RPM AC Synchronous PM Motors

Motor Repair Guidelines

BALDOR · RELIANCE

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Important:
Be sure to check www.baldor.com to download the latest version of this manual in Adobe Acrobat PDF format.

Note! The manufacturer of these products, Baldor Electric Company became ABB Motors and Mechanical Inc. on March 1, 2018. Nameplates, Declaration of Conformity and other collateral material may contain the company name of Baldor Electric Company and the brand names of Baldor-Dodge and Baldor-Reliance until such time as all materials have been updated to reflect our new corporate identity.

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Overview

This manual contains general procedures that apply to BaldorReliance Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements.

A Warning statement indicates a possible unsafe condition that can cause harm to personnel.

A Caution statement indicates a condition that can cause damage to equipment.

Important: This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed.

Please contact your Baldor District office for more information or clarification.

Before you install, operate or perform maintenance, become familiar with the following if applicable to your area:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- IEC 34–1 Electrical and IEC72–1 Mechanical specifications
- ANSI C51.5, the National Electrical Code (NEC) and local codes and practices.

Safety Notice:

This equipment contains high voltage! Electrical shock can cause serious or fatal injury.

Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.

Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury.

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

WARNING: Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.

WARNING: The Adjustable Speed Controller may apply hazardous voltages to the motor leads after power to the controller has been turned off. Verify that the controller is incapable of delivering hazardous voltages and that the voltage at the motor leads is zero before proceeding. Failure to observe this precaution may result in severe bodily injury or death.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.

WARNING: Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.

WARNING: Surface temperatures of motor enclosures may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. When installing, protection should be provided by the user to protect against accidental contact with hot surfaces. Failure to observe this precaution could result in bodily injury.

WARNING: This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.

WARNING: Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.

WARNING: Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.

WARNING: Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.

WARNING: Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.

WARNING: Incorrect motor rotation direction can cause serious or fatal injury or equipment damage. Be sure to verify motor rotation direction before coupling the load to the motor shaft.

WARNING: Motors that are to be used in flammable and/or explosive atmospheres must display the CSA listed logo. Specific service conditions for these motors are defined in NFPA 70 (NEC) Article 500.

WARNING: Pacemaker danger – Magnetic and electromagnetic fields in the vicinity of current carrying carrying conductors and permanent magnet motors can result result in a serious health hazard to persons with cardiac pacemakers, metal implants, and hearing aids. To avoid risk, stay way from the area surrounding a permanent magnet motor.

WARNING: RPM AC permanent magnet motors can induce voltage and current in the motor leads by rotating the motor shaft. Electrical shock can cause serious or fatal injury. Therefore, do not couple the load to the motor shaft until all motor connections have been made. During any maintenance inspections, be sure the motor shaft will not rotate.

WARNING: Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.

Safety Notice Continued

WARNING: Do not use non UL/CSA listed explosion proof motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.

WARNING: UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

WARNING: Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.

WARNING: Motor C-Face is intended for mounting auxiliary equipment such as pumps, gears, etc. When mounted horizontally, frames FL/RL280C thru FL/RL320C must be supported by the feet and not by the C -Face alone. Horizontally mounted frames FL/RL360 thru FL/RL440 must be supported by the feet and not by the C -Face, D-Flange or IEC Flange alone. Consult Engineering for any questions on specific applications. Failure to observe these precautions can result in bodily injury and equipment damage

WARNING: RPM AC permanent magnet motors can induce voltage and current in the motor leads by rotation of the motor shaft even with the motor disconnected from line power. Electrical shock can cause serious or fatal injury. Therefore, do not couple the load to the motor shaft until all motor connections have been made. During any maintenance inspections, be sure the motor shaft will not rotate.

Caution: Use only a shielded motor power cable with a complete circumferential braided or copper film/tape ground jacket around the power leads. This ground should be secured to the motor frame from within the motor terminal box and must return without interruption to the drive ground. In addition, if the motor and coupled equipment are not on a single common metal base plate, it is important to equalize the equipment ground potentials by bonding the motor frame to the coupled equipment using a high frequency conductor such as a braided strap.

Caution: Do not over–lubricate motor as this may cause premature bearing failure.

Caution: Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.

Caution: If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.

Caution: To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.

Caution: If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG1 and MG2 standards to avoid equipment damage.

Caution: Do not use an induction oven to heat noise tested bearings. Arcing between the balls and races may damage the bearing. Failure to observe this precaution may result in equipment damage.

Caution: Do not operate motors with a roller bearing unless a radial load is applied so that damage to the roller bearing does not occur.

Caution: RPM AC permanent magnet motors with an open enclosure, such as DP–FV, should not be used where ferrous dust or particles may may be present . Totally enclosed permanent magnet motors are recommended for these applications.

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your local ABB representative or an Authorized ABB Service Center.

1.0 General Information

The RPM AC synchronous PM motors use a permanent magnet interior salient pole design. For this reason testing, rotor removal and rotor reinsertion of these PM machines is different from traditional induction motors. However, winding repair and bearing repair is identical to a typical induction motor and standard published repaired procedures should be followed.

Warning: RPM AC permanent magnet motors can induce voltage and current in the motor leads by rotation of the motor shaft even with the motor disconnected from line power. Electrical shock can cause serious or fatal injury. Therefore, do not couple the load to the motor shaft until all motor connections have been made. During any maintenance inspections, be sure the motor shaft will not rotate.

Rotor Characteristics

Due to the unique characteristics of the permanent magnet rotor, care must be used for removal and insertion of the rotating assembly to avoid personal injury or damage to the rotating assembly. It is highly unlikely that the rotor will become demagnetized during normal operation. The interior rotor magnets can suffer demagnetization due to 1) excessive heating or 2) instantaneous over current (IOC). Winding thermostats are provided to protect against excessive heating and to protect the windings. Each motor has the maximum IOC listed on the motor nameplate and the drive parameters should be set properly to protect the motor from excessive instantaneous over current conditions. However, to verify the integrity of the PM rotor the following procedure should be used.

Rotor Integrity Evaluation

To verify rotor integrity (rotor magnet strength) the motor's open circuit voltage should be measured with one of the following methods:

Method 1 Coast Down: (Limited to 1000 rpm Base Speed Motors and Higher)
The motor should be secured to a rigid surface. Connect a voltage meter capable of measuring phase to phase voltage to the motor terminals. Run the motor up to rated base speed and voltage. Note that the motor will have to be powered by a suitable variable frequency drive and cannot operate on line power. Turn the motor power off and quickly record both phase voltage and motor speed. Divide the recorded phase voltage by the recorded speed at the voltage. This is the motor's open circuit volts/rpm.

Method 2 Back Spin:
Secure and connect PM motor to dyne stand. Connect a voltage meter capable of measuring phase to phase voltage to the motor terminals. Confirm that there is no "Unit Under Test" drive connected to the PM Motor. Drive the motor at the base speed rpm with the load motor and load regen drive.

Method 3 ACS880:
Connect the PM Motor to an ACS880 Drive and ensure that the shaft is disconnected from any load and rotates freely with the drive powered-off. Power-up the drive and enter the Motor Data into Group 99 of the ACS880 based on the Main Motor Nameplate and Cemf Nameplate for these ACS880 Parameters:

- 99.03 – Motor Type – Set to "Permanent Magnet Motor"
- 99.04 – Motor Control Mode – Set to "DTC"
- 99.06 – Motor Nominal Current – Set to match FLA of PM Motor based on Main Motor Nameplate FLA of Motor
- 99.07 – Motor Nominal Voltage – Set to match Cemf Voltage of PM Motor based on special "Warning" Cemf Nameplate
- 99.08 – Motor Nominal Frequency – Set to match Nominal Frequency of PM Motor based on Main Motor Nameplate
- 99.09 – Motor Nominal Speed – Set to match Nominal Speed of PM Motor based on Main Motor Nameplate
- 99.10 – Motor Nominal Power – Set to match Nominal Power of PM Motor based on Main Motor Nameplate
- 99.13 – ID Run Requested – Set to "Normal"

The Drive will now enter a Warning State. Perform the ID Run as indicated in the ACS880 Drive Manual 3AUA0000085967.

If the ID Run completes with generating a Fault, the ID Run was successful. The obtain the Cemf Voltage multiply the number used for the Motor Nominal Voltage (99.07) that came from the Cemf Nameplate by the value found in PM Flux User (98.08). The value should be quite close to the value found on the Cemf Nameplate (meaning that 98.08 should be very close to "1").

Acceptance of Open Circuit Voltage
The volts/rpm value should be within 3% of the value on the motor warning nameplate. In the unlikely event that it is determined that the motor is not producing the required open circuit voltage the rotating assembly (rotor and shaft) will need to be returned to the Gainesville, Georgia manufacturing facility to be re-magnetized.

2.0 Disassembly and Reassembly

Motor Disassembly

When removing the PM rotating assembly from the motor care must be taken to overcome the inherent magnetic forces that will try to hold the rotating assembly (rotor and shaft) in the stator winding. It is recommended that the motor be disassembled and reassembled in a vertical drive end shaft up position using a hoist to remove the rotating assembly. In the horizontal position first remove any accessory items (fans, blower, feedback devices, etc.) Also remove the bearing inner cap bolts (if provided). Mount the motor in a vertical drive end shaft up position and remove the drive end bracket. The opposite drive end bracket can remain installed. The thread in the end of the shaft can be used with an eye bolt to lift the rotating assembly with the hoist out of the frame/winding stator.

Warning: Pacemaker danger – Magnetic and electromagnetic fields in the vicinity of current carrying conductors and permanent magnet motors can result in a serious health hazard to persons with cardiac pacemakers, metal implants and hearing aids. To avoid risk, stay away from the area surrounding a permanent magnet motor

Rotor Protection After Removal

After the rotating assembly is removed from the frame take care to not allow the rotor to come into contact or near other magnetic materials especially small metal shavings. The rotor should be protected with a non-magnetic cover (cloth, Styrofoam etc.) to prevent any metallic contamination from adhering to the rotor outside surface. Keep the rotating assembly clean and free from dirt, oil and grease.
Replacement of bearings can be done as with any standard induction motor using generally accepted standard procedures.

Reassembly

After the motor has been properly repaired, the rotating assembly can be carefully reinserted back into the frame using the same hoist method. Using the hoist slowly lower the rotating assembly back into the motor frame. A solenoid effect will want to pull the rotating assembly into the motor frame.
Warning: Keep hands and fingers away from the rotor and frame during the insertion process to prevent potential injury as the rotating assembly is being lowered and magnetically pulled into the motor frame.
The symmetric magnetic forces will help keep the rotating assembly centered such that you do not need to help guide or keep the rotating assembly centered while lowering into position. Keep hands clear of the air gap in case the rotating assembly comes loose and falls into position.

Bracket Assembly

Once the rotating assembly is properly located in the frame and into the opposite drive end bracket the motor can be moved back into a horizontal position. As with all RPM AC motors the bracket and frame assembly needs to be assembled on a smooth level machined flat surface in order to proper align the brackets and to ensure that the feet are aligned on in the same plane. If present, insure that all inner cap retaining bolts and bracket bolts are fastened securely. Reference 7.0 Bolt Torque Specifications for the proper torque ratings.

Stub Shaft Alignment

If a stub shaft is used for the feedback device the stub shaft should be checked for proper alignment.

1. Install the magnetic base of a dial indicator on the face of the motor bracket.

2. Position the dial indicator on the end of the stub shaft, rotate 360 degrees to determine the total indicated runout (TIR) and straighten the stub shaft using a brass hammer tapping the end of the stub shaft into alignment. Straighten to within .003".

If a new stub shaft is installed it will need to be secured with approximately 5 drops of Loctite 271 and tightened to 20 lb-ft before being indicated in for straightness to within .003".

3.0 Rotor Evaluation and Repair

Using the rotor open circuit test procedure described in section 1.0, if the rotor is found to be demagnetized it will need to be replaced or returned to the Gainesville, Georgia manufacturing plant to be magnetized back to it's original strength. It is not possible to properly re-magnetize the rotor in the field.

4.0 Bearings

Standard Construction.

Bearings can be replaced as with any other typical induction motor.

Cooling Tower Construction.

The bearing design in the RPM AC cooling tower motor includes a deep groove ball bearing in the bottom (opposite drive end) bracket. The FL5800 angular contact bearings are mounted in tandem with orientation for thrust down. As with a conventional motor these bearing can be replaced. The grease entry, bearings and grease cavity should be completed filled with grease. For further details reference RPM AC Direct Drive PM Motor Manual MN427.

5.0 Windings

Windings in the RPM AC PM motors are the same as an induction winding. All RPM AC 440 frame and all RPM AC Cooling Tower designs use VPI windings. VPI windings may also be found on smaller RPM AC frame sizes.

Non-VPI Windings.

Non-VPI windings can be re-wound similar to any other induction motor. Care must be taken when burning out the winding to not overheat the lamination steel which can inadvertently change the core loss of the electrical steel. Burn out temperature should be limited to 370 degrees C.

VPI Windings.

The VPI winding can be re-wound and again care must be taken in order to properly (slowly) burn out the original windings at temperatures less than 370 degrees C.

6.0 Testing

If the motor has had the winding replace standard induction winding check test procedures should be performed such as hipot and winding resistance to ensure the quality of the new winding.

7.0 Bolt Torque SpecificationsTorque values do not apply to bolts with o-rings or other gasket material.

Data obtained from Pocket Ref. by Thomas J. Glover, third edition.
Data for grade 5 bolts is supplied. Grade 2 bolts are not to be used on motors and the combination of grey iron casting material and the thickness of some castings will not tolerate Grade 8 torque values.
All bolts are to be tightened to the values in this table unless other torque values are specified on the sales order BOM or within assembly instructions.

Grades and Types: SAE J429—Grades 5, 5.1, & 5.2
Grade 5 —(1/4" to 1"), Grade 5.1 — (#6 to 5/8"), and Grade 5.2 —(1/4" to 1")
Proof Strength = 85,000 pound—force/square inch (lb/in2)
Grade 5 -(1-1/8" to 1-1/2")
Proof Strength = 74,000 pound-force/square inch (lb/in^2)

Table 1 Coarse Inch-Threaded

Bolt Size	Thread Pitch	Clamping Force		Standard Dry Torque	
		Pound force(lb)	Kilonewton (KN)	pound-feet (lb-ft) Tolerance ± 5%	newton meter(Nm) Tolerance ±5%
6	32	579	2.58	1.33	1.81
8	32	893	3.97	2.44	3.31
10	24	1,116	4.96	3.53	4.79
12	24	1,543	6.86	5.55	7.53
1/4	20	2,027	9.02	8.45	11.5
5/16	18	3,341	14.9	17.4	23.6
3/8	16	4,941	22.0	30.9	41.9
7/16	14	6,777	30.1	49.4	67.0
1/2	13	9,046	40.2	75.4	102
9/16	12	11,603	51.6	109	147
5/8	11	14,408	64.1	150	203
3/4	10	21,293	94.7	266	361
7/8	9	29,453	131	430	582
1	8	38,633	172	644	873
1-1/8	7	42,347	188	794	1,077
1-1/4	7	53,780	239	1,120	1,519
1-3/8	6	64,103	285	1,469	1,992
1-1/2	6	77,978	347	1,949	2,643

Table 2 Fine Inch-Threaded

Bolt Size	Thread Pitch	Clamping Force		Standard Dry Torque	
		Pound force(lb)	Kilonewton (KN)	pound-feet (lb-ft) Tolerance ± 5%	newton meter(Nm) Tolerance ±5%
6	40	646	2.88	1.49	2.02
8	36	939	4.18	2.57	3.48
10	32	1,275	5.67	4.04	5.47
12	28	1,645	7.32	5.92	8.03
1/4	28	2,321	10.3	9.67	13.1
5/16	24	3,704	16.5	19.3	26.2
3/8	24	5,597	24.9	35.0	47.4
7/16	20	7,567	33.7	55.2	74.8
1/2	20	10,200	45.4	85.0	115
9/16	18	12,941	57.6	121	164
5/8	18	16,320	72.6	170	230
3/4	16	23,779	106	297	403
7/8	14	32,449	144	473	642
1	12	42,266	188	704	955
1-1/8	12	47,508	211	891	1,208
1-1/4	12	59,552	265	1,241	1,682
1-3/8	12	72,983	325	1,673	2,268
1-1/2	12	87,746	390	2,194	2,974

Torque values do not apply to bolts with o-rings or other gasket material.

Data obtained from Pocket Ref. by Thomas J. Glover, third edition.
Data for grade 5 bolts is supplied. Grade 2 bolts are not to be used on motors and the combination of grey iron casting material and the thickness of some castings will not tolerate Grade 8 torque values.
All bolts are to be tightened to the values in this table unless other torque values are specified on the sales order BOM or within assembly instructions.

Class or Types: ISO 898/1, CLASS 8.8 (UP TO M16)
Grade 5 —(1/4" to 1"), Grade 5.1 — (#6 to 5/8"), and Grade 5.2 —(1/4" to 1")
Minimum Tensile Strength = 800 MPa = 116,000 lb/in^2

Table 3 Coarse Metric-Threaded

Bolt Size	Thread Pitch (mm)	Clamping Force		Standard Dry Torque	
		Pound force(lb)	Kilonewton (KN)	pound-feet (lb-ft) Tolerance ± 5%	newton meter(Nm) Tolerance ±5%
1.6	0.35	159.9	0.7112	0.1679	0.2276
1.8	0.35	214.2	0.9526	0.2529	0.3429
2	.040	261.0	1.161	0.3425	0.4644
2.2	0.45	312.5	1.390	0.4511	0.6116
2.5	0.45	426.9	1.899	0.7003	0.9495
3	0.50	633.3	2.817	1.247	1.690
3.5	0.60	852.9	3.794	1.959	2.656
4	0.70	1,105	4.916	2.901	3.933
4.5	0.75	1,425	6.339	4.208	5.705
5	0.80	1,785	7.941	5.857	7.941
6	1.00	2,533	11.27	9.972	13.52
7	1.00	3,633	16.16	16.69	22.63
8	1.25	4,609	20.50	24.19	32.80
9	1.25	6,059	26.95	35.78	48.51
10	1.50	7,300	32.47	47.90	64.94
11	1.50	9,098	40.47	65.67	89.03
12	1.75	10,610	47.20	83.53	113.3
14	2.00	14,530	64.63	133.5	180.9
16	2.0	19,730	87.76	207.1	280.8
18	2.5	24,230	107.8	286.2	388.1
20	2.5	30,820	137.1	404.4	548.4
22	2.5	38,200	169.9	551.4	747.6
24	3.0	44,380	197.4	698.9	947.5
27	3.0	57,840	257.3	1,025	1,389
30	3.5	70,570	313.9	1,389	1,883
33	3.5	87,320	388.4	1,890	2,563
36	4.0	102,800	457.3	2,429	3,293
39	4.0	122,800	546.2	3,143	4,262
42	4.5	141,100	627.6	3,890	5,274

Torque values do not apply to bolts with o-rings or other gasket material.

Data obtained from Pocket Ref. by Thomas J. Glover, third edition.
Data for grade 5 bolts is supplied. Grade 2 bolts are not to be used on motors and the combination of grey iron casting material and the thickness of some castings will not tolerate Grade 8 torque values.
All bolts are to be tightened to the values in this table unless other torque values are specified on the sales order BOM or within assembly instructions.

Class or Types: ISO 898/1, CLASS 8.8 (UP TO M16)
Grade 5 —(1/4" to 1"), Grade 5.1 — (#6 to 5/8"), and Grade 5.2 —(1/4" to 1")
Minimum Tensile Strength = 800 MPa = 116,000 lb/in^2

Table 4 Fine Metric-Threaded

Bolt Size	Thread Pitch (mm)	Clamping Force		Standard Dry Torque	
		Pound force(lb)	Kilonewton (KN)	pound-feet (lb-ft) Tolerance ± 5%	newton meter(Nm) Tolerance ±5%
1.6	0.35	243.8	1.085	0.2560	0.3471
1.8	0.35	326.6	1.453	0.3857	0.5230
2	.040	398.0	1.770	0.5223	0.7081
2.2	0.45	476.5	2.120	0.6879	0.9326
2.5	0.45	651.0	2.896	1.068	1.448
3	0.50	965.8	4.296	1.901	2.578
3.5	0.60	1,301	5.786	2.987	4.050
4	0.70	1,685	7.497	4.424	5.998
4.5	0.75	2,173	9.667	6.417	8.700
5	0.80	2,722	12.11	8.932	12.11
6	1.00	3,863	17.18	15.21	20.62
7	1.00	5,541	24.65	25.45	34.50
8	1.25	7,028	31.26	36.89	50.02
9	1.25	9,237	41.09	54.55	73.96
10	1.50	11,130	49.51	73.05	99.04
11	1.50	13,880	61.74	100.1	135.8
12	1.75	16,180	71.97	127.4	172.7
14	2.00	22,150	98.53	203.5	275.9
16	2.0	30,080	133.8	315.8	428.2
18	2.5	36.960	164.4	436.5	591.8
20	2.5	47,010	209.1	616.9	836.4
22	2.5	58,250	259.1	840.9	1,140
24	3.0	67,670	301.0	1,066	1,445
27	3.0	88,190	392.3	1,562	2,118
30	3.5	107,600	478.6	2,119	2,873
33	3.5	133,200	592.5	2,883	3,909
36	4.0	156,800	697.5	3,704	5,022
39	4.0	187,300	833.2	4,794	6,500
42	4.5	215,200	957.3	5,931	8,041

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