MO-0004

DIESEL - NON REVERSIBLE MARINE ENGINE

MODEL DMRV-16-4 ENGINE SERIAL NUMBER 72001 to 72010 Inclusive

B.M.E.P. 182 PSI

NO. CYCLES 4 NO. CYLINDERS 16

BORE 17” STROKE 21”

H.P. 7000 AT 400 R.P.M.

TOTAL DISPLACEMENT 76,266 CUBIC INCHES

*FUEL INJECTION TIMING 22° Left Bank 20° Right Bank BEFORE TOP CENTER

SET 1 inch Left Bank 7/8 inch Right Bank BEFORE TOP CENTER ON

51 IN. DIAMETER FLYWHEEL

FIRING ORDER 1L-8R-4L-5R-7L-2R-3L-6R-8L-1R-5L-4R-2L-7R-6L-3R

FUEL INJECTION PUMP RACK AT FULL LOAD 31.5MM No. 2 Diesel Fuel Oil

30.0 MM 3500 SSU Heavy Fuel

STARTING SYSTEM Pilot Air – Gear Driven Distributor

CRANKSHAFT ROTATION Clockwise (VIEWED FROM FLYWHEEL END)

*AVGAVAGE FULL LOAD SHOP DATA

*** EXHAUST TEMPERATURE 870°F

AIR MANIFOLD PRESSURE 31 in.-hg

AIR MANIFOLD TEMPERATURE 110°F

AMBIENT TEMPERATURE 72°F

BAROMETRIC PRESSURE 30.11 in.-hg

** FULL LOAD FIRING PRESSURE 1225 PSI No. 2 Diesel Fuel

1200 PSI 3500 SSU Heavy Fuel

VALVE CLEARANCE WITH COLD ENGINE

INTAKE .040” EXHAUST .040”

*Values based on No. 2 Diesel Fuel Oil

** ABS Allowable Firing Pressure 1400 PSI

Maximum allowable Differential Firing Pressure ±50 PSI from mean.

***Maximum allowable Exhaust Gas Temperature 950°F.
MO-0006
(Courtesy of New Sulzer Diesel)
COOLANT FREEZING AND BOILING TEMPERATURES
VS. ETHYLENE GLYCOL CONCENTRATION
(Courtesy of New Sulzer Diesel)
MO-0029

A

B

C

D

3-24
Pressure-volume diagram, diesel 4-stroke cycle.

3-29
This chart gives the relative positions of fuel injection cam noses on a six-cylinder four-stroke cycle auxiliary diesel engine with a right hand rotation. At the moment indicated, #1 cylinder is at top dead center and combustion is taking place.
This information is for a two-stroke cycle marine engine and the flywheel is marked with reference to number one cylinder.

<table>
<thead>
<tr>
<th>Firing Order</th>
<th>Top Dead Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 DEGREES</td>
</tr>
<tr>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>16</td>
<td>63</td>
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<tr>
<td>4</td>
<td>72</td>
</tr>
<tr>
<td>13</td>
<td>99</td>
</tr>
<tr>
<td>6</td>
<td>108</td>
</tr>
<tr>
<td>20</td>
<td>135</td>
</tr>
<tr>
<td>3</td>
<td>144</td>
</tr>
<tr>
<td>12</td>
<td>171</td>
</tr>
<tr>
<td>10</td>
<td>180</td>
</tr>
<tr>
<td>17</td>
<td>207</td>
</tr>
<tr>
<td>2</td>
<td>216</td>
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<tr>
<td>15</td>
<td>243</td>
</tr>
<tr>
<td>7</td>
<td>252</td>
</tr>
<tr>
<td>18</td>
<td>279</td>
</tr>
<tr>
<td>5</td>
<td>288</td>
</tr>
<tr>
<td>11</td>
<td>315</td>
</tr>
<tr>
<td>8</td>
<td>324</td>
</tr>
<tr>
<td>19</td>
<td>351</td>
</tr>
</tbody>
</table>
MO-0052

DIAPHRAGM FOLLOWER
39
31
EXHAUST VALVE
SUPPLY VALVE
8

APPLIED POSITION

DIAPHRAGM FOLLOWER
39
31
EXHAUST VALVE
SUPPLY VALVE
8

RELEASED POSITION

3-40
STARTING CONTROL AIR DISTRIBUTOR

A. Control air pipe
B. Annular space
C. Air inlet
D. Discharge space
E. Discharge line
F. Distribution space
H. Closing pipe to starting air valve
J. Opening pipe to starting air valve

1. Upper shaft of vertical drive
2. Bush for starting control valve
3. Starting control valve
4. Valve housing
5. Starting cam (insert)
6. Cover

NOTES: The illustrated "starting control air distributor" is sectioned to show the operation of one starting control valve (3) of which there are several. These valves are arranged radially in a common plane and operated by a common starting cam (5). The air inlet (C), discharge line (E), and control air pipe (A), are common to the entire bank of starting control valves (3).
MO-0057

3-45

This document, and much more, is available for download at Martin's Marine Engineering Page - www.dieselduck.net
### LOW PRESSURE
15 lbs. Steam – 30 lbs. Water

### HIGH PRESSURE
150 to 250 lbs. Steam

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#### SPECIFICATIONS AND DIMENSION DATA

<table>
<thead>
<tr>
<th>CATALOG NUMBER OF UNIT</th>
<th>S10</th>
<th>S12</th>
<th>S14</th>
<th>S16</th>
<th>S18</th>
<th>S22</th>
<th>S24</th>
<th>S26</th>
<th>S28</th>
<th>S30</th>
<th>S32</th>
<th>S34</th>
<th>S35</th>
<th>S36</th>
<th>S38</th>
<th>S40</th>
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</thead>
<tbody>
<tr>
<td><strong>Rating - Horsepower, Max.</strong></td>
<td>125</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
<td>650</td>
<td>700</td>
<td>750</td>
<td>800</td>
<td>850</td>
<td>900</td>
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<tr>
<td><strong>Steam Per Hour (Feed 21°F) Lbs.</strong></td>
<td>3180</td>
<td>6900</td>
<td>8600</td>
<td>10350</td>
<td>12100</td>
<td>13850</td>
<td>15600</td>
<td>17350</td>
<td>19100</td>
<td>20850</td>
<td>22600</td>
<td>24350</td>
<td>26100</td>
<td>27850</td>
<td>29600</td>
<td>31350</td>
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<tr>
<td><strong>Steam Radiation EDR Sq. Ft.</strong></td>
<td>10465</td>
<td>13950</td>
<td>17440</td>
<td>20925</td>
<td>24410</td>
<td>27895</td>
<td>31380</td>
<td>34865</td>
<td>38350</td>
<td>41835</td>
<td>45320</td>
<td>48805</td>
<td>52290</td>
<td>55775</td>
<td>59260</td>
<td>62745</td>
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<tr>
<td><strong>Water Radiation EDR</strong></td>
<td>15740</td>
<td>22130</td>
<td>27620</td>
<td>33110</td>
<td>38600</td>
<td>44090</td>
<td>49580</td>
<td>55070</td>
<td>60560</td>
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<td>71540</td>
<td>77030</td>
<td>82520</td>
<td>88010</td>
<td>93500</td>
<td>99000</td>
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<tr>
<td><strong>Btu Per Hour</strong></td>
<td>1000's</td>
<td>2511</td>
<td>3350</td>
<td>4185</td>
<td>5025</td>
<td>5870</td>
<td>6715</td>
<td>7560</td>
<td>8405</td>
<td>9250</td>
<td>10095</td>
<td>11080</td>
<td>11965</td>
<td>12850</td>
<td>13735</td>
<td>14620</td>
</tr>
</tbody>
</table>

Note: Three transverse saddles, S30 thru S40.
SWING CHECK VALVE
USED AS VACUUM
BREAKER (OPTIONAL)

1/2"

CONDUIT
CONNECTION

MAGNETROL

LOWEST VISIBLE
PART OF
GAGE GLASS

AT LEAST
2" ABOVE
LOWEST PERMISSIBLE
WATER LEVEL

3/4" PIPE SIZE
BLOW DOWN

DRUM ON WATER
TUBE BOILER
GOVERNOR

MO-0098

- Nozzle & Electrode Bracket
- Ignition Electrode
- Burner Cone
- Oil Nozzle
- Firecrete

3-80

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SYNCHRONIZING MOTOR

COVER

TERMINAL SHAFT

SYNCHRONIZER CONTROL

COMPENSATING ADJUSTING POINTER

PANEL

COMPENSATING NEEDLE VALVE BEHIND PLUG

OIL DRAIN PLUG

DRIVE SHAFT

(COURTESY OF WOODWARD GOVERNOR COMPANY)

3-81
MO-0102

P
A

V

B

P

V

C

V

D

3-84
Separating temperature

(COURTESY OF WESTFALIA SEPARATOR)
(COURTESY OF NEW SULZER DIESEL)
TO GOVERNOR OUTPUT SHAFT

TO FUEL INJECTION PUMP

TO SHUTDOWN SERVOMOTOR

MULTIPLE POSITION LOCKING HANDLE

(COURTESY OF NEW SULZER DIESEL)

3-101
MO-0125

3-109 (COURTESY OF COLTEC INDUSTRIES INC.)
APPROX. POSITION OF LOAD INDICATOR (L.I.) IN % OF POSITION AT M.C.R. (Specific values see shop trial report)

% L.I. % pe

% ENGINE POWER

M.C.R.

110

100 % Pe

100

90

80

70

60

% BRAKE MEAN EFFECTIVE PRESSURE (pe)

% ENGINE SPEED

70

80

90

100

103

% n

(COURTESY OF NEW SULZER DIESEL)