#### 1. STRUCTURE

This service manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This service manual mainly contains the necessary technical information for operations performed in a service workshop.

For ease of understanding, the manual is divided into the following sections.

#### Structure and function

This group explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

#### Operational checks and troubleshooting

This group explains the system operational checks and troubleshooting charts correlating problem to remedy.

#### Tests and adjustments

This group explains checks to be amide before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs.

# Disassembly and assembly

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your Hyundai distributor for the latest information.

#### 2. HOW TO READ THE SERVICE MANUAL

# Distribution and updating

Any additions, amendments or other changes will be sent to Hyundai distributors.

Get the most up-to-date information before you start any work.

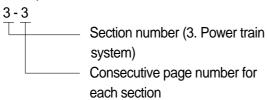
#### Filing method

1. See the page number on the bottom of the page.

File the pages in correct order.

2. Following examples shows how to read the page number.

Example 1



3. Additional pages: Additional pages are indicated by a hyphen(-) and number after the page number. File as in the example.

# Revised edition mark(1)(2)(3)···)

When a manual is revised, an edition mark is recorded on the bottom outside corner of the pages.

#### Revisions

Revised pages are shown at the **list of revised pages** on the between the contents page and section 1 page.

# **Symbols**

So that the service manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

| Symbol | Item    | Remarks   |
|--------|---------|---|
| Λ      | Safety  | Special safety precautions are necessary when performing the work.  |
| **     | Caloty  | Extra special safety precautions are necessary when performing the work because it is under internal pressure.      |
| *      | Caution | Special technical precautions or other precautions for preserving standards are necessary when performing the work. |

#### 3. CONVERSION TABLE

Method of using the Conversion Table.

The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

#### **Example**

- 1. Method of using the Conversion Table to convert from millimeters to inches. Convert 55mm into inches.
  - (1) Locate the number 50 in the vertical column at the left side, take this as ⓐ, then draw a horizontal line from ⓐ.
  - (2) Locate the number 5 in the row across the top, take this as ⓑ, then draw a perpendicular line down from ⓑ.
  - (3) Take the point where the two lines cross as ©. This point © gives the value when converting from millimeters to inches. Therefore, 55mm = 2.165 inches.
- 2. Convert 550mm into inches.
  - (1) The number 550 does not appear in the table, so divide by 10(Move the decimal point one place to the left) to convert it to 55mm.
  - (2) Carry out the same procedure as above to convert 55mm to 2.165 inches.
  - (3) The original value(550mm) was divided by 10, so multiply 2.165 inches by 10(Move the decimal point one place to the right) to return to the original value.

    This gives 550mm = 21.65 inches.

|      | Millimete | rs to inche | es    |       |       |       | <b>b</b> | 1mm = 0.03937 in |       |       |       |
|------|-----------|-------------|-------|-------|-------|-------|----------|------------------|-------|-------|-------|
|      |           | 0           | 1     | 2     | 3     | 4     | 5        | 6                | 7     | 8     | 9     |
|      | 0         |             | 0.039 | 0.079 | 0.118 | 0.157 | 0.197    | 0.236            | 0.276 | 0.315 | 0.354 |
|      | 10        | 0.394       | 0.433 | 0.472 | 0.512 | 0.551 | 0.591    | 0.630            | 0.669 | 0.709 | 0.748 |
|      | 20        | 0.787       | 0.827 | 0.866 | 0.906 | 0.945 | 0.984    | 1.024            | 1.063 | 1.102 | 1.142 |
|      | 30        | 1.181       | 1.220 | 1.260 | 1.299 | 1.339 | 1.378    | 1.417            | 1.457 | 1.496 | 1.536 |
|      | 40        | 1.575       | 1.614 | 1.654 | 1.693 | 1.732 | 1.772    | 1.811            | 1.850 | 1.890 | 1.929 |
|      |           |             |       |       |       |       | ©        |                  |       |       |       |
| (a). | 50        | 1.969       | 2.008 | 2.047 | 2.087 | 2.126 | 2.165    | 2.205            | 2.244 | 2.283 | 2.323 |
| )    | 60        | 2.362       | 2.402 | 2.441 | 2.480 | 2.520 | 2.559    | 2.598            | 2.638 | 2.677 | 2.717 |
|      | 70        | 2.756       | 2.795 | 2.835 | 2.874 | 2.913 | 2.953    | 2.992            | 3.032 | 3.071 | 3.110 |
|      | 80        | 3.150       | 3.189 | 3.228 | 3.268 | 3.307 | 3.346    | 3.386            | 3.425 | 3.465 | 3.504 |
|      | 90        | 3.543       | 3.583 | 3.622 | 3.661 | 3.701 | 3.740    | 3.780            | 3.819 | 3.858 | 3.898 |

Millimeters to Inches 1mm = 0.03937in

|    | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0  |       | 0.039 | 0.079 | 0.118 | 0.157 | 0.197 | 0.236 | 0.276 | 0.315 | 0.354 |
| 10 | 0.394 | 0.433 | 0.472 | 0.512 | 0.551 | 0.591 | 0.630 | 0.669 | 0.709 | 0.748 |
| 20 | 0.787 | 0.827 | 0.866 | 0.906 | 0.945 | 0.984 | 1.024 | 1.063 | 1.102 | 1.142 |
| 30 | 1.181 | 1.220 | 1.260 | 1.299 | 1.339 | 1.378 | 1.417 | 1.457 | 1.496 | 1.536 |
| 40 | 1.575 | 1.614 | 1.654 | 1.693 | 1.732 | 1.772 | 1.811 | 1.850 | 1.890 | 1.929 |
|    |       |       |       |       |       |       |       |       |       |       |
| 50 | 1.969 | 2.008 | 2.047 | 2.087 | 2.126 | 2.165 | 2.205 | 2.244 | 2.283 | 2.323 |
| 60 | 2.362 | 2.402 | 2.441 | 2.480 | 2.520 | 2.559 | 2.598 | 2.638 | 2.677 | 2.717 |
| 70 | 2.756 | 2.795 | 2.835 | 2.874 | 2.913 | 2.953 | 2.992 | 3.032 | 3.071 | 3.110 |
| 80 | 3.150 | 3.189 | 3.228 | 3.268 | 3.307 | 3.346 | 3.386 | 3.425 | 3.465 | 3.504 |
| 90 | 3.543 | 3.583 | 3.622 | 3.661 | 3.701 | 3.740 | 3.780 | 3.819 | 3.858 | 3.898 |

Kilogram to Pound 1 kg = 2.2046 lb

|    | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0  |        | 2.20   | 4.41   | 6.61   | 8.82   | 11.02  | 13.23  | 15.43  | 17.64  | 19.84  |
| 10 | 22.05  | 24.25  | 26.46  | 28.66  | 30.86  | 33.07  | 35.27  | 37.48  | 39.68  | 41.89  |
| 20 | 44.09  | 46.30  | 48.50  | 50.71  | 51.91  | 55.12  | 57.32  | 59.5.  | 61.73  | 63.93  |
| 30 | 66.14  | 68.34  | 70.55  | 72.75  | 74.96  | 77.16  | 79.37  | 81.57  | 83.78  | 85.98  |
| 40 | 88.18  | 90.39  | 92.59  | 94.80  | 97.00  | 99.21  | 101.41 | 103.62 | 105.82 | 108.03 |
|    |        |        |        |        |        |        |        |        |        |        |
| 50 | 110.23 | 112.44 | 114.64 | 116.85 | 119.05 | 121.25 | 123.46 | 125.66 | 127.87 | 130.07 |
| 60 | 132.28 | 134.48 | 136.69 | 138.89 | 141.10 | 143.30 | 145.51 | 147.71 | 149.91 | 152.12 |
| 70 | 154.32 | 156.53 | 158.73 | 160.94 | 163.14 | 165.35 | 167.55 | 169.76 | 171.96 | 174.17 |
| 80 | 176.37 | 178.57 | 180.78 | 182.98 | 185.19 | 187.39 | 189.60 | 191.80 | 194.01 | 196.21 |
| 90 | 198.42 | 200.62 | 202.83 | 205.03 | 207.24 | 209.44 | 211.64 | 213.85 | 216.05 | 218.26 |

Liter to U.S. Gallon 1  $\iota$  = 0.2642 U.S.Gal

|    | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0  |        | 0.264  | 0.528  | 0.793  | 1.057  | 1.321  | 1.585  | 1.849  | 2.113  | 2.378  |
| 10 | 2.642  | 2.906  | 3.170  | 3.434  | 3.698  | 3.963  | 4.227  | 4.491  | 4.755  | 5.019  |
| 20 | 5.283  | 5.548  | 5.812  | 6.6076 | 6.340  | 6.604  | 6.869  | 7.133  | 7.397  | 7.661  |
| 30 | 7.925  | 8.189  | 8.454  | 8.718  | 8.982  | 9.246  | 9.510  | 9.774  | 10.039 | 10.303 |
| 40 | 10.567 | 10.831 | 11.095 | 11.359 | 11.624 | 11.888 | 12.152 | 12.416 | 12.680 | 12.944 |
|    |        |        |        |        |        |        |        |        |        |        |
| 50 | 13.209 | 13.473 | 13.737 | 14.001 | 14.265 | 14.529 | 14.795 | 15.058 | 15.322 | 15.586 |
| 60 | 15.850 | 16.115 | 16.379 | 16.643 | 16.907 | 17.171 | 17.435 | 17.700 | 17.964 | 18.228 |
| 70 | 18.492 | 18.756 | 19.020 | 19.285 | 19.549 | 19.813 | 20.077 | 20.341 | 20.605 | 20.870 |
| 80 | 21.134 | 21.398 | 21.662 | 21.926 | 22.190 | 22.455 | 22.719 | 22.983 | 23.247 | 23.511 |
| 90 | 23.775 | 24.040 | 24.304 | 24.568 | 24.832 | 25.096 | 25.631 | 25.625 | 25.889 | 26.153 |

Liter to U.K. Gallon 1  $\iota$  = 0.21997 U.K.Gal

|    | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0  |        | 0.220  | 0.440  | 0.660  | 0.880  | 1.100  | 1.320  | 1.540  | 1.760  | 1.980  |
| 10 | 2.200  | 2.420  | 2.640  | 2.860  | 3.080  | 3.300  | 3.520  | 3.740  | 3.950  | 4.179  |
| 20 | 4.399  | 4.619  | 4.839  | 5.059  | 5.279  | 5.499  | 5.719  | 5.939  | 6.159  | 6.379  |
| 30 | 6.599  | 6.819  | 7.039  | 7.259  | 7.479  | 7.969  | 7.919  | 8.139  | 8.359  | 8.579  |
| 40 | 8.799  | 9.019  | 9.239  | 9.459  | 9.679  | 9.899  | 10.119 | 10.339 | 10.559 | 10.778 |
|    |        |        |        |        |        |        |        |        |        |        |
| 50 | 10.998 | 11.281 | 11.438 | 11.658 | 11.878 | 12.098 | 12.318 | 12.528 | 12.758 | 12.978 |
| 60 | 13.198 | 13.418 | 13.638 | 13.858 | 14.078 | 14.298 | 14.518 | 14.738 | 14.958 | 15.178 |
| 70 | 15.398 | 15.618 | 15.838 | 16.058 | 16.278 | 16.498 | 16.718 | 16.938 | 17.158 | 17.378 |
| 80 | 17.598 | 17.818 | 18.037 | 18.257 | 18.477 | 18.697 | 18.917 | 19.137 | 19.357 | 19.577 |
| 90 | 19.797 | 20.017 | 20.237 | 20.457 | 20.677 | 20.897 | 21.117 | 21.337 | 21.557 | 21.777 |

 $kg \cdot m \text{ to } lb \cdot ft$   $1kg \cdot m = 7.233lb \cdot ft$ 

|     | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9       |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|     |        | '      | _      |        | •      |        |        | ,      |        |         |
|     |        | 7.2    | 14.5   | 21.7   | 28.9   | 36.2   | 43.4   | 50.6   | 57.9   | 65.1    |
| 10  | 72.3   | 79.6   | 86.8   | 94.0   | 101.3  | 108.5  | 115.7  | 123.0  | 130.2  | 137.4   |
| 20  | 144.7  | 151.9  | 159.1  | 166.4  | 173.6  | 180.8  | 188.1  | 195.3  | 202.5  | 209.8   |
| 30  | 217.0  | 224.2  | 231.5  | 238.7  | 245.9  | 253.2  | 260.4  | 267.6  | 274.9  | 282.1   |
| 40  | 289.3  | 396.6  | 303.8  | 311.0  | 318.3  | 325.5  | 332.7  | 340.0  | 347.2  | 354.4   |
|     |        |        |        |        |        |        |        |        |        |         |
| 50  | 361.7  | 368.9  | 376.1  | 383.4  | 390.6  | 397.8  | 405.1  | 412.3  | 419.5  | 426.8   |
| 60  | 434.0  | 441.2  | 448.5  | 455.7  | 462.9  | 470.2  | 477.4  | 484.6  | 491.8  | 499.1   |
| 70  | 506.3  | 513.5  | 520.8  | 528.0  | 535.2  | 542.5  | 549.7  | 556.9  | 564.2  | 571.4   |
| 80  | 578.6  | 585.9  | 593.1  | 600.3  | 607.6  | 614.8  | 622.0  | 629.3  | 636.5  | 643.7   |
| 90  | 651.0  | 658.2  | 665.4  | 672.7  | 679.9  | 687.1  | 694.4  | 701.6  | 708.8  | 716.1   |
|     |        |        |        |        |        |        |        |        |        |         |
| 100 | 723.3  | 730.5  | 737.8  | 745.0  | 752.2  | 759.5  | 766.7  | 773.9  | 781.2  | 788.4   |
| 110 | 795.6  | 802.9  | 810.1  | 817.3  | 824.6  | 831.8  | 839.0  | 846.3  | 853.5  | 860.7   |
| 120 | 868.0  | 875.2  | 882.4  | 889.7  | 896.9  | 904.1  | 911.4  | 918.6  | 925.8  | 933.1   |
| 130 | 940.3  | 947.5  | 954.8  | 962.0  | 969.2  | 976.5  | 983.7  | 990.9  | 998.2  | 10005.4 |
| 140 | 1012.6 | 1019.9 | 1027.1 | 1034.3 | 1041.5 | 1048.8 | 1056.0 | 1063.2 | 1070.5 | 1077.7  |
|     |        |        |        |        |        |        |        |        |        |         |
| 150 | 1084.9 | 1092.2 | 1099.4 | 1106.6 | 1113.9 | 1121.1 | 1128.3 | 1135.6 | 1142.8 | 1150.0  |
| 160 | 1157.3 | 1164.5 | 1171.7 | 1179.0 | 1186.2 | 1193.4 | 1200.7 | 1207.9 | 1215.1 | 1222.4  |
| 170 | 1129.6 | 1236.8 | 1244.1 | 1251.3 | 1258.5 | 1265.8 | 1273.0 | 1280.1 | 1287.5 | 1294.7  |
| 180 | 1301.9 | 1309.2 | 1316.4 | 1323.6 | 1330.9 | 1338.1 | 1345.3 | 1352.6 | 1359.8 | 1367.0  |
| 190 | 1374.3 | 1381.5 | 1388.7 | 1396.0 | 1403.2 | 1410.4 | 1417.7 | 1424.9 | 1432.1 | 1439.4  |

| 1   | 12              | 1_ | 11. | 1: 2 |
|-----|-----------------|----|-----|------|
| KQ/ | cm <sup>2</sup> | το | ID/ | 'In- |

|     | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|     |       | 14.2  | 28.4  | 42.7  | 56.9  | 71.1  | 85.3  | 99.6  | 113.8 | 128.0 |
| 10  | 142.2 | 156.5 | 170.7 | 184.9 | 199.1 | 213.4 | 227.6 | 241.8 | 256.0 | 270.2 |
| 20  | 284.5 | 298.7 | 312.9 | 327.1 | 341.4 | 355.6 | 369.8 | 384.0 | 398.3 | 412.5 |
| 30  | 426.7 | 440.9 | 455.1 | 469.4 | 483.6 | 497.8 | 512.0 | 526.3 | 540.5 | 554.7 |
| 40  | 568.9 | 583.2 | 597.4 | 611.6 | 625.8 | 640.1 | 654.3 | 668.5 | 682.7 | 696.9 |
|     |       |       |       |       |       |       |       |       |       |       |
| 50  | 711.2 | 725.4 | 739.6 | 753.8 | 768.1 | 782.3 | 796.5 | 810.7 | 825.0 | 839.2 |
| 60  | 853.4 | 867.6 | 881.8 | 896.1 | 910.3 | 924.5 | 938.7 | 953.0 | 967.2 | 981.4 |
| 70  | 995.6 | 1010  | 1024  | 1038  | 1053  | 1067  | 1081  | 1095  | 1109  | 1124  |
| 80  | 1138  | 1152  | 1166  | 1181  | 1195  | 1209  | 1223  | 1237  | 1252  | 1266  |
| 90  | 1280  | 1294  | 1309  | 1323  | 1337  | 1351  | 1365  | 1380  | 1394  | 1408  |
|     |       |       |       |       |       |       |       |       |       |       |
| 100 | 1422  | 1437  | 1451  | 1465  | 1479  | 1493  | 1508  | 1522  | 1536  | 1550  |
| 110 | 1565  | 1579  | 1593  | 1607  | 1621  | 1636  | 1650  | 1664  | 1678  | 1693  |
| 120 | 1707  | 1721  | 1735  | 1749  | 1764  | 1778  | 1792  | 1806  | 1821  | 1835  |
| 130 | 1849  | 2863  | 1877  | 1892  | 1906  | 1920  | 1934  | 1949  | 1963  | 1977  |
| 140 | 1991  | 2005  | 2020  | 2034  | 2048  | 2062  | 2077  | 2091  | 2105  | 2119  |
|     |       |       |       |       |       |       |       |       |       |       |
| 150 | 2134  | 2148  | 2162  | 2176  | 2190  | 2205  | 2219  | 2233  | 2247  | 2262  |
| 160 | 2276  | 2290  | 2304  | 2318  | 2333  | 2347  | 2361  | 2375  | 2389  | 2404  |
| 170 | 2418  | 2432  | 2446  | 2460  | 2475  | 2489  | 2503  | 2518  | 2532  | 2546  |
| 180 | 2560  | 2574  | 2589  | 5603  | 2617  | 2631  | 2646  | 2660  | 2674  | 2688  |
|     |       |       |       |       |       |       |       |       |       |       |
| 200 | 2845  | 2859  | 2873  | 2887  | 2901  | 2916  | 2930  | 2944  | 2958  | 2973  |
| 210 | 2987  | 3001  | 3015  | 3030  | 3044  | 3058  | 3072  | 3086  | 3101  | 3115  |
| 220 | 3129  | 3143  | 3158  | 3172  | 3186  | 3200  | 3214  | 3229  | 3243  | 3257  |
| 230 | 3271  | 3286  | 3300  | 3314  | 3328  | 3343  | 3357  | 3371  | 3385  | 3399  |
| 240 | 3414  | 3428  | 3442  | 3456  | 3470  | 3485  | 3499  | 3513  | 3527  | 3542  |

# **TEMPERATURE**

Fahrenheit-Centigrade Conversion.

A simple way to convert a fahrenheit temperature reading into a centigrade temperature reading or vice verse is to enter the accompanying table in the center or boldface column of figures.

These figures refer to the temperature in either Fahrenheit or Centigrade degrees.

If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.

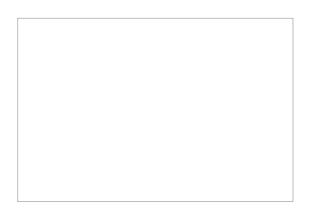
If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

| °C  |                          | °F                                 | ℃                                    |                            | °F                                   | °C                                   |                            | °F  | ${\mathbb C}$                        |                            | ۴   |
|---|--------------------------|------------------------------------|--------------------------------------|----------------------------|--------------------------------------|--------------------------------------|----------------------------|---|--------------------------------------|----------------------------|---|
| -40.4                                     | -40                      | -40.0                              | -11.7                                | 11                         | 51.8                                 | 7.8                                  | 46                         | 114.8                                     | 27.2                                 | 81                         | 117.8                                     |
| -37.2                                     | -35                      | -31.0                              | -11.1                                | 12                         | 53.6                                 | 8.3                                  | 47                         | 116.6                                     | 27.8                                 | 82                         | 179.6                                     |
| -34.4                                     | -30                      | -22.0                              | -10.6                                | 13                         | 55.4                                 | 8.9                                  | 48                         | 118.4                                     | 28.3                                 | 83                         | 181.4                                     |
| -31.7                                     | -25                      | -13.0                              | -10.0                                | 14                         | 57.2                                 | 9.4                                  | 49                         | 120.2                                     | 28.9                                 | 84                         | 183.2                                     |
| -28.9                                     | -20                      | -4.0                               | -9.4                                 | 15                         | 59.0                                 | 10.0                                 | 50                         | 122.0                                     | 29.4                                 | 85                         | 185.0                                     |
| -28.3                                     | -19                      | -2.2                               | -8.9                                 | 16                         | 60.8                                 | 10.6                                 | 51                         | 123.8                                     | 30.0                                 | 86                         | 186.8                                     |
| -27.8                                     | -18                      | -0.4                               | -8.3                                 | 17                         | 62.6                                 | 11.1                                 | 52                         | 125.6                                     | 30.6                                 | 87                         | 188.6                                     |
| -27.2                                     | -17                      | 1.4                                | -7.8                                 | 18                         | 64.4                                 | 11.7                                 | 53                         | 127.4                                     | 31.1                                 | 88                         | 190.4                                     |
| -26.7                                     | -16                      | 3.2                                | -6.7                                 | 20                         | 68.0                                 | 12.8                                 | 55                         | 131.0                                     | 32.2                                 | 90                         | 194.0                                     |
| -26.1                                     | -15                      | 5.0                                | -6.7                                 | 20                         | 68.0                                 | 12.8                                 | 55                         | 131.0                                     | 32.2                                 | 90                         | 194.0                                     |
| -25.6<br>-25.0<br>-24.4<br>-23.9<br>-23.3 | -14<br>-13<br>-12<br>-11 | 6.8<br>8.6<br>10.4<br>12.2<br>14.0 | -6.1<br>-5.6<br>-5.0<br>-4.4<br>-3.9 | 21<br>22<br>23<br>24<br>25 | 69.8<br>71.6<br>73.4<br>75.2<br>77.0 | 13.3<br>13.9<br>14.4<br>15.0<br>15.6 | 56<br>57<br>58<br>59<br>60 | 132.8<br>134.6<br>136.4<br>138.2<br>140.0 | 32.8<br>33.3<br>33.9<br>34.4<br>35.0 | 91<br>92<br>93<br>94<br>95 | 195.8<br>197.6<br>199.4<br>201.2<br>203.0 |
| -22.8                                     | -9                       | 15.8                               | -3.3                                 | 26                         | 78.8                                 | 16.1                                 | 61                         | 141.8                                     | 35.6                                 | 96                         | 204.8                                     |
| -22.2                                     | -8                       | 17.6                               | -2.8                                 | 27                         | 80.6                                 | 16.7                                 | 62                         | 143.6                                     | 36.1                                 | 97                         | 206.6                                     |
| -21.7                                     | -7                       | 19.4                               | -2.2                                 | 28                         | 82.4                                 | 17.2                                 | 63                         | 145.4                                     | 36.7                                 | 98                         | 208.4                                     |
| -21.1                                     | -6                       | 21.2                               | -1.7                                 | 29                         | 84.2                                 | 17.8                                 | 64                         | 147.2                                     | 37.2                                 | 99                         | 210.2                                     |
| -20.6                                     | -5                       | 23.0                               | -1.1                                 | 35                         | 95.0                                 | 21.1                                 | 70                         | 158.0                                     | 51.7                                 | 125                        | 257.0                                     |
| -20.0                                     | -4                       | 24.8                               | -0.6                                 | 31                         | 87.8                                 | 18.9                                 | 66                         | 150.8                                     | 40.6                                 | 105                        | 221.0                                     |
| -19.4                                     | -3                       | 26.6                               | 0                                    | 32                         | 89.6                                 | 19.4                                 | 67                         | 152.6                                     | 43.3                                 | 110                        | 230.0                                     |
| -18.9                                     | -2                       | 28.4                               | 0.6                                  | 33                         | 91.4                                 | 20.0                                 | 68                         | 154.4                                     | 46.1                                 | 115                        | 239.0                                     |
| -18.3                                     | -1                       | 30.2                               | 1.1                                  | 34                         | 93.2                                 | 20.6                                 | 69                         | 156.2                                     | 48.9                                 | 120                        | 248.0                                     |
| -17.8                                     | 0                        | 32.0                               | 1.7                                  | 35                         | 95.0                                 | 21.1                                 | 70                         | 158.0                                     | 51.7                                 | 125                        | 257.0                                     |
| -17.2                                     | 1                        | 33.8                               | 2.2                                  | 36                         | 96.8                                 | 21.7                                 | 71                         | 159.8                                     | 54.4                                 | 130                        | 266.0                                     |
| -16.7                                     | 2                        | 35.6                               | 2.8                                  | 37                         | 98.6                                 | 22.2                                 | 72                         | 161.6                                     | 57.2                                 | 135                        | 275.0                                     |
| -16.1                                     | 3                        | 37.4                               | 3.3                                  | 38                         | 100.4                                | 22.8                                 | 73                         | 163.4                                     | 60.0                                 | 140                        | 284.0                                     |
| -15.6                                     | 4                        | 39.2                               | 3.9                                  | 39                         | 102.2                                | 23.3                                 | 74                         | 165.2                                     | 62.7                                 | 145                        | 293.0                                     |
| -15.0                                     | 5                        | 41.0                               | 4.4                                  | 40                         | 104.0                                | 23.9                                 | 75                         | 167.0                                     | 65.6                                 | 150                        | 302.0                                     |
| -14.4                                     | 6                        | 42.8                               | 5.0                                  | 41                         | 105.8                                | 24.4                                 | 76                         | 168.8                                     | 68.3                                 | 155                        | 311.0                                     |
| -13.9                                     | 7                        | 44.6                               | 5.6                                  | 42                         | 107.6                                | 25.0                                 | 77                         | 170.6                                     | 71.1                                 | 160                        | 320.0                                     |
| -13.3                                     | 8                        | 46.4                               | 6.1                                  | 43                         | 109.4                                | 25.6                                 | 78                         | 172.4                                     | 73.9                                 | 165                        | 329.0                                     |
| -12.8                                     | 9                        | 48.2                               | 6.7                                  | 44                         | 111.2                                | 26.1                                 | 79                         | 174.2                                     | 76.7                                 | 170                        | 338.0                                     |
| -12.2                                     | 10                       | 50.0                               | 7.2                                  | 45                         | 113.0                                | 26.7                                 | 80                         | 176.0                                     | 79.4                                 | 172                        | 347.0                                     |

# **GROUP 1 SAFETY HINTS**

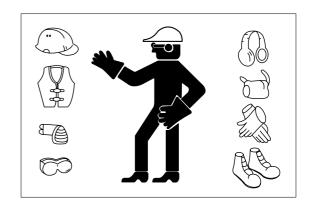
# **FOLLOW SAFE PROCEDURE**

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.



#### WEAR PROTECTIVE CLOTHING

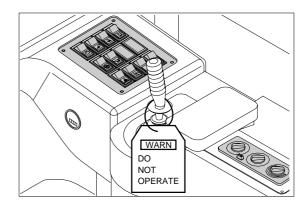
Wear close fitting clothing and safety equipment appropriate to the job.



# WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.

Before performing any work on the wheel loader, attach a 「Do Not Operate」 tag on the right side controller lever.

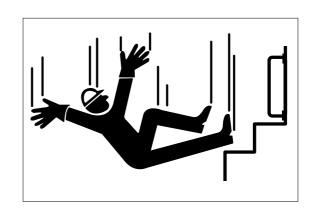


# **USE HANDHOLDS AND STEPS**

Falling is one of the major causes of personal injury. When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.

Never jump on or off the machine. Never mount or dismount a moving machine.

Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.

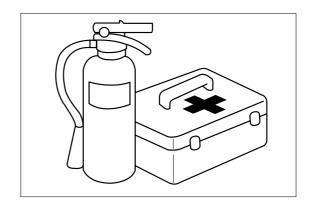


#### PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

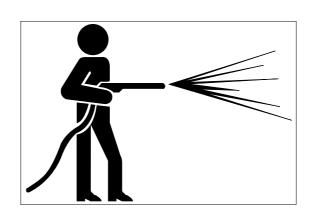
Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



#### **WORK IN CLEAN AREA**

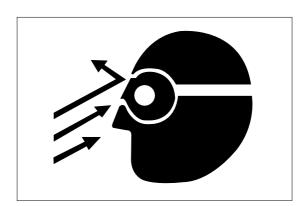
Before starting a job:

- · Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- · Have the right parts on hand.
- Read all instructions thoroughly; Do not attempt shortcuts.



# PROTECT AGAINST FLYING DEBRIS

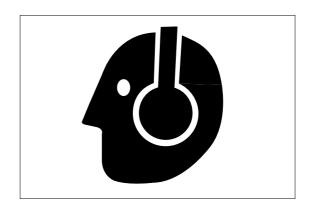
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



## **PROTECT AGAINST NOISE**

Prolonged exposure to loud noise can cause impairment or loss of hearing.

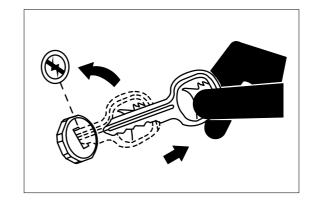
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



#### PARK MACHINE SAFELY

Before working on the machine:

- · Park machine on a level surface.
- · Lower bucket to the ground.
- Turn key switch to OFF to stop engine. Remove key from switch.
- · Move pilot control shutoff lever to locked position.
- · Allow engine to cool.



#### **SUPPORT MACHINE PROPERLY**

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.

Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



#### SERVICE COOLING SYSTEM SAFELY

Explosive release of fluids from pressurized cooling system can cause serious burns.

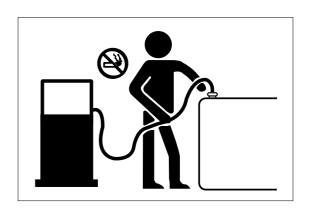
Shut off engine. Only remove filler cap when cool enough to touch with bare hands.



#### HANDLE FLUIDS SAFELY-AVOID FIRES

Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine.

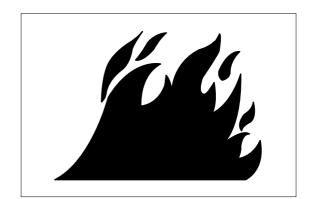
Fill fuel tank outdoors.



Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; They can ignite and burn spontaneously.



# **BEWARE OF EXHAUST FUMES**

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, be positive there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.

# REMOVE PAINT BEFORE WELDING OR HEATING

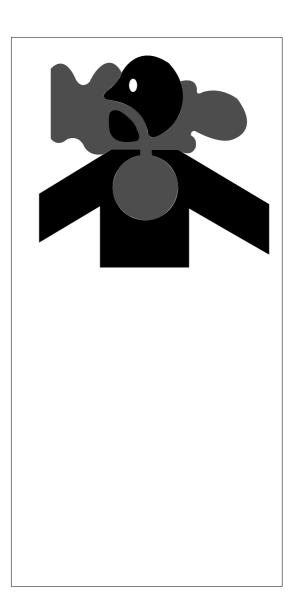
Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

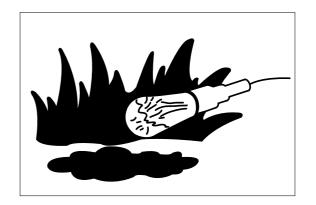
Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding.
   Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



#### **ILLUMINATE WORK AREA SAFELY**

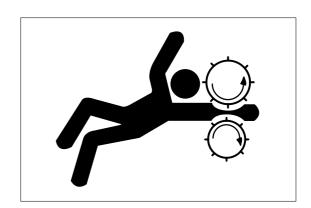
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



#### **SERVICE MACHINE SAFELY**

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

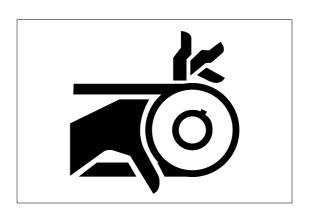
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



# STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

To prevent accidents, use care when working around rotating parts.



#### **AVOID HIGH PRESSURE FLUIDS**

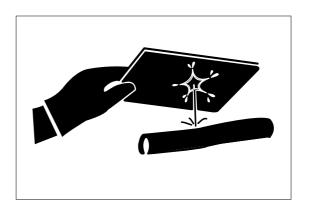
Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.





# AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.

Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install fire resisting guards to protect hoses or other materials.

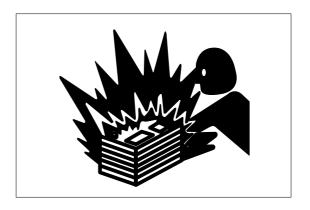


#### PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; It may explode. Warm battery to  $16^{\circ}C(60^{\circ}F)$ .



#### PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

#### Avoid the hazard by:

- 1. Filling batteries in a well-ventilated area.
- 2. Wearing eye protection and rubber gloves.
- 3. Avoiding breathing fumes when electrolyte is added.
- 4. Avoiding spilling of dripping electrolyte.
- 5. Use proper jump start procedure.

# If you spill acid on yourself:

- 1. Flush your skin with water.
- 2. Apply baking soda or lime to help neutralize the acid.
- 3. Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

#### If acid is swallowed:

- 1. Drink large amounts of water or milk.
- 2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
- 3. Get medical attention immediately.

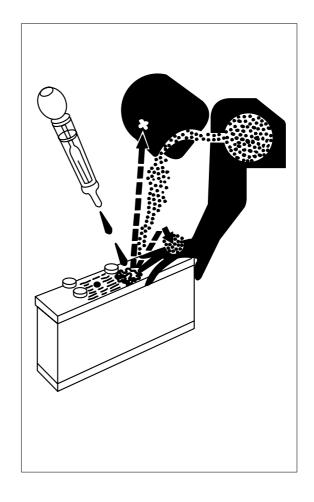
# **USE TOOLS PROPERLY**

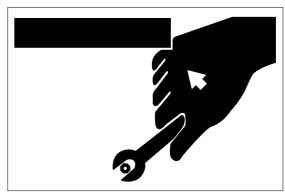
Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

Use power tools only to loosen threaded tools and fasteners.

For loosening and tightening hardware, use the correct size tools. Avoid bodily injury caused by slipping wrenches.

Use only recommended replacement parts(See Parts manual).





#### **SERVICE TIRES SAFELY**

Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion.

Welding can structurally weaken or deform the wheel.

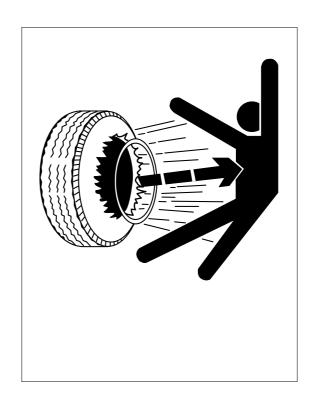
When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and not in front of or over the tire assembly. Use a safety cage if available.

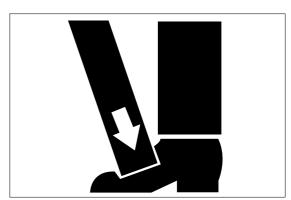
Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



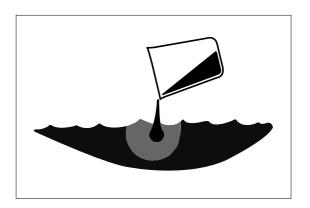


#### **DISPOSE OF FLUIDS PROPERLY**

Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.

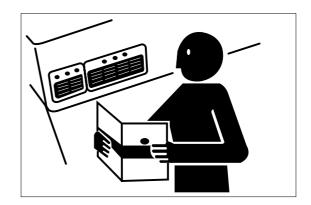
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.



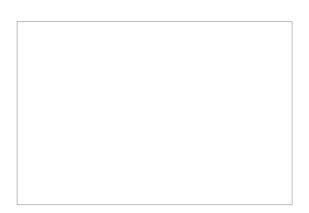
#### **REPLACE SAFETY SIGNS**

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



# **LIVE WITH SAFETY**

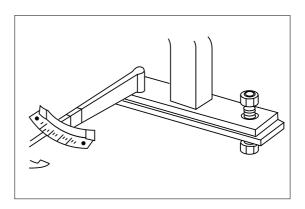
Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



# **KEEP ROPS INSTALLED PROPERLY**

Make certain all parts are reinstalled correctly if the roll-over protective structure(ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. A damaged ROPS should be replaced, not reused.



# **BUY NOW**

Then Instant Download the Complete Manual Thank you very much!