brake fluid fill location
	Brake malfunction
	Hydraulic oil low-level mark
	Hydraulic oil filter restriction indicator
	Hydraulic temperature gauge
	Hydraulic oil temperature high
	Hydraulic oil pressure gauge OR hydraulic oil pressure low
	Positive polarity
	Negative polarity

	Engine oil pressure low
	Engine coolant fill location
	Engine coolant temperature high
	Engine coolant low level mark
	Engine air filter restriction indicator
	Engine start
	Engine idle set
	Check engine
	Stop engine
	Wait to start/ engine preheat/ grid heater/ glow plug switch
	Control lever travel
	Diesel fuel only
	Fuel level gauge
	Drain

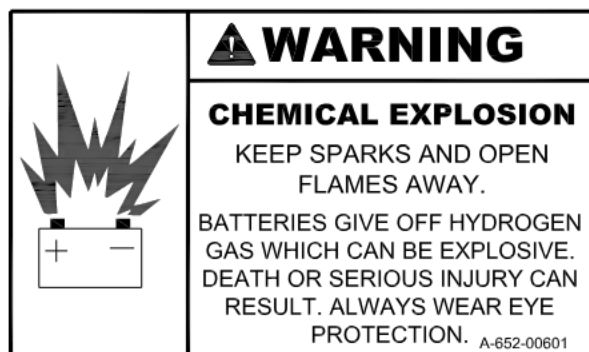


1. Lower load and boom , shutdown engine, remove key and put it in a safe place. Place warnings on the ignition switch and crane controls to prevent unauthorized starting or movement during maintenance. Disconnect battery when disabling crane. Disconnect battery, RCL and engine electronic module when welding on crane.
2. Relieve hydraulic pressure when working on hydraulic parts by cycling the controls with the engine shut down.
3. Allow fluids and parts to cool before working on them.
4. Read maintenance instructions before beginning work.
5. Do not check for hydraulic leaks with hands. If a mist of hydraulic oil is noticed around a line or component, use cardboard or other material to check for location of leaks. High pressure fluid leaking from a small hole, can be almost invisible, yet have enough force to penetrate the skin. If injured by escaping fluid, see a doctor at once. Serious reaction or infection can occur.
6. Wear safety glasses and shoes.
7. Do not wear loose-fitting or torn clothing.
8. Remove rings and other jewelry.
9. Wear heavy leather gloves when working on wire rope.
10. Keep fingers, clothing and hair away from moving parts.
11. To prevent falls, clean areas of crane that are stepped on for access to crane parts. Wear slip resistant footwear. Use appropriate ladders/steps to gain access to boom tip and deck.
12. Avoid placing body parts in pinch points. Use tools that extend through the pinch points when possible. Block the moving parts securely when it is necessary to work in pinch point areas.
13. When inflating or adding air to a tire, place a tire cage over the tire and use a clip-on inflater chuck with an extension hose that will permit standing behind the tire tread when inflating. Use proper tire handling equipment when changing any tires of this size.
14. Do not work on any machine that is supported only by jacks or a hoist. Always use adequate blocks or jack stands.
15. If it is necessary to work on the boom in an unstowed condition, block it to prevent it from dropping unexpectedly.

16. Use a hoist when lifting components that weigh 50 pounds (22 kg) or more. Follow all hoist and rigging safety rules.
17. Do not use lower grade fasteners if replacements are necessary.
18. When reinstalling wiring or plumbing after repairs, be sure that it will not be damaged by rubbing against sharp, rough or hot surfaces or edges.
19. Never use a rope clip on live side of the load hoist rope. This will seriously weaken the rope. Death or serious injury can result from the misuse of a rope clip on the hoist rope.
20. Replace any instruction or warning placards that are lost or damaged or not readable.
21. Always replace all guards and covers after working on the crane.
22. After working on the hydraulic system, remove air from the lines and cylinders involved by cycling them full stroke with the engine running until the functions operate smoothly.
23. When welding on the crane or on anything connected to the crane by wire rope or other conducting link, disconnect the battery, the Rated Capacity Limiter display and computer and the engine electronic control module. When welding on the boom or turntable assembly, remove the cable reel and any other electronic components bolted to these assemblies.
24. When using pressure spray to clean the crane, cover all electronic components with sheets of plastic to protect them from spray.
25. Do not allow antifreeze to contact skin. Rinse off spills immediately with plenty of water. Antifreeze is highly toxic if ingested.
26. Always disconnect negative cable first and refasten last to prevent accidental short through chassis components.



1. The battery is a source of electrical energy. It is used to power the engine and other electrical components. The battery is located in the engine compartment. It is a lead-acid battery. It is a sealed battery. It is a maintenance-free battery. It is a deep-cycle battery. It is a long-life battery. It is a reliable battery. It is a safe battery. It is a clean battery. It is a quiet battery. It is a powerful battery. It is a strong battery. It is a durable battery. It is a long-lasting battery. It is a high-performance battery. It is a top-quality battery. It is a premium battery. It is a professional-grade battery. It is a commercial-grade battery. It is a heavy-duty battery. It is a rugged battery. It is a tough battery. It is a reliable battery. It is a safe battery. It is a clean battery. It is a quiet battery. It is a powerful battery. It is a strong battery. It is a durable battery. It is a long-lasting battery. It is a high-performance battery. It is a top-quality battery. It is a premium battery. It is a professional-grade battery. It is a commercial-grade battery. It is a heavy-duty battery. It is a rugged battery. It is a tough battery.



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The results of the study show that the use of the proposed model can significantly reduce the time and cost of the design process. The model can be used by designers to quickly and accurately estimate the time and cost of the design process. The model can also be used by managers to make decisions about the design process. The model can be used by designers to quickly and accurately estimate the time and cost of the design process. The model can also be used by managers to make decisions about the design process.

OPERATOR PRE-START CHECKS

An operator, in the course of normal operation, should make certain observations, inspections and tests to assure that the unit is ready to perform safely.

PRE-START

1. Check levels of engine oil, coolant and transmission fluid.
2. Check air cleaner intake system for cracks or looseness.
3. Check general condition of tires.
4. Visually inspect for loose pins, bolts, physical damage and leaks.
5. Check hydraulic hoses, particularly those that flex during crane operation.
6. Check hydraulic oil level.
7. Check fuel level.
8. Check hydraulic filter indicator gauge after running at least twenty minutes.
9. Check hydraulic brake operation.
10. Check parking brake operation. (See park brake test and adjustment.)
11. Check power steering operation.
12. Observe chassis for normal driving operation.
13. Observe boom operation for normal power and speed.
14. Check load line and hooks for damage.
15. Check condition of sheaves and load line retainers.
16. Check anti-two-block system for proper operation.
17. Check back-up alarm for proper operation.
18. Check operation of all transmission gears, forward and reverse.
19. Clean all glass (if equipped) and check for cracks.
20. Check operation of all warning and safety devices.
21. Check operation of Rated Capacity Limiter according to the RCL Operation Manual.
22. Check the outrigger warning light for proper operation as described on page 2-12.
23. GM 4.3L Gas or Dual Fuel Engine, per engine manual:
 - a. Inspect foot pedal travel and operation
 - b. Verify "Check Engine" light illuminates with key on and engine off
 - c. Inspect for exhaust leaks
24. Cummins QSB 3.3L Diesel Engine, per engine manual:
 - a. Check crankcase breather tube
 - b. Drain water from diesel fuel filter.
 - c. Inspect cooling fan
 - d. Check dust ejection valve
 - e. Inspect drive belts
 - f. Check air cleaner restriction indicator

OPERATOR SAFETY

Operator safety is the most important consideration when operating the crane. The operator must always follow the safety rules and procedures outlined in the Operator's Manual. The operator must also be aware of the surrounding environment and the location of the crane at all times. The operator must never operate the crane if they are under the influence of alcohol or drugs, or if they are tired or distracted. The operator must always wear their seat belt and use proper lifting techniques to avoid injury.



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1990 年 1 月 1 日，中国开始实行改革开放政策，这是中国历史上最重要的转折点之一。在这一政策指引下，中国逐步从计划经济向市场经济过渡，吸引了大量外资进入，推动了经济的快速增长。

随着改革开放的深入，中国在国际舞台上的影响力日益增强。1997 年，中国成功举办了亚太经合组织（APEC）领导人非正式会议，这是中国首次主办如此规模的国际会议，标志着中国在国际事务中的地位不断提升。

然而，在取得巨大成就的同时，中国也面临着诸多挑战。例如，环境污染问题日益严重，城乡贫富差距扩大，以及加入世界贸易组织（WTO）后所面临的国际竞争压力等。中国政府在应对这些挑战的过程中，不断调整政策，推动可持续发展。

进入 21 世纪，中国继续深化改革，扩大开放。2001 年，中国正式加入 WTO，进一步融入了全球经济体系。此后，中国在经济、科技、文化等领域取得了显著进步，人民生活水平显著提高。

展望未来，中国将继续坚持改革开放的基本国策，推动高质量发展，为实现中华民族伟大复兴的中国梦而努力奋斗。

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500 HOUR MAINTENANCE

1. 500 hour maintenance.
2. 50, 250, 1000 hour and 12 month lubrication.
3. Change hydraulic fluid and filter and clean breather and reservoir.
4. Change transmission fluid and filter and clean strainer.
5. Replace vapor block inside slip ring. See turret installation in parts manual.
6. Perform all maintenance required by engine manual.
7. Place vapor block inside slip ring. See turret installation in parts manual.

12 MONTH MAINTENANCE

1. 12 month maintenance.
2. Pressure test engine cooling system.
3. Flush cooling system.
4. Fill with new coolant and distilled water.
5. Perform all maintenance required by engine manual.

S/N: _____ HOURS: _____ DATE: _____ BY: _____

COMMENTS & PARTS REQUIRED: _____



Hydraulic reservoir – 54 gallons (204 L)

Fuel tank – 30 gallons (113 L)

Planetary hoist – 2.5 quarts (2.4 L)

Front auxiliary winch – 2 pints (0.9 L)

4x2 & 4x4 Front axle – 5.98 gallons (22.6 L) housing, 39 gallons (1.5 L) each hub

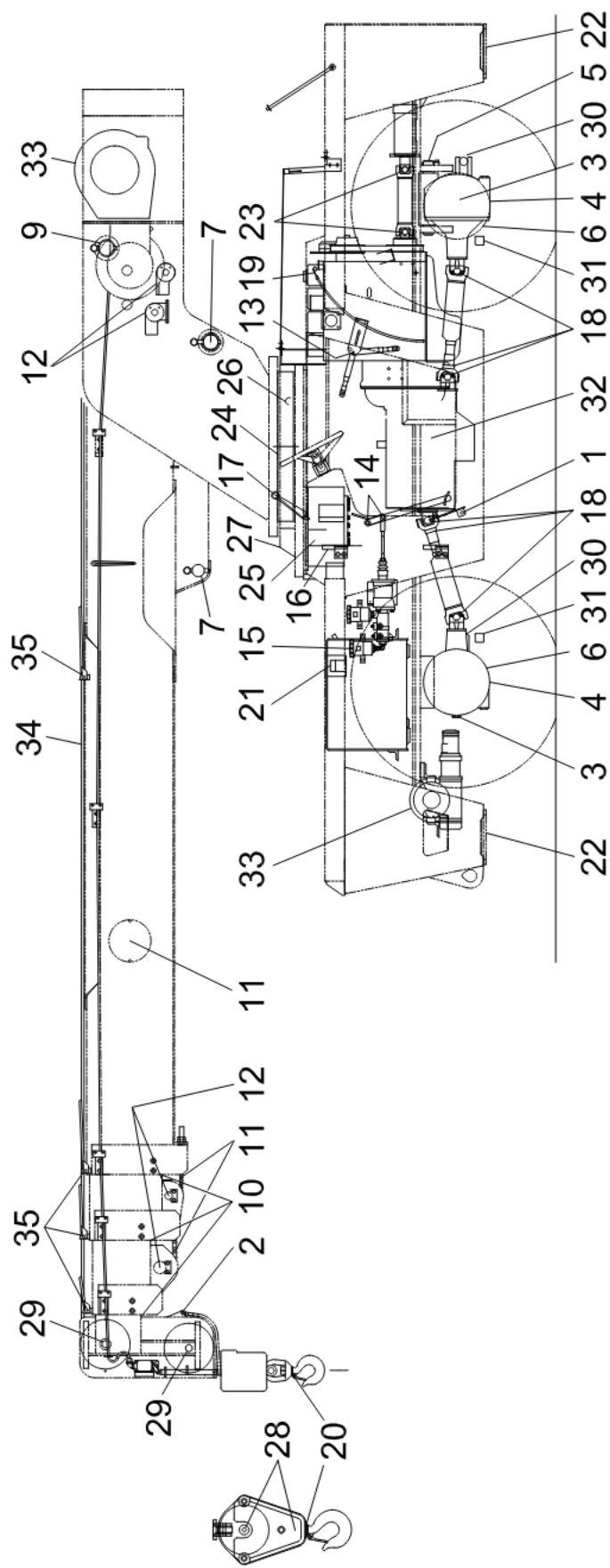
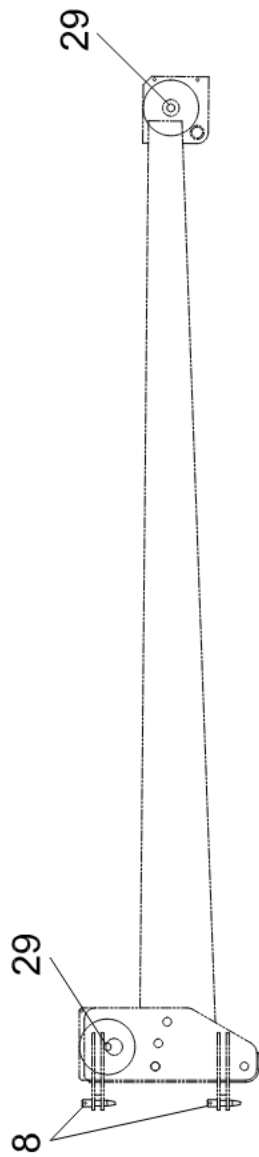
4x4 Rear axle – 4.68 gallons housing (17.7 L), .44 gallons (1.7 L) each hub

4x2 Rear axle – 0 gallons housing, .44 gallons (1.7 L) each hub

Transmission – 17.5 quarts (16.6 L)

Engine cooling system (Gas) - 15 (14.2L) to 17 (16.1 L) quarts depending on engine and heater.

Engine cooling system (Diesel) - 20 (18.9 L) to 24 (22.7 L) quarts depending on engine and heater; fill to bottom of fill neck in surge tank.



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ITEM	DESCRIPTION	LUBE	LUBRICATION INTERVALS					NOTES
			50 HOUR	250 HOUR	500 HOUR	1000 HOUR	MONTHS	
1	Accelerator Pedal	MPG			X			1 Zerk, Diesel
2	Anti-Two-Block Arm	SIL	X					2 Points - Oilcan
3	Axle Differential	424	X				12	Check @50, Change @12 Mo.
4	Axle Kingpins	MPG	X					4 Zerks
5	Axle Pivot Pin	MPG			X			1 Zerk
6	Axle Planetary Hubs	424	X				12	Check @50, Change @12 Mo.
7	Boom Cylinder Pins	MPG			X			2 Zerks
8	Boom Ext. Pins	MPG	X					Wipe on.
9	Boom Hinge Pin	MPG			X			1 Zerk
10	Boom Rub Pads	SIL	X					Spray or Wipe
11	Boom Chain	EO		X				Spray or Wipe* IC-200-3
12	Boom Chain Sheaves	MPG		X				6 Zerks* IC-200-3
13	Brake Lever, Parking	SIL	X					
14	Brake Linkages	SIL	X					
15	Brake Reservoirs	DTE	X					Check @50, Change When Brakes are Serviced.
16	Cab Hinges & Latches	SIL	X					
17	Control Valve Links	SIL	X					
18	Drive Shaft Joints	MPG	X					3 Zerks 2WD, 6 Zerks 4WD
19	Engine Oil (Gas Engine)	EO	X	X			3 Max.	Check Daily, Change @50, then at 250 or 3 Mo. Max.
20	Hook Swivel & Pin	SIL	X					
21	Hydraulic Oil	HO	X			X	12 Max.	Check Daily, Change @1000 Hours or 12 Mo. Max.
22	Outrigger Legs	MPG	X					Wipe on Legs.
23	Pump Shaft	MPG	X					2 Zerks
24	Rotation Bearing	MPG	X					1 Zerk*
25	Rotation Gearbox	WGO						Repack @ overhaul
26	Rotation Gear Teeth	OGG	X					Brush On.*
27	Rotation Pinion Bearing	MPG	X					1 Zerk*
28	Sheave Block	MPG			X			3 Zerks
29	Sheave Pins	MPG			X			2 Zerks Std, 2 Optional.
30	Steering Cyl. Ends	MPG			X			8 Zerks
31	Steering Link Ends	MPG			X			4 Zerks
32	Transmission, 4-Speed	TPF		X			12 Max.	Check @250, Change @12 Mo.
33	Winch(es)	MPL		X			12	Check @250, Change @12 Mo.
34	Wire Rope	2-X	X					Spray, Brush or Soak.*
35	Wire Rope Retainers	SIL	X					

*See Procedures in Manual

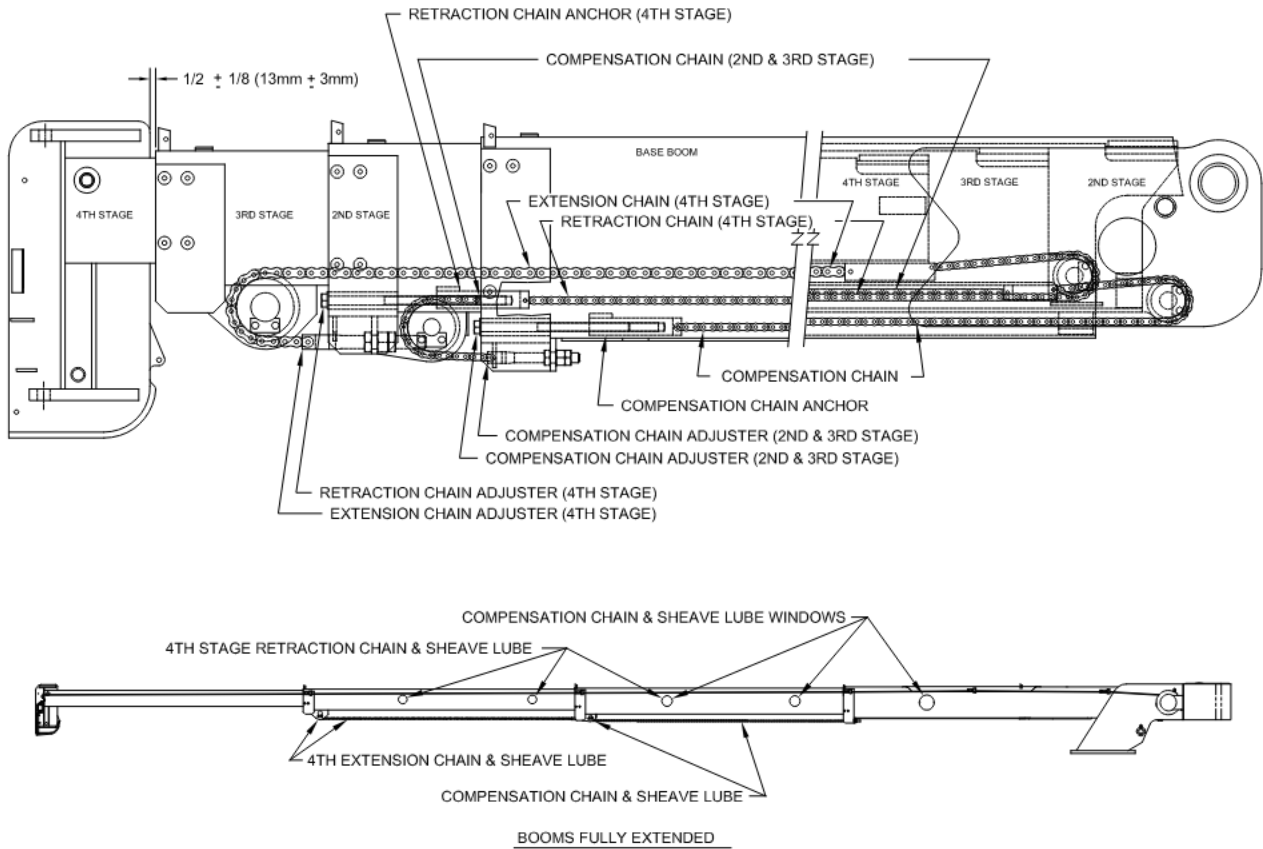
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TPF - ATF Type F
 2-X - AMOVIS #2-x
 424 - Mobil Fluid 424 or Equivalent
 DTE - Mobil DTE 10, Excel 15 or Equivalent
 (Do Not Use Brake Fluid)
 EO - Engine Oil - See Specs in Engine Manual

HO - Hydraulic Fluid - See Specs in Hyd. Sec.
 MPG - Multi-Purpose Gun Grease
 MPL - Multi-Purpose Gear Lube, SAE 80W-90
 OGG - Open Gear Grease, Such as Mobilkote S
 OGG - Silicone Lube, Aerosol with Concentrating Tube
 WGO - Worm Gear Oil, Exxon Cylsstic TK460



Lubricate inner chains and chain sheaves through windows with boom fully extended and set horizontally. There are grease fittings on chain sheave shafts both inside and outside the boom. Reach in through boom windows with a long tipped oil can and spray chains generously and grease sheave fittings. Do not attempt to grease chain shafts or oil chains inside boom with engine running as boom may move while your hands are inside.



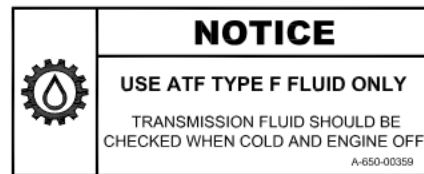
Greasing the Turntable Bearing

There is one grease zerk in a hole on the right-hand side of the turntable base plate. This should be used to lubricate the bearing every 50 hours. Rotate the turntable about 45 degrees and pump some grease into the zerk. Repeat until the turntable has rotated 2 revolutions. Use about 8 ounces (230 cc) of grease each time the bearing is lubricated.

Lubricate the gear teeth of the rotation bearing at the 50 hour interval. Remove the pinion cover. Brush open gear grease, such as Mobilkote-S, on the teeth on each side of the pinion at four places around the bearing. Rotate the boom several times and check the coverage of the grease on all of the teeth. Also, lubricate the pinion bearings at the zerk below the pinion teeth. Replace the pinion cover.

Checking the Transmission Fluid

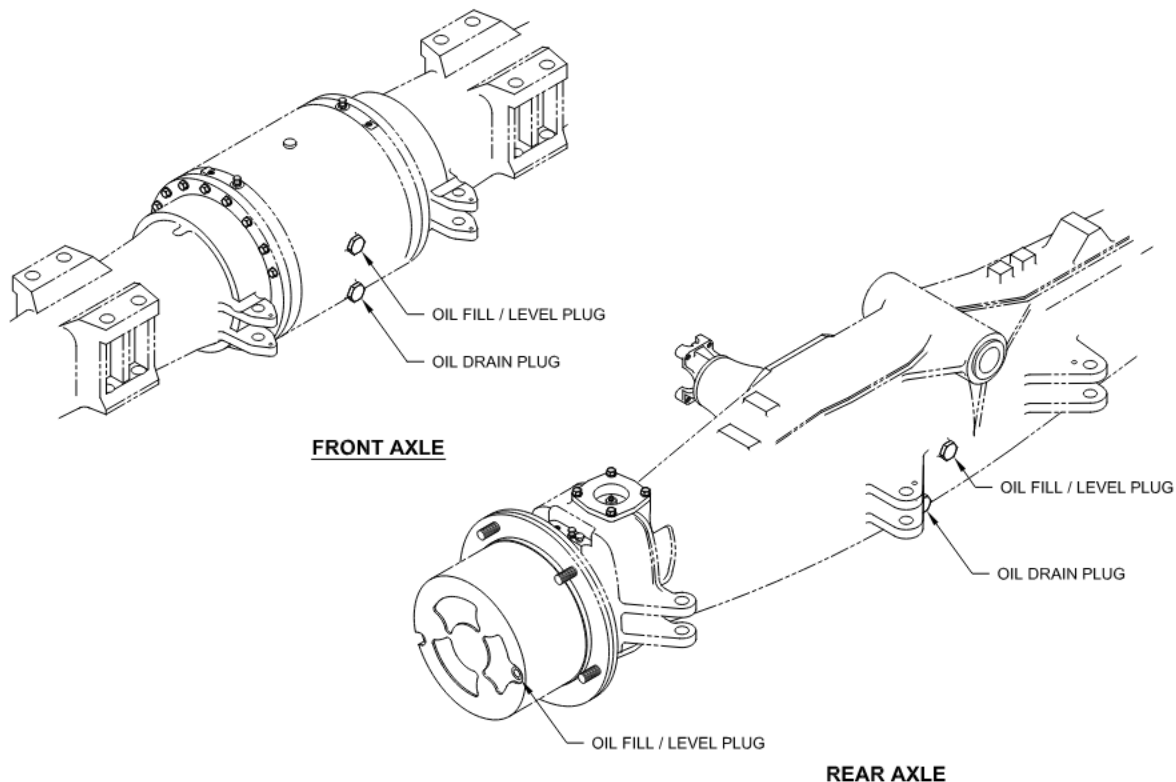
Check the transmission fluid with the dipstick and add fluid through the dipstick tube as required. Use Mobil ATF Type F or equivalent. Transmission factory service manuals are available from Broderson. Order BMC Part Number 990-00021.



Maintaining Lubricant Levels

Maintain lubricant to levels shown here with Mobil 424 or equivalent. Axle factory service manuals are available from Broderson. Order BMC Part No. 990-00020.

*No lubricant is required in the center section of the 2WD rear axle.





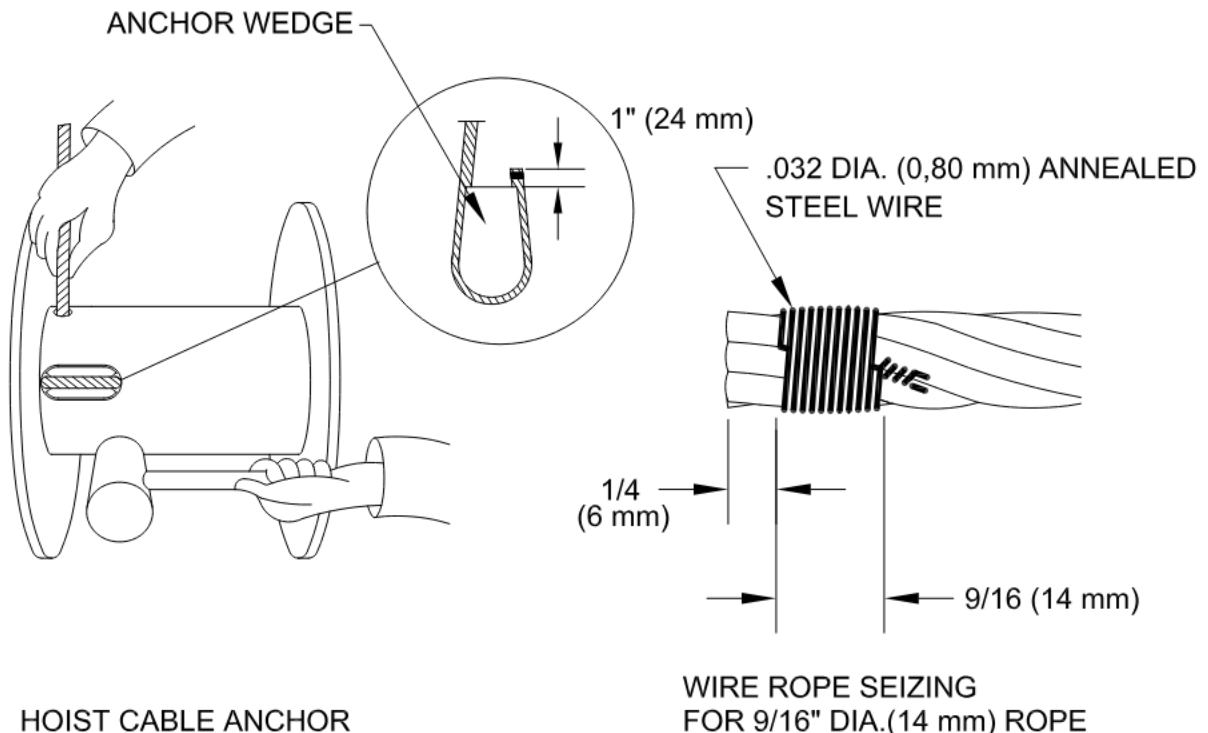
The wire rope should be cleaned and lubricated every 50 hours of normal operation and more frequently when used in dirty or corrosive environments. Whenever the rope is dirty or dry, it should be serviced. The rope should be cleaned with solvent and compressed air or solvent and rags. A wire brush may be used for difficult areas.

The recommended lubricant is AMOVIS #2-X. It should be sprayed or dripped onto the rope where it is bent as it passes over the tip sheave. Wrap rags around the wire rope behind the sheave and swab the excess oil that is carried along on the rope. Always wear heavy leather gloves when handling wire rope.



The following steps will assure that the wire rope winds smoothly and evenly on the hoist and will yield greater safety and longer cable life:

1. If the cable needs to be replaced use $\frac{1}{2}$ diameter (12.7 mm) 6X 25-EIP-RRL-IWRC wire rope, minimum breaking force 26,600 lbs (117 kn).
2. If possible, the cable should be rolled off a storage spool and straightened out on the ground in line with the boom. If the ground is not clean or the space is too limited, the cable can be wound directly from the storage spool onto the hoist, but the spool must rotate in the same direction as the hoist.
3. Check the seizings on the ends of the cable and replace them if they are missing or damaged.
4. Install the cable over the boom tip sheave and route it through the cable retainer loops to the hoist drum.



5. Position the hoist drum with the cable anchor on top.

6. Insert the cable through the anchor slot and wrap it around the anchor wedge. The end of the cable should extend past the wedge by about one inch (24 mm).
7. Slide the cable and wedge into the drum socket and pull firmly on the free end of the cable to set the wedge. Seat the wedge securely with a brass or rawhide mallet.
8. Slowly rotate the hoist while applying tension on the cable in front of the boom. Wear heavy leather gloves and wrap rags around the cable to wipe off any dirt from the cable. Keep hands away from the sheaves and hoist drum while the cable is moving.
9. After two turns of the hoist drum, stop the hoist and push the cable into the drum groove if it has come out.
10. Slowly rotate the drum until the first layer of cable is on the drum. If any gaps between the rope appear, back up the hoist and rewind. There must be no gaps.
11. After the first layer is on the drum, the hoist may be turned a little faster until the remainder of the cable is installed.
12. Leave about 30 feet (9 m) of cable on the ground to install the sheave block. See the Operation Section for instructions on reeving and wedge socket attachment.
13. Install the cable retainer pins and cotters in the tip sheave plates.
14. For the cable preloading, extend the outriggers and attach a load of about 2000 pounds (900 kg). Extend the boom fully. Position the load at a 10-foot (3 m) load radius over the right-hand side of the crane. Hoist and lower the load three times and check winding of the rope on the hoist.
15. Attach about 5000 pounds (2300 kg) and repeat. Be sure that the cable winds evenly on the hoist.
16. If the cable appears to twist too much, remove the sheave block and rewind the cable on the drum as in Steps 7-11.
17. Never lift more than the rated load on the Capacity Chart for the parts of line and type of wire rope being used.
18. Lubricate the cable as recommended in the "Wire Rope Lubrication" section. Inspect, maintain and replace the cable in accordance with ANSI B30.5-1982, Section 5-2.4.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■

The IC-200 hydraulic system consists of 2 subsystems, driven by a double pump with a single inlet port. The 29 GPM (110 L/min) vane pump supplies the hydrostatic steering function and the boom and outrigger functions. The hoist and brake booster are powered by the 34 GPM (129 L/min) vane pump.

The boom, outriggers, hoist and optional front winch are controlled by one valve assembly. The 29 GPM (110 L/min) pump flow enters the steering flow control valve first and then flows into the left-hand section of the control valve assembly supplying the swing, telescope, boom and outrigger sections. The flow from the 32 GPM (129 L/min) pump enters the brake booster flow control valve first and all but 4 GPM (15 L/min) is directed to the inlet section to the left of the hoist valve. Adjustment procedures for the crane hydraulic functions are given on page 3-21 through 3-23. The schematic of the hydraulic system is shown on the next page.

■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■

The steering system is shown in the schematic on the next page. The IC-200 steering system is a load-sensing, demand-type system that takes only as much flow as is needed when steering and directs the excess flow to the control valve for boom and outrigger functions. The priority flow-control valve is in the line between the 29 GPM (110 L/min) pump section and control valve.

Oil from the 29 GPM (110 L/min) section of the pump goes into the priority valve at port "P." When no steering is required, the entire flow goes through the priority valve and leaves through port "EF" to the crane valve. The crane operating speed is not affected, since there is no loss of volume passing through the priority valve.

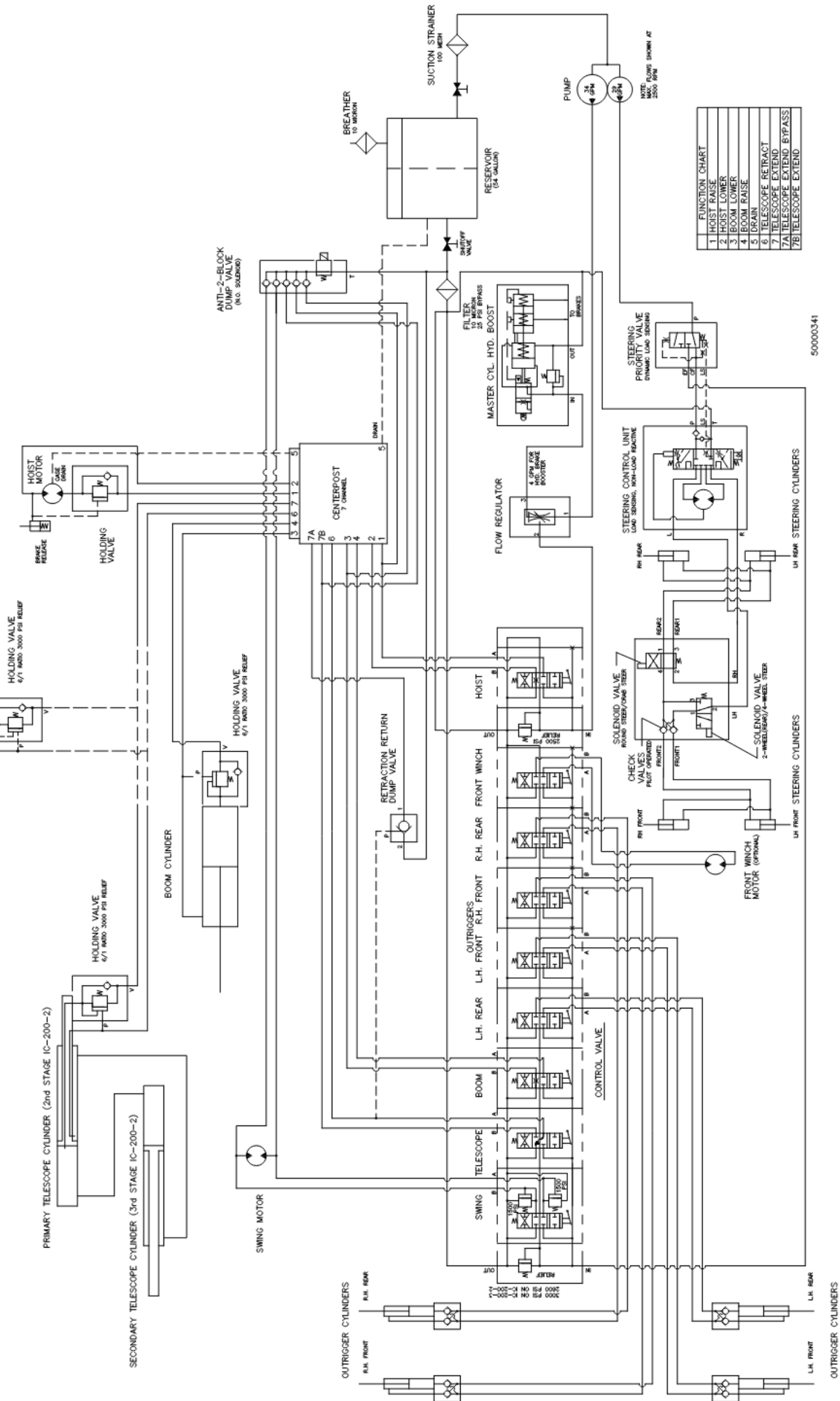
When the steering wheel is turned, the load-sensing line signals the priority valve to divert the required amount of oil to the steering control unit to meet the steering system requirements. The excess oil, not required for steering, flows to the crane control valve as usual. Since the amount of oil required for steering is usually a small portion of the pump output, the crane control valve is always operational while the unit is being steered. Crane operation speed is reduced such a slight amount it is usually not noticed.

The steering control unit is non-load reactive. This means that bumps, curbs, and obstacles cannot change the steering angle and are not felt in the steering wheel. It also means that the wheels do not recenter when the steering wheel is released. The steering wheel must be turned back to center at the end of a turn. The steering system pressure was set at 1800 PSI (124 bar) at the factory, and this should not need adjustment.

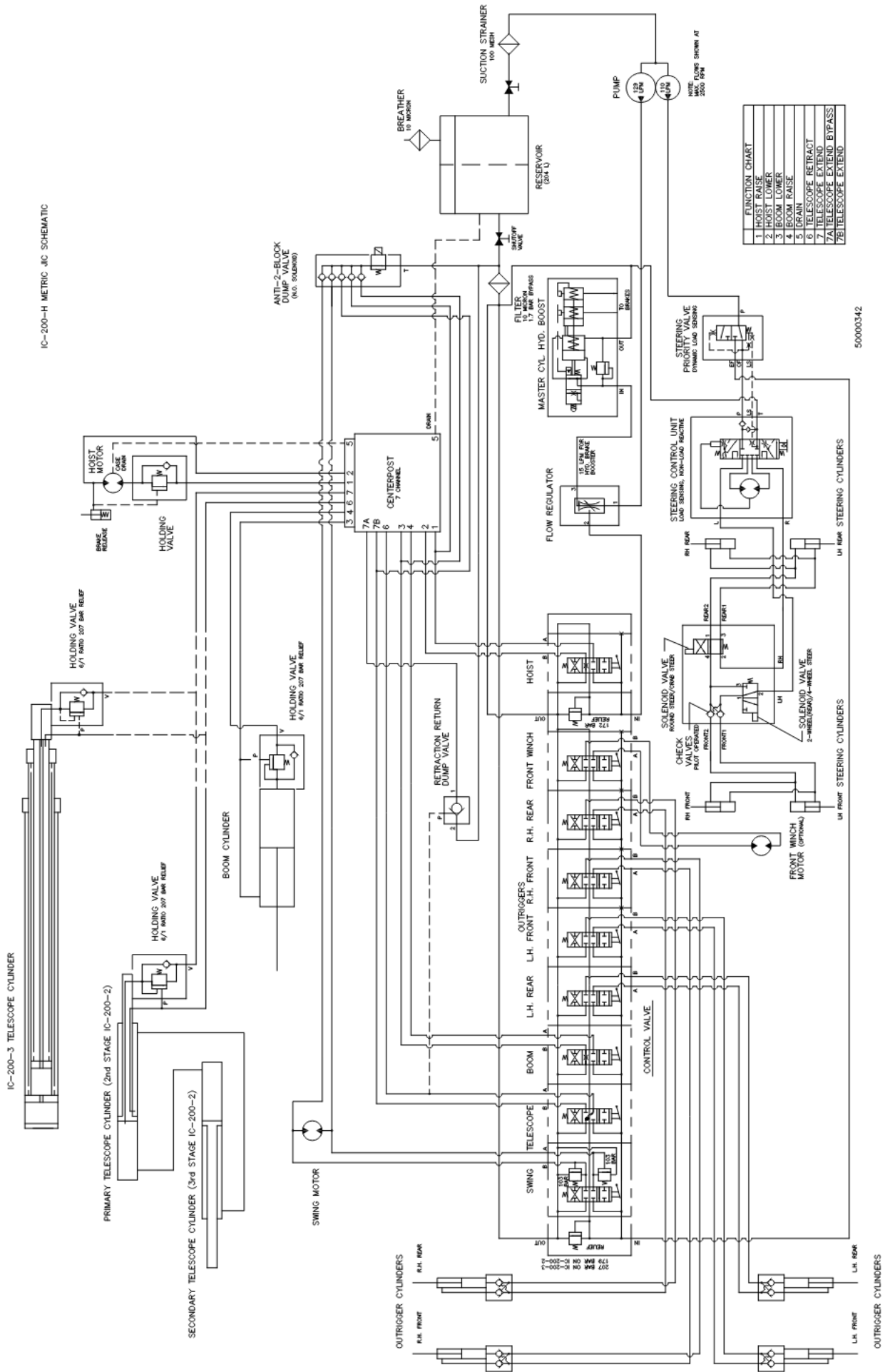
The three steering modes are selected by a switch on the dashboard, which activates the automatic alignment system. Electronic proximity sensors and logic controls delay the switching of the steering mode until the wheels are centered. The proximity sensors should be cleaned periodically with a rag to prevent dirt buildup from blocking their operation.

IC-200-3 TELESCOPE CYLINDER

IC-200-H JIC SCHEMATIC



IC-200-H METRIC JIC SCHEMATIC





The hydraulic system contains many highly pressurized, precision components. To protect these, it is very important to keep the hydraulic oil clean, at proper temperature, within the oil specification and to the proper fill level.

The IC-200 is equipped with a 100-mesh suction strainer, a breather filter, a 10-micron return-line filter and a 54-gallon (204 L) tank. The filter must be changed whenever the filter indicator gauge under the control panel points to the red sector at full engine speed or at 500 hours or six months maximum. Note: The oil should be warmed by at least 15 minutes of normal operation to get a good reading. The indicator should be checked daily.

The filter is located to the rear of the front axle. Clean the filter and the surrounding parts with pressure washer before changing, to prevent dirt from getting into the clean oil tube. To minimize oil loss, close the shutoff valves under the tank.



Remove the filter element and catch the hydraulic oil in a clean container. Pour the remaining oil out of the old element into the clean container and inspect the oil for water and excessive contaminants. If water is found, the oil should be changed in the reservoir and purged out of the cylinders. If excessive particles are found, the source should be located and fixed, and the oil should be purged.

Lubricate the new element seal and install the new element. Open the shutoff valves. Run the engine and check for any leaking around the seal.

The hydraulic oil should be changed every 1000 hours or once a year, whichever is sooner. Wash the oil tank and filters before changing the oil. Retract the telescope, boom and outrigger cylinders. Leave the shutoff valves open and remove the drain plug. Catch the oil and dispose of it properly. Remove the breather from the top of the tank and clean the element with solvent and compressed air. Clean out the tank with solvent and compressed air.

The suction strainer is located under the hydraulic tank and has a reusable element. To service, remove the four bolts holding the two parts of the housing together. Remove the element from the housing by turning the element counter-clockwise. Wash the element in clean solvent and allow to dry. Reassemble the strainer.

Replace the filter as described previously and refill the tank with new hydraulic oil that meets the specifications in the table below. Start the engine and run it at low idle for 15 minutes to filter the new oil. Then cycle all of the hydraulic cylinders at low idle and low pressure. Add hydraulic oil to the dipstick full mark, if necessary, with cylinders retracted.

RECOMMENDED OILS

AMBIENT TEMP RANGE:	-40° to 75°F (-40° to 24°C)	-15° to 110°F (-26° to 43°C)	50° to 130°F (10° to 54°C)
POUR POINT:	-40°F MAX (-40°C)	-15°F MAX (-26°C)	0°F MAX (-18°C)
VISCOSITY INDEX:	140 MIN	95 to 100	95 to 100
VISC. SSU @ 100°F (38°C):	200 MAX	230 MAX	340 MAX
SSU @ 210°F (100°C):	44 MIN	47 MIN	53 MIN
EXAMPLES:	MOBIL DTE-13 MOBIL UNIV.-ATF TEXAMATIC TYPE F TEXACO HD 46	MOBIL AW-46 MOBIL DTE-25 CONOCO SUPER 46 TEXACO HD 68	MOBIL AW-68 MOBIL DTE-26 CONOCO SUPER 68

OTHER REQUIREMENTS: Must contain rust and oxidation inhibitor, and antifoam and antiwear agents. Must pass Vickers Vane Pump Test.

The IC-200 is factory filled with hydraulic oil for the -15° to 110°F (-26° to 43°C) range. If significant portions of time are spent operating below 20°F (-7°C) or above 100°F (43°C), the oil should be replaced with an extreme temperature oil.

The oils shown are compatible with and may be combined with SAE 10W or SAE 20W-20 motor oil if it is necessary to add oil between changes and the recommended oils are not available. These motor oils are not suitable substitutes when changing hydraulic oil because they lack certain additives that are needed for hydraulic system use.

OPERATION

Before starting the machine, check the oil level. If the oil level is low, add the recommended oil. If the oil level is high, remove the excess oil. After starting the machine, check the oil level again. If the oil level is low, add the recommended oil. If the oil level is high, remove the excess oil. After operating the machine for a short time, check the oil temperature. If the oil temperature is too high, stop the machine and allow the oil to cool. If the oil temperature is too low, warm the machine up before attempting hard work.

TROUBLESHOOTING

If the machine is not operating properly, check the following: 1. Oil level: Is the oil level correct? 2. Oil temperature: Is the oil temperature within the recommended range? 3. Oil type: Is the oil the recommended type? 4. Filter: Is the filter clean? 5. Hoses: Are the hoses connected properly? 6. Valves: Are the valves operating correctly? 7. Pumps: Are the pumps working properly? 8. Seals: Are the seals in good condition? 9. Wear: Are there any signs of wear on the machine parts? 10. Safety: Are all safety features working properly?

Observe the operation of the machine. If the oil is too cold, the machine will be sluggish and should be warmed up further to prevent damage before sustained hard work is attempted. If the oil is too hot, leakage will increase, pump efficiency will go down, and moving parts will not be properly lubricated. If operating temperature is excessive, rapid deterioration of the oil will result and moving parts and seals will wear more quickly. The cause of the excess heat should be determined and corrected. A possible indication of excessive oil temperature is a control valve lever that becomes hard to operate or sticks instead of returning to neutral.

To remove air from hydraulic circuits, perform the following steps:

1. Ensure all main shutoff valves on the reservoir are open.
2. Start the engine.
3. Raise and lower the boom minimum five times. Ensure that the cylinder travels full stroke.
4. With the boom retracted and elevated to at least 65°, raise and lower the hook at least once.
5. Extend and retract the boom minimum five times.
6. Swing the turret left one full revolution. Swing the turret right one full revolution.
7. Extend and retract each outrigger minimum five times. Outriggers can be operated in pairs.
8. With the crane on outriggers, steer the crane wheels fully left and right three times in each steering mode.
9. BMC uses multiple types of RCL computer. If the RCL computer is connected to the topping cylinder by hose, it may be necessary to bleed this hose. Perform the following:
 - a. Raise the boom to approximately 5°.
 - b. Turn off engine.

BLEEDING THE HOSE

- c. The boom  lower during this procedure. Ensure no personnel are in potential pinch points, especially around the topping cylinder and between turret side plates. Ensure that the boom is free of obstructions. Ensure that the hook will not hit the ground and foul the hoist line.
 - d. Find the small hose that connects to the piston side of the cylinder, and follow it back to the RCL computer. Find the hose that connects to the rod side of the cylinder, and follow it back to the computer.
 - e. Loosen the piston-side fitting at the computer until the boom begins to lower. Allow the boom to lower 1-2 degrees, or until no more air appears to be leaking out. Then re-tighten the fitting. Use a bucket or other means to catch as much oil as possible. If little or no air is present in the line, the boom may not visibly lower before the line is purged.
 - f. Loosen the rod-side fitting at the computer. The boom should not move.
 - g. Start the engine.
 - h. SLOWLY lower the boom until no more air is leaking out of the rod-side fitting. Oil may come out of the fitting before the boom begins to move. Use a bucket or other means to catch as much oil as possible.
 - i. Re-tighten the rod-side fitting.
 - j. Turn off the engine.
10. Check the level of oil in the hydraulic reservoir and add more if necessary.
11. Set the crane on outriggers. With the boom about halfway extended and about 45° elevated, lift a load near maximum capacity using the hoist. Raise the boom an additional 10-15°. Extend the boom. Check for "spongy" operation.
12. If necessary, cycle functions again to remove remaining air.

HYDRAULIC SYSTEM

LEAKS

Leaks in hydraulic systems are a common problem. They can be caused by a variety of factors, including worn seals, loose fittings, or damaged hoses. If you notice a leak, stop the machine immediately and check the hydraulic system. If you find a leak, tighten the fitting or replace the seal or hose. If the leak is not stopped, contact a qualified technician for assistance.

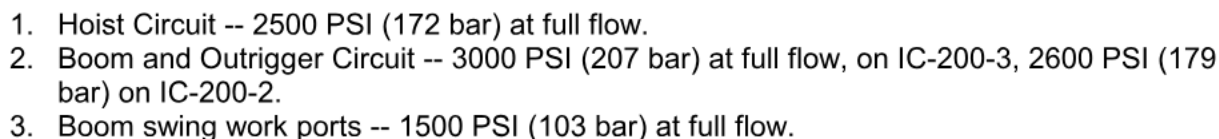
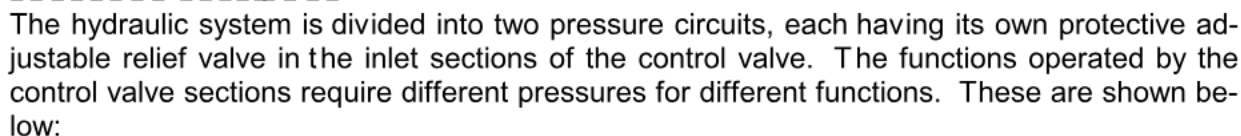
All hydraulic fittings and hose connections should be kept tight to prevent loss of fluid from the system and unnecessary dripping from the machine. Most hydraulic fittings on the IC-200 crane use o-ring seals, and if tightening the fitting fails to stop the leak, the o-ring should be replaced.

Notes:

1. When installing an o-ring fitting with an adjustable nut and washer, be sure to back off the nut, washer and o-ring as far as possible before threading the fitting into the port. Then turn the fitting into the port as far as possible with fingers and turn it backward until it is oriented properly. Torque the nut with a wrench, while holding the fitting with a wrench.
2. Lubricate all seals before assembling.
3. Take care not to over tighten pipe threads.
4. Do not use Teflon tape to seal pipe threads. Loctite-type (anaerobic) sealant is preferred.

Leaks in component parts, such as pumps, valves and motors, that cannot be stopped by tightening bolts, can usually be stopped by replacing the seals in the component. Seal and packing replacement is the only maintenance which owners should attempt on component parts, unless they have a well-equipped shop with mechanics trained in hydraulic component overhaul.

Leakage in the pump suction line may not cause oil to appear externally, but may allow air to enter the line during operation. The air entrained in the oil will cause pumps to be noisy, and if allowed to continue, can damage the pump. If a pump becomes noisy, immediately check the fluid level in the reservoir and be sure all suction fittings are tight. If noise continues, squirt hydraulic fluid on the suction connections. Listen for a change in the noise and watch for oil being sucked into a small opening in the connection. When the reservoir is full, the shutoff valve is open and all suction connections are tight, most pump noises will disappear. If they do not, a worn or faulty pump is indicated. On a routine basis, all hoses should be checked for wear, deterioration, and physical damage. Defective hoses should be replaced for maximum economy for the user.



1 2 3 4 5 6 7 8 9 10

1. Broken mechanical connection to the pump shaft.
2. Low oil level in the reservoir.
3. Clogged suction filter or shutoff valve not fully opened.
4. Valve spool linkage not allowing control valve to fully open. Valve spool should move 3/8" (9.5 mm) each way from neutral position.
5. Anti-two-block system malfunction.
6. Adjust relief valve by loosening nut on top of relief cartridge above winch gauge port and turning socket-head screw clockwise to increase pressure or counter-clockwise to lower pressure.
7. Foreign particle in pilot operated relief.
8. Worn or defective hydraulic pump.

BOOM CONTROL SECTION RELIEF VALVE PRESSURE

The relief valve pressure setting at the inlet for boom control sections is 2600 PSI (179 bar) for IC-200-1 & 2, 3000 PSI (207 bar) for IC-200-3. This pressure is required for all but the swing control section. Two work port relief valves are installed in the swing section. These relief valves are set at 1500 PSI (103 bar).

The relief pressure at the inlet end of the valve can be adjusted with a wrench and an allen wrench. Loosen the nut and tighten the threaded stem with an allen wrench to increase pressure, and loosen the stem to decrease pressure. Lock in place with the nut. Actuate the BOOM LOWER or TELESCOPE RETRACT function with the cylinder fully retracted when making this adjustment.

While the pressure gauge is attached, the swing function may be checked by capping the two work ports of the swing section and actuating the swing control lever in each direction. If these pressures are improper, the work port relief valve can be removed and shims added or removed as needed. Part numbers for the work port relief valves and shims are listed below:

9-340-00070	Work Port Relief Valve-Gresen #7460-002 PS 1500 C
9-340-00032	Shim -- .010" -- Gresen #0462-001
9-340-00031	Shim -- .020" -- Gresen #0459-001
9-340-00030	Shim -- .040" -- Gresen #0458-001

(Pressure is changed approximately 100 to 125 PSI (7 to 9 bar) for each .010" shim).

BOOM LIFT CYLINDER HOLDING VALVE

A holding valve is directly connected to the base of the boom lift cylinder barrel and to the base of the primary telescope cylinder rod. These valves are designed to hold the boom in position should loss of power or pressure line failure occur.

To check the boom lift cylinder holding valve, set the outriggers, place the boom in the horizontal position over the front of the crane and raise rated load about six inches (15 cm) above the ground using the boom lift cylinder (not the hoist). The best load for this test is the rated load at the 16 foot (5.0 m) load radius with outriggers extended and the boom over the front. Turn the engine off and move the BOOM lever to the LOWER position. If the boom moves down, adjust the holding valve.

ADJUSTING THE HOLDING VALVE

Loosen the jam nuts on the adjusting screw and tighten the screw until unpowered boom movement stops. Retighten the jam nuts. If adjusting the valve does not help, the cylinder may have internal leakage or the valve may be malfunctioning.

A holding valve is directly connected to the base of the primary telescope cylinder rod. The valve is designed to hold the boom in position should loss of power or pressure line failure occur.

Turn the engine off and pull the TELESCOPE lever to the RETRACT position. If the boom retracts, the valve should be adjusted.

000

Retract boom completely. The 4th stage extension and retraction chains set the position of the 4th stage relative to the 3rd stage. As shown in Illustration 1,  (13 mm) clearance must be held between the 4th stage tip and 3rd stage tip. To increase this distance, loosen the retraction adjustment and tighten the extension adjustment. To decrease this distance, loosen the extension adjustment and tighten the retraction adjustment.

The numbers “3” shown in the small windows on the bottom of the 2nd stage and base boom show the adjustment is about midrange. These numbers run from 1 to 6 (25 to 150 mm) in 1” (25 mm) increments. Numbers in these windows are approximate adjustment and cannot be used for final adjustment. Important are the dimensions stated above taken at the large side windows.

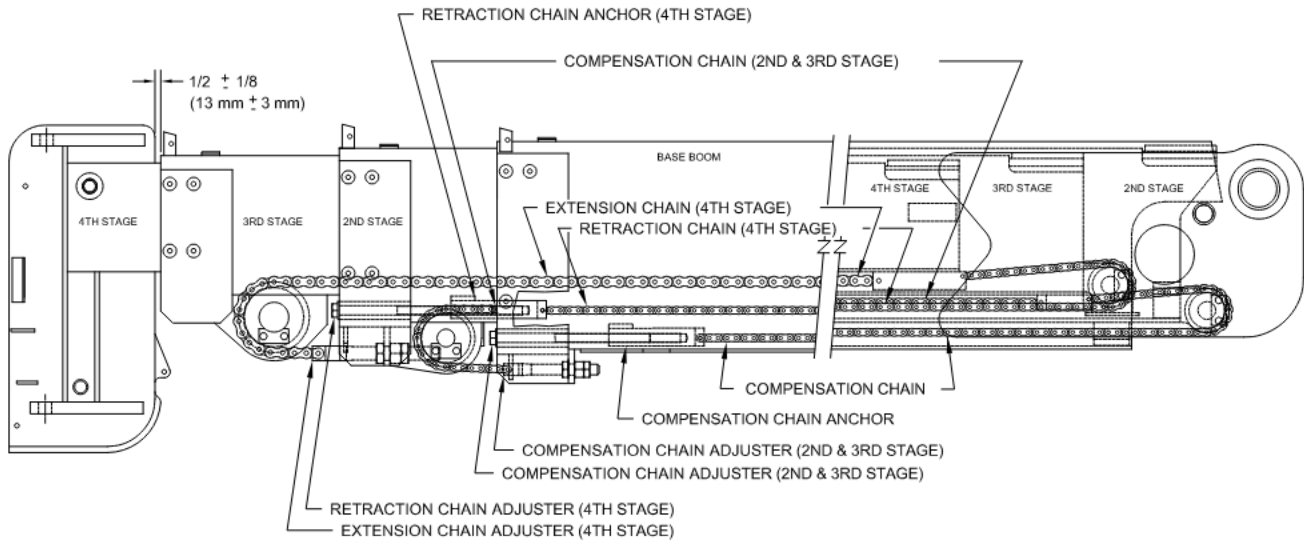
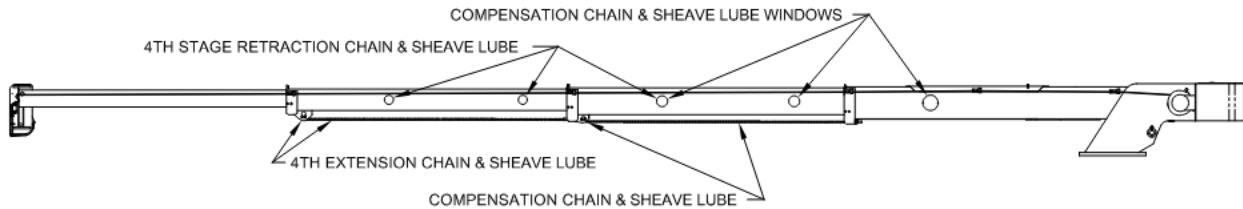


ILLUSTRATION 1



BOOMS FULLY EXTENDED

ILLUSTRATION 2

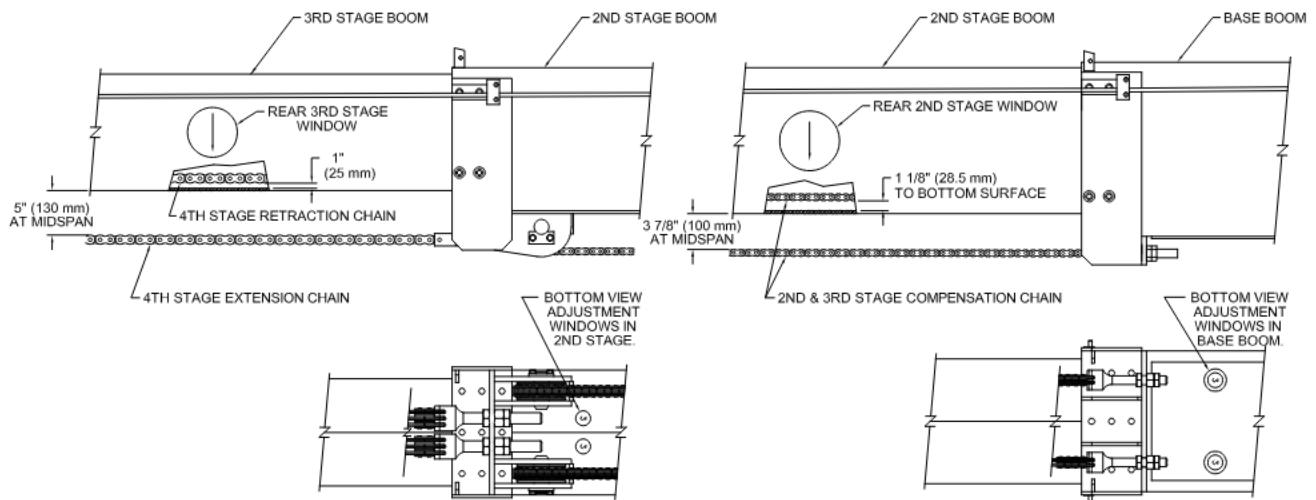


ILLUSTRATION 3



Refer to the engine manual for engine maintenance.



Gas or Dual Fuel Engine:

Clean out the dust cup every 50 hours. Loosen the clamps around the cup and housing and remove the cup. Dump dust out of cup. Clean gasket and sealing surfaces with a damp cloth. Replace cup gasket if it shows signs of damage. Replace cup with arrows pointing up and tighten clamp.

Clean the intake cap screen every 50 hours, and perform a thorough inspection of the air intake pipes and joints.

Clean the filter element every 250 hours or every 3 months, whichever comes sooner and replace the element every 500 hours or 6 months. Remove and clean the dust cup and gasket, and the intake cap. Remove the wing nut on the element and gently remove the element. Bumping the element during removal may cause dirt to fall into the clean air tube. Clean the inside of the housing carefully with a damp cloth. To clean the element, use a compressed air blower nozzle with less than 100 PSI and blow air from the inside of the element. Shake dust off of the outside of the element. Make sure the gaskets and element fit properly and reassemble, being careful not to allow any dust into the intake pipe.

Do not remove an element just for inspection. This may do more harm than good. You cannot judge the element condition by its appearance. If you think the filter may need service, remove it and replace or clean it before reassembling air cleaner.

Conditions where more dirt than usual is in the air, especially soot, will make more frequent service necessary. If there is a significant amount of dust in the dust cup when it is cleaned every 50 hours, clean the element every 100 hours and replace it every 200 hours--or more frequently in extremely dusty conditions. Excessive exhaust smoke or loss of power may indicate a plugged filter.

Diesel Engine:

Check the air filter restriction indicator daily with the engine running. If the indicator is in the "Replace" zone, replace the primary and secondary filter. If the filter has not been changed for over 1000 hours, replace the filter regardless of the restriction indicator reading.

4. Push down hard on the foot brake pedal.
5. Select forward gear.
6. Move the park brake lever fractionally downward, just over center, slightly releasing it. Hold park brake lever switch in the off position (located in the lever bracket).
7. Slowly release the foot brake pedal.
8. If the machine has not moved, use maximum engine speed. The machine should not move.
9. Do not do this test for longer than 30 seconds.
10. Reduce engine speed to an idle.
11. Return the park brake lever to the fully ON position from its partially applied position. Place transmission in neutral.
12. If the machine moved during the test, adjust the parking brake by checking the clearance between the park brake pad and brake disc. Maximum clearance is .010" (0.254 mm) with park brake lever in the OFF position, and repeat the test.



BOLT GRADE	SAE GRADE 1 OR 2	SAE GRADE 5	SAE GRADE 8
MARKING			
MATERIAL	LOW CARBON	MEDIUM CARBON STEEL Q & T	MEDIUM CARBON ALLOY STEEL Q & T
MINIMUM TENSILE STRENGTH	64,000 PSI (441 MPa)	120,000 PSI (827 MPa)	150,000 PSI (1034 MPa)
BOLT SIZE	RECOMMENDED TORQUE VALUES FT-LBS (N·m)		
1/4	5 (6.7)	7 (9.5)	10.5 (14)
5/16	9 (12)	14 (19)	22 (30)
3/8	15 (20)	25 (34)	37 (50)
7/16	24 (32)	40 (54)	60 (81)
1/2	37 (50)	60 (81)	92 (125)
9/16	53 (72)	88 (119)	132 (179)
5/8	74 (100)	120 (163)	180 (244)
3/4	120 (163)	200 (271)	296 (401)
7/8	190 (258)	302 (409)	473 (641)
1	282 (382)	466 (632)	714 (968)



THE FOLLOWING RULES APPLY TO THE CHART:

1. Consult manufacturers' specific recommendations when available.
2. The chart may be used with coarse and fine thread fasteners lightly lubricated.
3. Increase torque by 20% when multiple tooth (shakeproof) lockwashers are used.
4. The torque values are given in foot-pounds (N·m).
5. Inch-pounds equivalent may be obtained by multiplying by 12.

