## Test Bench Measurement

Motor type: **HP 875-50-A8 S P30**

Date: 17.02.2021

Bearing type: RS

Controller: MST 400-133

## Measuring Parameter

Voltage: **120.0 [V]**

Throttle setting: 100%

## Calculated Motor Constants

nl: 3,776.5 [RPM] Io: 3.0 [A] kV: 31.9 [RPM/V] kn: -19.27 [RPM/A] kT: 36.38 [Ncm/A]

| Voltage [V] | Current [A] | Speed [RPM] | Input Power [W] | Output Power [W] | Torque [Ncm] | Efficiency[1] [%] |
|---|---|---|---|---|---|---|
| 120.0 | 5.0 | 3,793.2 | 600.0 | 458.8 | 115.5 | 76.47 |
| 120.0 | 6.0 | 3,766.5 | 720.0 | 574.7 | 145.7 | 79.82 |
| 120.0 | 7.0 | 3,740.1 | 840.0 | 690.5 | 176.3 | 82.20 |
| 120.0 | 8.0 | 3,714.2 | 960.0 | 805.9 | 207.2 | 83.95 |
| 120.0 | 9.0 | 3,688.5 | 1,080.0 | 921.6 | 238.6 | 85.33 |
| 120.0 | 10.0 | 3,663.3 | 1,200.0 | 1,036.9 | 270.3 | 86.41 |
| 120.0 | 11.0 | 3,638.3 | 1,320.0 | 1,152.1 | 302.4 | 87.28 |
| 120.0 | 12.0 | 3,613.8 | 1,440.0 | 1,267.4 | 334.9 | 88.01 |
| 120.0 | 13.0 | 3,589.6 | 1,560.0 | 1,381.8 | 367.6 | 88.58 |
| 120.0 | 14.0 | 3,565.7 | 1,680.0 | 1,496.2 | 400.7 | 89.06 |
| 120.0 | 15.0 | 3,542.2 | 1,800.0 | 1,610.6 | 434.2 | 89.48 |
| 119.9 | 16.0 | 3,519.0 | 1,918.4 | 1,724.3 | 467.9 | 89.88 |
| 119.9 | 17.0 | 3,496.1 | 2,038.3 | 1,837.5 | 501.9 | 90.15 |
| 119.9 | 18.0 | 3,473.6 | 2,158.2 | 1,950.5 | 536.2 | 90.37 |
| 119.9 | 19.0 | 3,451.3 | 2,278.1 | 2,063.0 | 570.8 | 90.56 |
| 119.9 | 20.0 | 3,429.5 | 2,398.0 | 2,175.3 | 605.7 | 90.71 |
| 119.9 | 21.0 | 3,407.9 | 2,517.9 | 2,286.9 | 640.8 | 90.82 |
| 119.9 | 22.0 | 3,386.6 | 2,637.8 | 2,398.1 | 676.2 | 90.91 |
| 119.9 | 23.0 | 3,365.7 | 2,757.7 | 2,508.8 | 711.8 | 90.97 |
| 119.9 | 24.0 | 3,345.0 | 2,877.6 | 2,619.1 | 747.7 | 91.02 |
| 119.9 | 25.0 | 3,324.7 | 2,997.5 | 2,728.9 | 783.8 | 91.04 |
| 119.9 | 26.0 | 3,304.6 | 3,117.4 | 2,838.0 | 820.1 | 91.04 |
| 119.9 | 27.0 | 3,284.9 | 3,237.3 | 2,946.7 | 856.6 | 91.02 |
| 119.9 | 28.0 | 3,265.4 | 3,357.2 | 3,054.7 | 893.3 | 90.99 |
| 119.9 | 29.0 | 3,246.3 | 3,477.1 | 3,161.9 | 930.1 | 90.93 |
| 119.9 | 30.0 | 3,227.4 | 3,597.0 | 3,268.9 | 967.2 | 90.88 |

| Voltage [V] | Current [A] | Speed [RPM] | Input Power [W] | Output Power [W] | Torque [Ncm] | Efficiency[1] [%] |
|---|---|---|---|---|---|---|
| 119.9 | 32.0 | 3,190.5 | 3,836.8 | 3,480.4 | 1,041.7 | 90.71 |
| 119.9 | 33.0 | 3,172.4 | 3,956.7 | 3,585.6 | 1,079.3 | 90.62 |
| 119.9 | 34.0 | 3,154.6 | 4,076.6 | 3,689.7 | 1,116.9 | 90.51 |
| 119.9 | 35.0 | 3,137.1 | 4,196.5 | 3,793.4 | 1,154.7 | 90.39 |
| 119.8 | 36.0 | 3,119.8 | 4,312.8 | 3,896.3 | 1,192.6 | 90.34 |
| 119.8 | 37.0 | 3,102.8 | 4,432.6 | 3,998.5 | 1,230.6 | 90.21 |
| 119.8 | 38.0 | 3,086.1 | 4,552.4 | 4,099.8 | 1,268.6 | 90.06 |
| 119.8 | 39.0 | 3,069.6 | 4,672.2 | 4,200.7 | 1,306.8 | 89.91 |
| 119.8 | 40.0 | 3,053.4 | 4,792.0 | 4,301.0 | 1,345.1 | 89.75 |
| 119.8 | 41.0 | 3,037.4 | 4,911.8 | 4,400.3 | 1,383.4 | 89.59 |
| 119.8 | 42.0 | 3,021.6 | 5,031.6 | 4,498.9 | 1,421.8 | 89.41 |
| 119.8 | 43.0 | 3,006.1 | 5,151.4 | 4,596.7 | 1,460.2 | 89.23 |
| 119.8 | 44.0 | 2,990.8 | 5,271.2 | 4,693.9 | 1,498.7 | 89.05 |
| 119.8 | 45.0 | 2,975.7 | 5,391.0 | 4,790.1 | 1,537.2 | 88.85 |
| 119.8 | 46.0 | 2,960.9 | 5,510.8 | 4,885.7 | 1,575.7 | 88.66 |
| 119.8 | 47.0 | 2,946.3 | 5,630.6 | 4,980.4 | 1,614.2 | 88.45 |
| 119.8 | 48.0 | 2,931.9 | 5,750.4 | 5,074.2 | 1,652.7 | 88.24 |
| 119.8 | 49.0 | 2,917.7 | 5,870.2 | 5,167.6 | 1,691.3 | 88.03 |
| 119.8 | 50.0 | 2,903.7 | 5,990.0 | 5,259.9 | 1,729.8 | 87.81 |
| 119.8 | 51.0 | 2,889.9 | 6,109.8 | 5,351.1 | 1,768.2 | 87.58 |
| 119.8 | 52.0 | 2,876.4 | 6,229.6 | 5,441.8 | 1,806.6 | 87.35 |
| 119.8 | 53.0 | 2,863.0 | 6,349.4 | 5,531.5 | 1,845.0 | 87.12 |
| 119.8 | 54.0 | 2,849.9 | 6,469.2 | 5,620.8 | 1,883.4 | 86.89 |
| 119.7 | 55.0 | 2,836.9 | 6,583.5 | 5,708.7 | 1,921.6 | 86.71 |
| 119.7 | 56.0 | 2,824.1 | 6,703.2 | 5,795.9 | 1,959.8 | 86.46 |
| 119.7 | 57.0 | 2,811.5 | 6,822.9 | 5,882.2 | 1,997.9 | 86.21 |
| 119.7 | 58.0 | 2,799.1 | 6,942.6 | 5,967.7 | 2,035.9 | 85.96 |
| 119.7 | 59.0 | 2,786.8 | 7,062.3 | 6,052.0 | 2,073.8 | 85.69 |
| 119.7 | 60.0 | 2,774.7 | 7,182.0 | 6,135.3 | 2,111.5 | 85.43 |
| 119.7 | 61.0 | 2,762.8 | 7,301.7 | 6,218.1 | 2,149.2 | 85.16 |
| 119.7 | 62.0 | 2,751.1 | 7,421.4 | 6,299.8 | 2,186.7 | 84.89 |
| 119.7 | 63.0 | 2,739.5 | 7,541.1 | 6,380.5 | 2,224.1 | 84.61 |
| 119.7 | 64.0 | 2,728.1 | 7,660.8 | 6,460.2 | 2,261.3 | 84.33 |
| 119.7 | 65.0 | 2,716.9 | 7,780.5 | 6,539.0 | 2,298.3 | 84.04 |
| 119.7 | 66.0 | 2,705.8 | 7,900.2 | 6,616.8 | 2,335.2 | 83.75 |
| 119.7 | 67.0 | 2,694.8 | 8,019.9 | 6,693.5 | 2,371.9 | 83.46 |
| 119.7 | 68.0 | 2,684.0 | 8,139.6 | 6,769.2 | 2,408.4 | 83.16 |
| 119.7 | 69.0 | 2,673.3 | 8,259.3 | 6,843.9 | 2,444.7 | 82.86 |
| 119.7 | 70.0 | 2,662.8 | 8,379.0 | 6,917.7 | 2,480.8 | 82.56 |

| Voltage [V] | Current [A] | Speed [RPM] | Input Power [W] | Output Power [W] | Torque [Ncm] | Efficiency[1] [%] |
|---|---|---|---|---|---|---|
| 119.7 | 72.0 | 2,642.1 | 8,618.4 | 7,061.4 | 2,552.2 | 81.93 |
| 119.7 | 73.0 | 2,632.0 | 8,738.1 | 7,132.0 | 2,587.6 | 81.62 |
| 119.7 | 74.0 | 2,621.9 | 8,857.8 | 7,201.3 | 2,622.8 | 81.30 |
| 119.6 | 75.0 | 2,612.0 | 8,970.0 | 7,269.3 | 2,657.6 | 81.04 |

nl = rpm with no load
Io = current with no load
kV = specific rpm
kn = rpm drop per Amp
kT = torque constant
[1] incl. Controller