

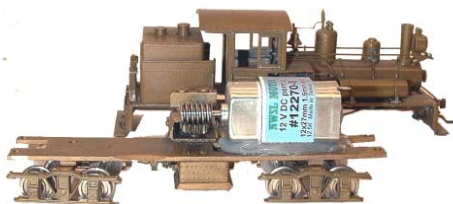
NWSL 12 volt DC PERMAG CAN MOTORS

NWSL POWERS THE WORLD

SMOOTH, POWERFUL, QUIET, RUGGED, RELIABLE, EASY TO USE

Part No.	Millimeters			Inches		Shaft	Shaft Size (mm)		12V RPM no load	Stall amp	OPTIONAL		Shaft Adapter
	F	R	L	Flat x Length	Shaft		Dia. x Length	Flyw heel			Coupling		
1215D-9	10	12	15	.394 x .590	dbl	1.0 x 8	12,000				435-6	479-6	10165-9 10170-9 10171-9
1220D-9	10	12	20	.394 x .787	dbl	1.0 x 8	12,000	0.45			435-6	479-6	10165-9 10170-9 10171-9
1220S-9	10	12	20	.394 x .787	sngl	1.0 x 8	12,000	0.45			435-6	479-6	10165-9 10170-9 10171-9
1225D-9	10	12	25	.394 x .984	dbl	1.2 x 17	17,000	0.38			420-6 421-6	485-6	10157-9 10158-9 10160-9
16207-9		16	20	.472 x .787	dbl	2.0 x 20	19,000	0.75			402-6 406-6	482-6 483-6	10159-9 10166-9
1627S-9	12	16	27	.472 x 1.06	sngl	1.5 x 9	13,000	0.54			400-6 401-6	482-6 483-6 487-6	10161-9
1627D-9	12	16	27	.472 x 1.06	dbl	1.5 x 9	13,000	0.54			400-6 401-6	482-6 483-6 487-6	10161-9
1630D-9	12	16	27	.472 x 1.06	dbl	1.5 x 9	12,500	0.85			423-6 425-6	482-6 483-6 487-6	10161-9
2032D-9	15	20	32	.78 x 1.26	dbl	2.0 x 14	9,500	1.75			402-6 406-6	482-6 483-6	10159-9 10166-9
22243-9		22	24	DISCONTINUED	dbl	2.4 x 13	10,500	1.00			403-6 404-6	481-6 490-6	10162-9
22313-9		22	34	DISCONTINUED	dbl	2.4 x 15	9,900	2.00			403-6 404-6	481-6 490-6, etc	10162-9
29301-9		29	30	1.138 x 1.185	dbl	2.4 x 17	8,500	1.90			403-6 404-6	491-6, etc	10162-9
29351-9		29	35	1.138 x 1.385	dbl	2.4 x 17	8,500	2.50			403-6 404-6	491-6, etc	10162-9
29401-9		29	40	1.138 x 1.575	sngl	2.4 x 24	10,500	3.80			403-6 404-6	491-6, etc	
29409-9		29	40	1.138 x 1.575	dbl	2.4 x 24	10,500	3.80			403-6 404-6	491-6, etc	
30621-9		30	62	1.175 x 2.382	dbl	5/32" x 24	6,415	6.85			415-6 416-6 417-6	495-6, etc	
40611-9		40	61	1.575 x 2.403	dbl	5/32" x 12	6,470	14.50			415-6 416-6 417-6	495-6, etc	

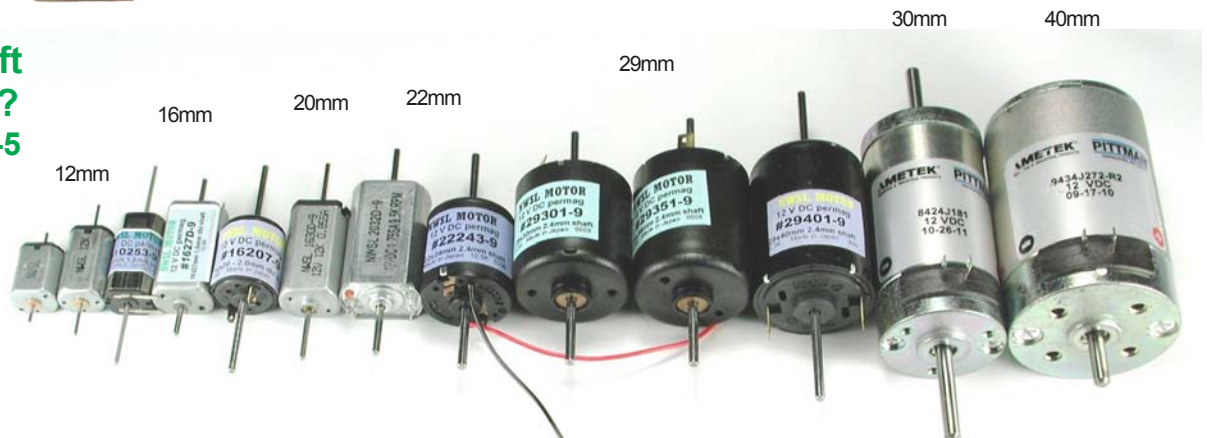
12270-9/12271-9 repowers NWSL 18 ton Shay



Motors are of sealed design and are not internally serviceable. When shorter shaft is desired, use cutoff disk in motor tool, secure shaft in vise, keep grindings out of motor bearings.

GENERAL RULE: When uncertain which motor to use, select the largest diameter, longest motor that will fit the space available. This will usually provide more than adequate power although peculiar construction or shape/size of some models can make it difficult to shoe-horn in a motor of adequate power.

Need Shaft Adapters?
See page 5-5



What fits? Replaces?

The NWSL part number endeavors to aid you in identifying motors and determining what will fit. If you don't have a metric-inch conversion table handy—just remember that 25.4mm is one inch. Therefore 16mm is about 5/8" and 30mm is about 1-1/4".

What size motor?

When uncertain, determine the space available and use the largest diameter, longest motor that will fit the space. This will usually over-power a model unless the design has unusual restrictions. In general the 1630 is appropriate for mid to small size HO but not for HO diesels larger than a switcher. The 2032 is appropriate for mid to large HO and the 2231, 2236 and 2240 for large HO and wide body diesels.

FLYWHEELS

Flywheels provide a momentum or smoothing action to your prime mover (motor) output to provide you with smooth and more reliable operation of your models. The momentum action provides more realistic starts and stops and helps overcome pesky intermittent electrical contact problems. The NWSL Standard Flywheel design has a deep recess to accept universal couplings thereby keeping overall length of the power unit to a minimum. The NWSL Bell Flywheel has been discontinued. Precision machined brass, not cast. Light press fit (to precision shaft of dimension shown) unless indicated otherwise.

Does it have enough power?

Any new installation must be checked for adequate power. Just because the motor will move the locomotive doesn't mean it is appropriate. For best life and suitability, watch the amp draw and compare to the motor specification sheet. If amp draw exceeds maximum continuous rating (or is more than 1/3rd stall amp draw rating) the motor is probably overloaded and in risk of failure.

Okay I got the motor—How Do I Connect It?

See the #480-6 thru 499-6 series of precision miniature universal connectors (next page). Choices fitting all commonly found in railroad model shaft sizes.

Diam	Length	Shaft	R1	R2	Pt #
10mm/.390"	7mm/.276"	1.0mm	3mm	6.3mm	435-6
10mm/.390"	7mm/.276"	1.5mm	3mm	6.3mm	400-6
10mm/.390"	7mm/.276"	1.2mm	3mm	6.3mm	420-6
11mm/.433"	7mm/.276"	1.5mm	3mm	6.3mm	408-6
11mm/.433"	7mm/.276"	2.0mm	5mm	8mm	409-6
12mm/.472"	7mm/.276"	1.5mm	3mm	6.3mm	401-6
12mm/.472"	7mm/.276"	1.2mm	3mm	6.3mm	421-6
12mm/.472"	9mm/.354"	1.5mm	3mm	6.3mm	424-6
12mm/.472"	11mm/.433"	1.5mm	3mm	6.3mm	425-6
16mm/.630"	9mm/.354"	2.0mm	4mm	8mm	402-6
16mm/.630"	9mm/.354"	2.0mm slip	4-5/32"	6.3mm/.250"	432-6
16mm/.630"	9mm/.354"	1.5mm	4mm	6.3mm	422-6
16mm/.630"	11mm/.433"	2.0mm	4mm	6.3mm	407-6
16mm/.630"	11mm/.433"	1.5mm	4mm	6.3mm	423-6
17mm/.669"	11mm/.433"	2.0mm	5mm	8mm	405-6
18mm/.708"	11mm/.433"	2.0mm	5mm	8mm	406-6
18mm/.709"	11mm/.433"	2.4mm	5mm	8mm	403-6
25mm/.984"	11mm/.433"	2.4mm	5mm	8mm	404-6
25mm/.984"	13mm/.51"	1/8"	7mm/.276"	9.5mm/3/8"	411-6
28mm/1.1"	13mm/.51"	5/32"	7mm/.276"	9.5mm/3/8"	415-6
28mm/1.1"	13mm/.51"	3.0mm			433-6
31mm/1.25"	16mm/.630"	5/32"	7mm/.276"	9.5mm/3/8"	417-6
31mm/1.25"	16mm/.630"	3.0mm			434-6
38mm/1.5"	13mm/.51"	1/8"	7mm/.276"	9.5mm/3/8"	412-6
38mm/1.5"	13mm/.51"	5/32"	7mm/.276"	9.5mm/3/8"	416-6

BUSHING (REDUCER, SHAFT ADAPTER)

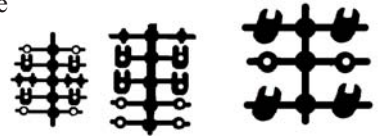
A bushing is used to adapt one size shaft (or axle) to a larger size hole (or shaft) for coupling purposes or otherwise. Some modelers refer to them as 'reducers'. A bushing can also be used as mechanical shaft connectors HOWEVER this requires perfect alignment of the connected shafts for satisfactory operation, such alignment can rarely be successfully accomplished or maintained. Bushings can sometimes be used as bearings, but must be reamed to proper final bore - this is an emergency solution at best. Because the use of bushings can result in tolerance buildup and eccentricity in a mechanism, NWSL has worked to alleviate their necessity by developing a line of universal couplings which can fit (and couple) virtually any shaft size found in small scale models - see the #480-6 series Universal Couplings. The tolerance buildup and thus eccentricity can be particularly troublesome if bushings are used to mount flywheels (which require concentricity as close to perfect as possible for satisfactory smooth operation). Therefore, NWSL discourages use of bushings but makes this limited selection available to help save those 'impossible' model building situations

ID	OD	Length	Material	Qty	Part #
1.0mm	1.5mm	3.0mm	steel	2	10170-9
1.0mm	2.0mm	3.0mm	brass	2	10171-9
1.0mm	2.4mm	3.0mm	steel	2	10165-9
1.2mm	1.5mm*	2.5mm	steel	2	10160-9
1.2mm	2.0mm	1.6mm	brass	2	10158-9
1.2mm	2.4mm	1.6mm	brass	2	10157-9
1.5mm	2.0mm	3.0mm	brass	2	10161-9
1.5mm	2.4mm	3.0mm	steel	2	10164-9
2.0mm	1/8"	4.75mm	brass	2	10166-9
2.0mm	2.4mm	3.0mm	brass	2	10159-9
2.0mm	2.4mm	3.0mm	steel	2	10169-9
2.4mm	1/8"	5.75mm	steel	2	10162-9
*Adapter style, not bushing					

WHADDYA WANNA CONNECT?

QUICK, PRECISION, EASY TO USE SHAFT COUPLINGS DRIVELINE UNIVERSALS

You've got the motor in place, the gearbox is installed, but how do you connect them. You could use a piece of flexible tubing, but is it really flexible enough? or does it cause binding and friction? and will it slip under heavy load? or will it stiffen with age? or is it too flexible and whips causing a lockup or gallop? NWSL precision universal couplings are designed and precision moulded of engineering acetal plastic to provide you with the most accurate, concentric, efficient power connections available for miniature mechanisms. The press-fits make them extremely easy to use, the size choices and combinations permit you to fit virtually any size you'll encounter, the engineering plastic allows you to tap and drill them like metal if you prefer or require set screws and the self-lubrication quality of the acetal allows you to install them and forget them (but lubrication will extend their life by a factor of 10...which must be a very long time because we've never had one wear out un-lubricated!)



Part #	"Dog Bone"					Couples these shaft sizes										Horned Ball ID				Minimum	Comment		
	Ball Diameter **					Cup (Socket) fits this shaft diameter														Length			
	2.0	3/16"	1/8"	3/32"	1/4"	1.0	1.2	1.5	2.0	2.4	3.0	3/16"	1/8"	5/32"	1.0	1.5	2.0	2.4	3/16"	1/8"		inch-mm	
475-6		X												2							D	1.1-28	
476-6		D												2							D	1.1-28	
479-6	X							2	2						4							0.37-9	
478-6		X												2			2					0.7-18	
480-6		X												2				2				0.7-18	
481-6		X							2									2				0.7-18	
482-6			X					1	2	1							4					0.55-14	
483-6				X				2	1	1						D						0.37-9	
484-6			X							4							4					0.55-14	
485-6				X			2	1	1							D(4)						0.37-9	
486-6		X									2							2				0.7-18	
487-6				X				4								D						0.37-9	
488-6			X						2	2							4					0.55-14	
493-6				X				2	2							D						0.55-14	
494-6				X						4						D							
489-6			X							4							4					0.55-14	
490-6		X								4								2		N/A	17-18	Integral Style	
491-6		X								2	2							2		N/A	17-18	Integral Style	
492-6		X								4								2		N/A	17-18	Integral Style	
495-6					X								1-D	1-D						D	1.1-28		
496-6					X						1-D			1-D						D	1.1-28		
497-6					X					1-D				1-D						D	1.1-28		
498-6					X					1-D			1-D							D	1.1-28		
499-6					X					2-D								D			1.1-28		

The size fits are press-fit to shafts of the size indicated in mm (millimeters) or fractional inch sizes. (*2.4mm fits can usually be successfully used on 3/32" shafting). Heavy loading and/or undersize/under-specification shafting may allow the press-fit to slip. In this situation, knurl or upset the shaft press-fit area or install a setscrew in the cup shank (these are molded of engineering grade acetal plastic and can be drilled and tapped - although we find tapping unnecessary, just drill tap drill size and let the setscrew self-tap). The bores in the horned balls marked 'D' are 'D' shaped to better assure grip; you must file or grind a matching flat on the shaft to fit.

HOW FAST DOES YOUR MODEL RUN?

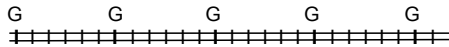
A QUICK, SIMPLE SPEED CHECK METHOD WITHOUT EXPENSIVE EQUIPMENT.

Is that model fast or just half fast? This method enables you to accurately determine the scale speed of your models with no new expenses, you use equipment you already have. All you need is a length of track - preferably straight, your power supply, your model, and a stop watch or watch allowing you to measure seconds of time it takes your model to travel a specific distance.

Set up a measured distance on your trackage so you can accurately note the begin and end of the test run. It is easiest if your test track length is a multiple of the distance indicated in the chart below. The longer the distance, the more accurate result and easier it is to time the run. However, even a 3 foot run can permit a reasonably accurate measurement.

Scale	Gate*
N (160:1)	6-3/4"
HO (87:1)	12"
S (64:1)	16-1/2"
O (48:1)	22"

**'Gate' is the distance traveled in one second at the rate of 60 MPH



If you have a 5 foot test track in HO (above illustration with five Gates), divide the length by the above travel 'gate' length (5' / 12" = 5) and that is the number of seconds that will equal 60 SMPH (it is easiest if you use exact multiples of the above figures). Assuming T=number of seconds for your test track (ie. if your HO scale test track is 5' (60"), T would be 5 seconds - (T=60/12=5), use S to represent your measured time to travel the test track distance. Then, assuming a test run of 12 seconds:

$$T/S \times 60 = \text{Scale MPH}$$

Example: HO scale, 5 foot test track (T=5), 12 second test run (S=12): $5/12 \times 60 = .417 \times 60 = 25\text{mph}$

or install a setscrew in the cup shank (these are molded of engineering grade acetal plastic and can be drilled and tapped - although we find tapping unnecessary, just drill tap drill size and let the setscrew self-tap). The bores in the horned balls marked 'D' are 'D' shaped to better assure grip; you must file or grind a matching flat on the shaft to fit.

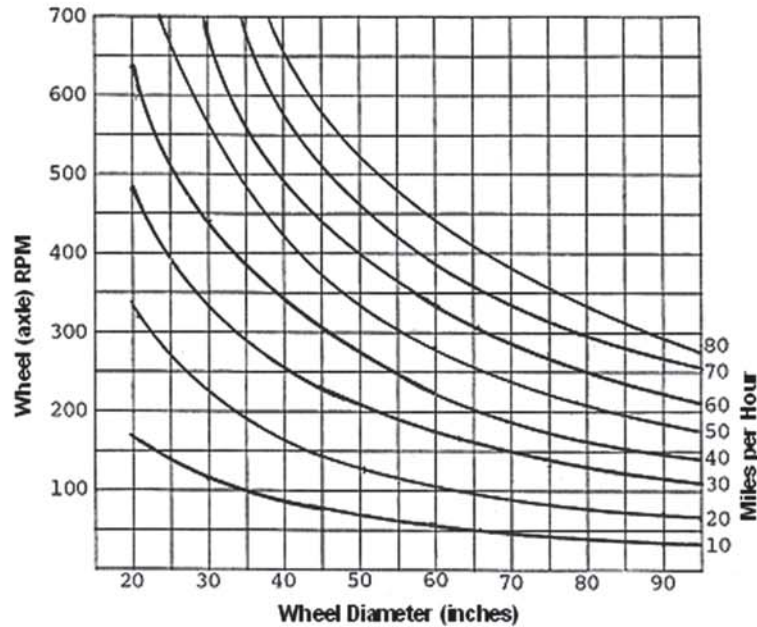
**Components of coupling sets with the same ball diameter can be interchanged to enable connecting different shaft sizes ("Cup" socket). Ball size determines load capacity - the smaller the ball size, the lower the load capacity of the set.

**Need Shafting?
See page 5-6**

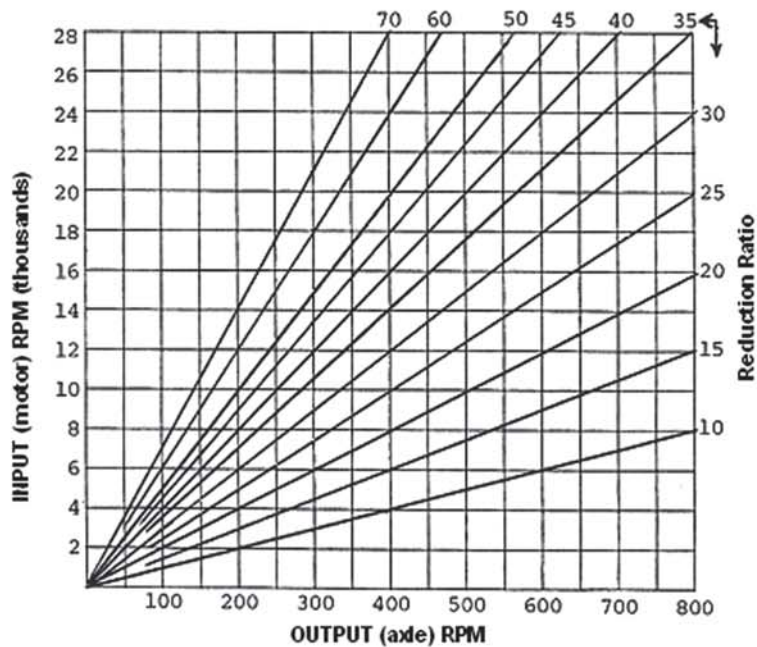
SELECT-A-SPEED

USE THESE "SELECT-A-SPEED" GRAPHS TO DETERMINE
REDUCTION RATIOS—MOTOR SPEED—SCALE SPEEDS—DRIVER RPM

Graph 1



Graph 2



To find needed motor RPM or ratio:

1. On graph 1, knowing wheel diameter and desired speed, determine the required wheel RPM
2. With axle RPM from graph 1 above;
 - a. determine needed motor speed if you know gearbox ratio
 - b. determine required reduction ratio if you know motor speed.

REPOWER KITS

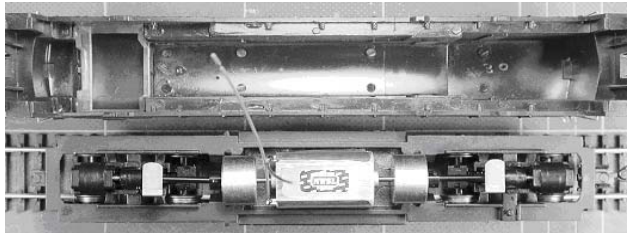
Athearn, ROCO, etc Diesel Locomotives

Want smooth, powerful operation for your diesels, especially the now-discontinued Athearn "Blue Box" diesel locomotives? NWSL's repower kits are the answer, and they're DCC ready if you need it.

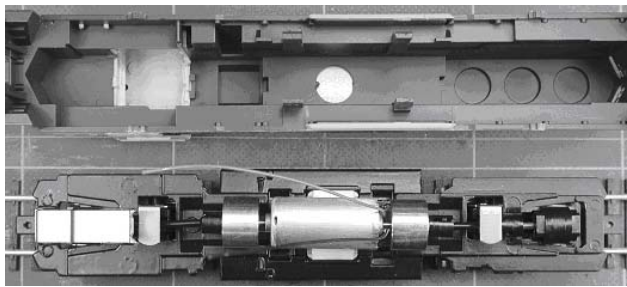
These repower kits come with pre-installed flywheels, pre-soldered motor leads, plus U-joints and NWSL's Qwik Mount mounting material. You remove the factory motor and driveshafts, install the repower kit, test the unit, then secure the motor to the chassis using the "silicone sealant" method described in the instructions (included with kit).

The NWSL repower kit comes in four versions and all use the same motor, the NWSL 2032D-9. The four configurations allow for different types of engines. Standard width and length engines, such as the F7, PA, FP40, etc. have enough length to allow for two flywheels and enough width for an 18mm (0.714") diameter flywheel. Standard width but narrow body units, such as SD40, GP7, GE-8, SD90, etc. have less room to work with, so the motor is fitted with two 16mm (0.630") flywheels and you install the motor on edge to fit. We also have two versions for switchers and other short locomotives; these have only one flywheel due to length restrictions inside the engine. This shorter version is also available in both a narrow and wide flywheel to accommodate for different widths.

Which one do you need? Pop off the shell and measure! Check the width of the shell cavity. If it's 21mm (0.826") or wider, go with the standard width version. Narrower? Go with the narrow version. Next, check length. If your model already has two flywheels, go with the longer version of the repower kit. Not sure? Measure how much length you have to work with, then refer to the images below. The NWSL repower kits are a bit more compact than the factory power plants they replace; note also that the flywheels are pressed on and can be moved a bit if need be. The motor shafts are supplied full length; if need be these can be trimmed back to provide more room. The NWSL driveshafts are adjustable and can be made to fit whatever configuration you come up with. See tutorials at www.nwsl.com



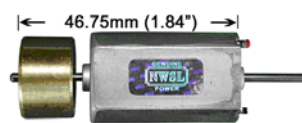
Repower kit 163-4 installed in an Athearn wide body diesel



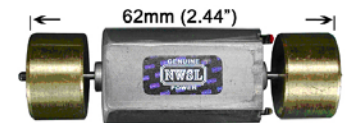
Repower kit 1163-4 installed in an Athearn narrow body diesel

Wide Diesels, Switchers, etc.

- 162-4 Re-power KIT w/2032 motor, one flywheel
- 163-4 Re-power KIT w/2032 motor, two flywheels



162-4 motor measurements



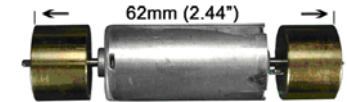
163-4 motor measurements

Narrow Diesels, Switchers, etc.

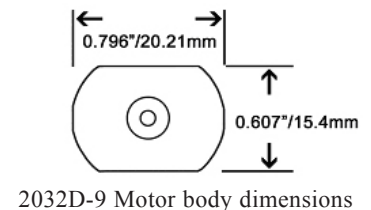
- 1162-4 Re-power KIT w/2032 motor, one flywheel
- 1163-4 Re-power KIT w/2032 motor, two flywheels



1162-4 motor measurements



1163-4 motor measurements



2032D-9 Motor body dimensions

#1170-4 HO Varney Dockside

Kit includes:

- (1) 16x30 motor (#1630D-9)
- (1) Worm (#30402-6)
- (1) Gear (#2451-6)
- (1pc) Quick-Mount (#199-6)
- (1) Wire, 12 in. (#10010-9)
- (4) Wire Tab, bronze (#120-4)

Instructions

#1171-4 HO Bachmann Doodlebug

Kit includes:

- (1) Stanton Drive, **powered**, 7"0" wheelbase, 36/110 NS wheels weathered
 - (1) Stanton Drive, **non-powered**, 7"0" wheelbase, 36/110 NS wheels weathered
- Aluminum stand, Washers, Screw, 2mm x 6mm, Instructions

#1172-4 Tyco/Mantua 0-6-0, 4-6-0

Kit includes:

- (1) Motor, #1630D-9
- (1) Worm, #50400-6
- (1) Gear 0.4 x 30T WG, #2284-6
- (1) Quik-Mount, #199-6 (1")
- (1) Wire, #10010-9 (6")
- (1) Tab, # 120-4

Instructions

01/01/2016

#1174-4 Tyco/Mantua 2-8-2 or 4-6-2

Kit includes:

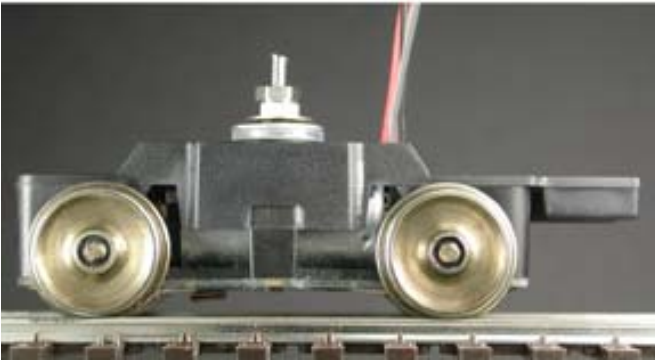
- (1) Motor, #1630D-9
- (1) Worm, #50400-6
- (1) Gear 0.4 x 38T WG, #2276-6
- (1) Quik-Mount, #199-6 (1")
- (1) Wire, #10010-9 (6")
- (1) Tab, # 120-4

Instructions

See Instructions in
"Tutorials"
at www.nwsl.com

The STANTON DRIVE

NWSL's new DCC-ready, self-contained underfloor power unit. Re-power that old diesel and open up the interior, or build a critter and have some fun!



Easy installation. As shown above, all you need is a 4mm (.157") hole in the chassis and the Stanton drive bolts right in. The included instructions show how to make retro-fitting a Stanton drive into a variety of engines. We've included a coupler pocket if you want a truck-mounted coupler. If not, just cut off the pocket. The Stanton drive comes pre-assembled and tested with your choice of wheels and axles...with everything we make, there are over 1,000 possible combinations.



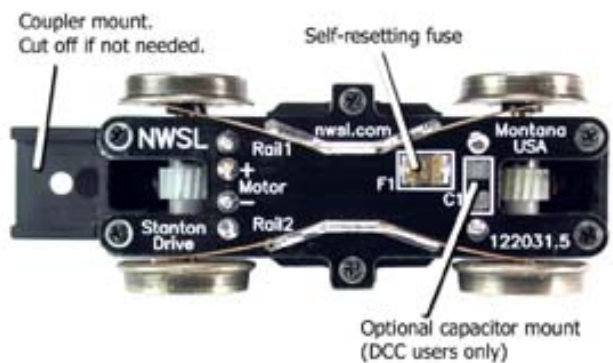
Individually adjustable bearings. As you can see in this (literal!) cutaway view, each axle is held by two heavy duty bearings, each of which is adjustable if you need to fine tune. All units ship with these bearings adjusted and ready to go.

Three models create a wide range of wheelbases. The Stanton Drive comes in with three motor choices: 12x20 (model 1220), 12x15 (model 1215), and 12x10 (model 1210). The difference is wheelbase. Model 1220 has HO wheelbase choice of 9'-0", 9'-6", or 10'-0". Model 1215 has HO wheelbase of 7'-6", 8'-0", or 8'-6". Model 1210 has HO wheelbase of 6'-6" or 7'-0", which is as small as we can go with this design. Our standard versions will have 38", 40", or 42" wheels with /110 tread (.110" wide) on 2.0mm x .797 flush axle. If you prefer a different wheel diameter/tread we can do that, just let us know.

Just add sideframes! NWSL does not manufacture sideframes, so simply salvage the sideframes from your current engine and attach them to the Stanton drive. The rigid plastic body is made from ABS, allowing you to glue, drill and tap, or otherwise attach what you've got. Illustrated here is an Athearn sideframe on a Stanton drive model 1220 with a 9'-0" wheelbase. Or, purchase sideframes from one of several sources.

Do the math. Although designed for HO standard gauge, by using larger wheels we can make these for On30 or On3, S standard, and so on. Convert the HO wheelbases offered above to your desired scale and just tell us what wheels and axles you need. There are practical limits, but we can do a lot with these. And more. On the heels of these will be other versions of the Stanton drive, including a 13'-3" wheelbase version to re-power the Athearn Hustler, as well as a three axle unit in a wide variety of wheelbases.

A new way to plug and play. The Stanton drive replaces NWSL's classic PDT drive unit, which we're no longer able to make. What's new? Plenty! Four color coded wires for direct hookup to a DCC decoder (comes wired for immediate DC operation.) Self-resetting fuse for power spike protection. Four individually adjustable bearings allow you to fine-tune the mesh between the worms and the axle worm gears. Just add sideframes if desired and off it goes!



STANTON DRIVE HO scale

How to measure

The wheelbase of a truck is the distance from axle center to axle center. This can be difficult to measure on some models, so a quick and easy way to measure the wheelbase of your truck is to measure from the journal box center to journal box center, as shown here:



Wheel base (HO)	Inches	Millimeters	
6'-6"	0.897	22.784	Stanton drive model 1210
7'-0"	0.966	24.536	Stanton drive model 1210
7'-6"	1.035	26.289	Stanton drive model 1215
8'-0"	1.104	28.042	Stanton drive model 1215
8'-6"	1.173	29.794	Stanton drive model 1215
9'-0"	1.242	31.547	Stanton drive model 1220
9'-6"	1.311	33.299	Stanton drive model 1220
10'-0"	1.380	35.052	Stanton drive model 1220

To measure the wheel diameter, measure the wheel across the widest part of the face, excluding the flange, as shown here:

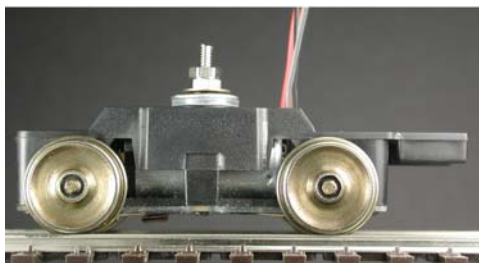


Wheel Diam. (HO)	Inches	Millimeters	
45	0.517	13.132	
42	0.483	12.268	
40	0.460	11.684	
38	0.437	11.100	
36	0.414	10.516	
33	0.380	9.639	
30	0.345	8.763	(too small for Stanton design)
28	0.322	8.179	(too small for Stanton design)
26	0.2997	7.595	(too small for Stanton design)

To measure the wheel tread (thickness) measure across the entire wheel, flange and all, as shown here. The /110 tread shown here is standard and is the default for virtually all manufacturer's locomotives (although tolerances may vary.) Stanton drives are available with /110 tread (which would be appropriate here) or /88 tread (0.088" wide, known as semi-fine scale) or /64 tread (0.064" wide, known as fine scale.) Not sure? Order /110 tread. Narrower wheels look more prototypical, but may de-rail more because of *any* glitch in your trackwork, especially switches.



STANTON DRIVE HO Scale / Gauge



Powered \$ 84.95
 Dummy Drive (no motor) \$ 44.95

(add a "D" to the end of the part number for
 non-powered version, i.e.39282D-9)

HO GAUGE (wheelbases are listed in HO scale)

Model 1220				Model 1215				Model 1210			
Part #	WB	Wheel	Gauge	Part #	WB	Wheel	Gauge	Part #	WB	Wheel	Gauge
39282-4	9'0"	33 /110	HO	39292-4	7'6"	33 /110	HO	39274-4	6'6"	33 /110	HO
39228-4	9'0"	36 /110	HO	39293-4	7'6"	36 /110	HO	39275-4	6'6"	36 /110	HO
39200-4	9'0"	38 /110	HO	39229-4	7'6"	38 /110	HO	39256-4	6'6"	38 /110	HO
39201-4	9'0"	40 /110	HO	39230-4	7'6"	40 /110	HO	39257-4	6'6"	40 /110	HO
39202-4	9'0"	42 /110	HO	39231-4	7'6"	42 /110	HO	39258-4	6'6"	42 /110	HO
39283-4	9'0"	33 /88	HO	39294-4	7'6"	33 /88	HO	39276-4	6'6"	33 /88	HO
39284-4	9'0"	36 /88	HO	39295-4	7'6"	36 /88	HO	39277-4	6'6"	36 /88	HO
39215-4	9'0"	38 /88	HO	39238-4	7'6"	38 /88	HO	39262-4	6'6"	38 /88	HO
39216-4	9'0"	40 /88	HO	39239-4	7'6"	40 /88	HO	39263-4	6'6"	40 /88	HO
39217-4	9'0"	42 /88	HO	39240-4	7'6"	42 /88	HO	39264-4	6'6"	42 /88	HO
39221-4	9'0"	38 /64	HO	39247-4	7'6"	38 /64	HO	39268-4	6'6"	38 /64	HO
39222-4	9'0"	40 /64	HO	39248-4	7'6"	40 /64	HO	39269-4	6'6"	40 /64	HO
39223-4	9'0"	42 /64	HO	39249-4	7'6"	42 /64	HO	39270-4	6'6"	42 /64	HO
39285-4	9'6"	33 /110	HO	39296-4	8'0"	33 /110	HO				
39286-4	9'6"	36 /110	HO	39297-4	8'0"	36 /110	HO				
39210-4	9'6"	38 /110	HO	39232-4	8'0"	38 /110	HO	39278-4	7'0"	33 /110	HO
39213-4	9'6"	40 /110	HO	39233-4	8'0"	40 /110	HO	39279-4	7'0"	36 /110	HO
39211-4	9'6"	42 /110	HO	39234-4	8'0"	42 /110	HO	39259-4	7'0"	38 /110	HO
39287-4	9'6"	33 /88	HO	39303-4	8'0"	33 /88	HO	39260-4	7'0"	40 /110	HO
39288-4	9'6"	36 /88	HO	39304-4	8'0"	36 /88	HO	39261-4	7'0"	42 /110	HO
39203-4	9'6"	38 /88	HO	39241-4	8'0"	38 /88	HO	39280-4	7'0"	33 /88	HO
39204-4	9'6"	40 /88	HO	39242-4	8'0"	40 /88	HO	39281-4	7'0"	36 /88	HO
39205-4	9'6"	42 /88	HO	39243-4	8'0"	42 /88	HO	39265-4	7'0"	38 /88	HO
39224-4	9'6"	38 /64	HO	39250-4	8'0"	38 /64	HO	39266-4	7'0"	40 /88	HO
39225-4	9'6"	40 /64	HO	39251-4	8'0"	40 /64	HO	39267-4	7'0"	42 /88	HO
39226-4	9'6"	42 /64	HO	39252-4	8'0"	42 /64	HO	39271-4	7'0"	38 /64	HO
								39272-4	7'0"	40 /64	HO
								39273-4	7'0"	42 /64	HO
39289-4	10'0"	33 /110	HO	39298-4	8'6"	33 /110	HO				
39227-4	10'0"	36 /110	HO	39299-4	8'6"	36 /110	HO				
39214-4	10'0"	38 /110	HO	39235-4	8'6"	38 /110	HO				
39209-4	10'0"	40 /110	HO	39236-4	8'6"	40 /110	HO				
39212-4	10'0"	42 /110	HO	39237-4	8'6"	42 /110	HO				
39290-4	10'0"	33 /88	HO	39300-4	8'6"	33 /88	HO				
39291-4	10'0"	36 /88	HO	39301-4	8'6"	36 /88	HO				
39218-4	10'0"	38 /88	HO	39244-4	8'6"	38 /88	HO				
39219-4	10'0"	40 /88	HO	39245-4	8'6"	40 /88	HO				
39220-4	10'0"	42 /88	HO	39246-4	8'6"	42 /88	HO				
39206-4	10'0"	38 /64	HO	39302-4	8'6"	36 /64	HO				
39207-4	10'0"	40 /64	HO	39253-4	8'6"	38 /64	HO				
39208-4	10'0"	42 /64	HO	39254-4	8'6"	40 /64	HO				
				39255-4	8'6"	42 /64	HO				

STANTON DRIVE
P:87, On30, On3 Gauge
Powered \$ 84.95 / Dummy \$ 44.95

(add a "D" to the end of the part number for non-powered version, i.e.39282D-9)

P:87 GAUGE (wheelbases are listed in HO scale)

Model 1220					Model 1215				Model 1210				
Part #	WB	Wheel	Gauge		Part #	WB	Wheel	Gauge		Part #	WB	Wheel	Gauge
39425-4	9'0"	33 /64	P:87		39410-4	7'6"	33 /64	P:87		39400-4	6'6"	33 /64	P:87
39426-4	9'0"	36 /64	P:87		39411-4	7'6"	36 /64	P:87		39401-4	6'6"	36 /64	P:87
39427-4	9'0"	38 /64	P:87		39412-4	7'6"	38 /64	P:87		39402-4	6'6"	38 /64	P:87
39428-4	9'0"	40 /64	P:87		39413-4	7'6"	40 /64	P:87		39403-4	6'6"	40 /64	P:87
39429-4	9'0"	42 /64	P:87		39414-4	7'6"	42 /64	P:87		39404-4	6'6"	42 /64	P:87
39430-4	9'6"	33 /64	P:87		39415-4	8'0"	33 /64	P:87		39405-4	7'0"	33 /64	P:87
39431-4	9'6"	36 /64	P:87		39416-4	8'0"	36 /64	P:87		39406-4	7'0"	36 /64	P:87
39432-4	9'6"	38 /64	P:87		39417-4	8'0"	38 /64	P:87		39407-4	7'0"	38 /64	P:87
39433-4	9'6"	40 /64	P:87		39418-4	8'0"	40 /64	P:87		39408-4	7'0"	40 /64	P:87
39434-4	9'6"	42 /64	P:87		39419-4	8'0"	42 /64	P:87		39409-4	7'0"	42 /64	P:87
39435-4	10'0"	33 /64	P:87		39420-4	8'6"	33 /64	P:87					
39436-4	10'0"	36 /64	P:87		39421-4	8'6"	36 /64	P:87					
39437-4	10'0"	38 /64	P:87		39422-4	8'6"	38 /64	P:87					
39438-4	10'0"	40 /64	P:87		39423-4	8'6"	40 /64	P:87					
39439-4	10'0"	42 /64	P:87		39424-4	8'6"	42 /64	P:87					
OOS 39600-4 4'6" 24 /88 On30					39612-4 3'9" 24 /88 On30				39624-4 3'3" 24 /88 On30				
39601-4 4'6" 26 /88 On30					39613-4 3'9" 26 /88 On30				39625-4 3'3" 26 /88 On30				
39602-4 4'6" 24 /110 On30					39614-4 3'9" 24 /110 On30				39626-4 3'3" 24 /110 On30				
39603-4 4'6" 26 /110 On30					39615-4 3'9" 26 /110 On30				39627-4 3'3" 26 /110 On30				
39604-4 4'9" 24 /88 On30					39616-4 4'0" 24 /88 On30				39628-4 3'6" 24 /88 On30				
39605-4 4'9" 26 /88 On30					39617-4 4'0" 26 /88 On30				39629-4 3'6" 26 /88 On30				
39606-4 4'9" 24 /110 On30					39618-4 4'0" 24 /110 On30				39630-4 3'6" 24 /110 On30				
39607-4 4'9" 26 /110 On30					39619-4 4'0" 26 /110 On30				39631-4 3'6" 26 /110 On30				
OOS 39608-4 5'0" 24 /88 On30					39620-4 4'3" 24 /88 On30								
39609-4 5'0" 26 /88 On30					39621-4 4'3" 26 /88 On30								
39610-4 5'0" 24 /110 On30					39622-4 4'3" 24 /110 On30								
39611-4 5'0" 26 /110 On30					39623-4 4'3" 26 /110 On30								
OOS 39701-4 4'6" 24 /88 On3					39709-4 3'9" 24 /88 On3								
39700-4 4'6" 26 /88 On3					39710-4 3'9" 26 /88 On3								
39702-4 4'6" 24 /110 On3					39711-4 3'9" 24 /110 On3								
39703-4 4'6" 26 /110 On3					39712-4 3'9" 26 /110 On3								
OOS 39704-4 4'9" 24 /88 On3					39713-4 4'0" 24 /88 On3								
39440-4 4'9" 26 /88 On3					39714-4 4'0" 26 /88 On3								
39441-4 4'9" 24 /110 On3					39715-4 4'0" 24 /110 On3								
39442-4 4'9" 26 /110 On3					39716-4 4'0" 26 /110 On3								
OOS 39705-4 5'0" 24 /88 On3					39717-4 4'3" 24 /88 On3								
39706-4 5'0" 26 /88 On3					39718-4 4'3" 26 /88 On3								
39707-4 5'0" 24 /110 On3					39719-4 4'3" 24 /110 On3								
39708-4 5'0" 26 /110 On3					39720-4 4'3" 26 /110 On3								

On30 GAUGE (wheelbases are listed in O scale)

On3 GAUGE (wheelbases are listed in O scale)

STANTON DRIVE S scale

How to measure

The wheelbase of a truck is the distance from axle center to axle center. This can be difficult to measure on some models, so a quick and easy way to measure the wheelbase of your truck is to measure from the journal box center to journal box center, as shown here:



Wheel base (S)	Inches	Millimeters
8'-0"	1.50	38.10
8'-6"	1.59	40.48
9'-0"	1.69	42.86



To measure the wheel diameter, measure the wheel across the widest part of the face, excluding the flange, as shown left:

Wheel Diam. (S)	Inches	Millimeters
40	0.624	15.875
36	0.561	14.288
33	0.515	13.097

STANTON DRIVE

Powered \$ 89.95

Dummy Drive (no motor) \$ 49.95

S Scale WB	Wheel Dia	Wheel Tread	Gauge	Powered Part #	Dummy Part #
8'0"	33	/110	S	40200-4	40200D-4
8'0"	36	/110	S	40201-4	40201D-4
8'0"	40	/110	S	40202-4	40202D-4
8'0"	33	/87	S	40203-4	40203D-4
8'0"	36	/87	S	40204-4	40204D-4
8'0"	40	/87	S	40205-4	40205D-4
8'6"	33	/110	S	40220-4	40220D-4
8'6"	36	/110	S	40221-4	40221D-4
8'6"	40	/110	S	40222-4	40222D-4
8'6"	33	/87	S	40223-4	40223D-4
8'6"	36	/87	S	40224-4	40224D-4
8'6"	40	/87	S	40225-4	40225D-4
9'0"	33	/110	S	40230-4	40230D-4
9'0"	36	/110	S	40231-4	40231D-4
9'0"	40	/110	S	40232-4	40232D-4
9'0"	33	/87	S	40233-4	40233D-4
9'0"	36	/87	S	40234-4	40234D-4
9'0"	40	/87	S	40235-4	40235D-4

To measure the wheel tread (thickness) measure across the entire wheel, flange and all, as shown above. The /110 tread shown here is standard and is the default for virtually all manufacturer's locomotives (although tolerances may vary.) Stanton drives are available with /110 tread (which would be appropriate here) or /87 tread (0.087" wide, known as semi-fine scale.) Not sure? Order /110 tread. Narrower wheels look more prototypical, but may de-rail more because of *any* glitch in your trackwork, especially switches.



STANTON DRIVE O scale

How to measure

The wheelbase of a truck is the distance from axle center to axle center. This can be difficult to measure on some models, so a quick and easy way to measure the wheelbase of your truck is to measure from the journal box center to journal box center, as shown here:



Wheel base (O)	Inches	Millimeters
8'-0"	2.00	50.80
8'-6"	2.13	54.10
9'-0"	2.25	57.15



To measure the wheel diameter, measure the wheel across the widest part of the face, excluding the flange, as shown left:

Wheel Diam. (O)	Inches	Millimeters
42	0.88	22.350
40	0.83	21.082
36	0.75	19.049
33	0.69	17.520

To measure the wheel tread (thickness) measure across the entire wheel, flange and all, as shown above. The /175 tread shown here is on manufacturer's example (although tolerances may vary, and some wheels can be as wide as 220.) Stanton drives are available with /172 tread (which would be appropriate here) or /145 tread (semi-fine scale) or /115 tread (fine scale). Not sure? Order /172 tread. Narrower wheels look more prototypical, but may de-rail more because of *any* glitch in your trackwork, especially switches.



O STANTON DRIVE

Powered \$ 94.95

Dummy Drive (no motor) \$ 64.95

8'0" Wheelbase				8'6" Wheelbase				9'0" Wheelbase			
Dia	Tread	Powered Part #	Dummy Part #	Dia	Tread	Powered Part #	Dummy Part #	Dia	Tread	Powered Part #	Dummy Part #
33	/115	41200-4	41200D-4	33	/115	41215-4	41215D-4	33	/115	41230-4	41230D-4
36	/115	41201-4	41201D-4	36	/115	41216-4	41216D-4	36	/115	41231-4	41231D-4
33	/145	41205-4	41205D-4	33	/145	41220-4	41220D-4	33	/145	41235-4	41235D-4
36	/145	41206-4	41206D-4	36	/145	41221-4	41221D-4	36	/145	41236-4	41236D-4
40	/145	41208-4	41208D-4	40	/145	41223-4	41223D-4	40	/145	41238-4	41238D-4
42	/145	41209-4	41209D-4	42	/145	41224-4	41224D-4	42	/145	41239-4	41239D-4
33	/172	41010-4	41010D-4	33	/172	41225-4	41225D-4	33	/172	41240-4	41240D-4
36	/172	41211-4	41211D-4	36	/172	41226-4	41226D-4	36	/172	41241-4	41241D-4
40	/172	41213-4	41213D-4	40	/172	41228-4	41228D-4	40	/172	41243-4	41243D-4
42	/172	41214-4	41214D-4	42	/172	41229-4	41229D-4	42	/172	41244-4	41244D-4

The Stanton Radio CAB

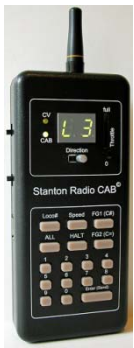
Visit www.s-cab.com for complete information and ordering

Inside the model is a decoder, a radio receiver and its antenna. In your hand is a wireless controller (the S-CAB) which communicated directly with the model's radio receiver. With these two products you control your model using DCC commands while avoiding any layout re-wiring or base stations, or enjoy the benefit of battery power and eliminate track wiring. Except for loco decoders, no DCC equipment to buy or install. With one CAB, run as many as 15 locos during and operating session. Control headlights, interior lighting and other loco functions. Choose a suitable decoder and control a selection of loco sounds; bells, whistles, chuff, brakes; whatever the decoder supports.



What is the Stanton CAB?

The Stanton Radio CAB (S-CAB) is a hand-held wireless controller that allows a user to operate up to 15 locomotives equipped with a radio receiver-decoder. The hand-held controller is battery powered and is designed for one-handed operation. It communicates with locos via radio, not through track signals, meaning no base station is needed and no changes to layout wiring are required (be it DC or DCC). If you're tired of fighting dirty track and power glitches, convert your loco to on-board battery power—the S-CAB system is already prepared for that. The battery power supply (available separately) uses a single 3.7V cell to deliver a constant 12VDC, including real-time battery charging if track power is either sporadically or continuously available. Convenient battery power in minimum space.

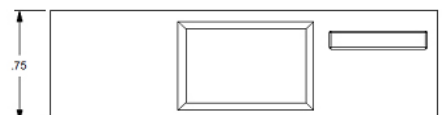
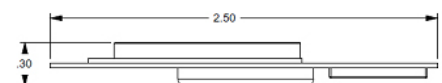
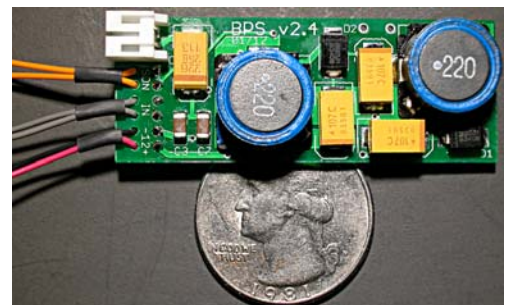


The S-CAB is supplied as a package which included one loco receiver/decoder, the hand-held controller, a USB cable (to charge the controller's battery when needed), and a user's guide. Additional loco receivers are available separately, and can be supplied for use with battery or track power. S-CAB loco control is compliant with NMRA standards, and you choose the decoder you want when you order your system (so far NCE decoder; economical, great control, without sound or Tsunami decoder if you want sound in the loco).

Pictured at right is the receiver, that is banded to the radio receiver and DCC decoder (NCE in this photo) with added antenna. Select a location in the model, mount the receiver-decoder, connect battery or track power, wire connections for motor, lights, speaker, etc., and that's it. Switch on the S-CAB, assign the model a 1 or 2-digit identifier (loco address; standard DCC stuff) and your ready to operate.

Have fun running trains with the benefit of DCC, but without its complexity, at an affordable price. Add receivers to locos as you need them. Scale is irrelevant to the S-CAB; everything from HO to G is at your control – you do need to choose the appropriate decoder and be sure to plan for the power requirements of larger motors.

The S-CAB communicates by radio, not wires, making it wireless, simple, straightforward, affordable and fun!



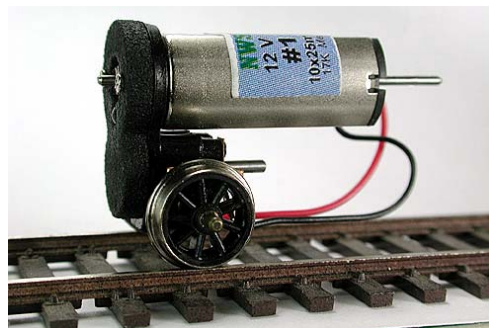
Visit www.s-cab.com for complete information and ordering

The FLEA

FLEA Geared Drive Units

See part nos. next page

- 1) Choose wheelsize
- 2) Choose axle style
- 3) Choose motor size



Individual wheelsets available for FLEAs and auxilliary

gearbox, \$7.95 (1/pkg) -- see part nos. under "Add'l geared wheelsets" next page

Individual mathcing wheelsets available ungeared \$12.95 (4/pkg) -- see part nos. under "Matching ungeared wheelsets" next page

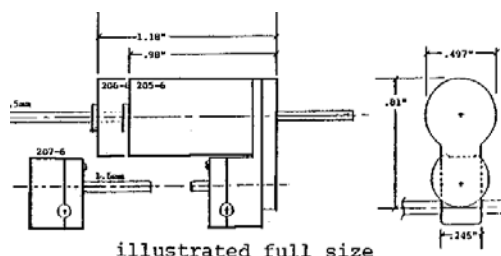
A miniature motorizing unit for powering small railroad models, ship capstans, model house elevators and other miniature devices. With interchangeable wheelset (see listing below) or custom made wheelset, can be used to power small models from HO to On3; use the output shaft (#2023-6) for your special project or gear your own 3/32" shaft using the #31015-6 gear. NWSL precision motor provides speed range from slow crawl to moderate speed.

The gearbox is precision moulded in Acetal engineering plastic (Delrin is an Acetal plastic) for strength and self-lubricating properties. IMPORTANT: Proper gear lubrication IS required for better operation and longer component life; gearbox (bearing area) lubrication is recommended for long life. Quality NWSL manufactured brass gears and polished steel worm provide quiet, efficient, reliable smooth operation that your fine models deserve.

The driven wheelset is easily interchangeable - just loosen two screws and replace the wheelset with any desired FLEA III wheelset or 3/32" output shaft. Other wheelsets (gauge, wheel size) can be ordered for custom assembly.

The FLEA is a single axle basic drive unit, however, additional axles can be driven from the shaft protruding from the bottom gearbox by hooking up an Auxiliary gearbox (#207-6) using NWSL universal couplings (#483-6 or #487-6). The Auxiliary gearbox (#207-6) can also be used independently as a miniature 15:1 ratio gearbox. Motor shafts are long (17mm) so that you can choose where and

if you wish to use a flywheel (NWSL #420-6 or #421-6). Unwanted shaft length should be removed carefully using a cutoff wheel in a hand motor tool (protect bearings and eyes from grindings intrusion).

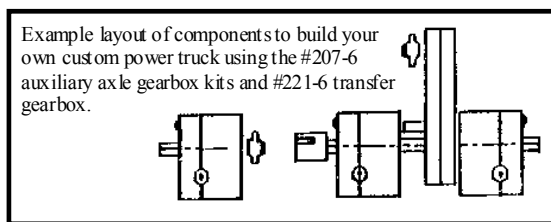


Tractive effort and electrical contact reliability are heavily dependent on clean track and model weight as with any powered model drive. Wheelsets are provided with outside bearing (shouldered) journals for 1/16" sideframe bearings. Supporting the model weight on these bearings will provide substantially longer gearbox life than using the gearbox to support the model weight. Electrical pickup is via wheel wipers; additional pickup from other wheels of your finished model will result in more reliable operation.

Individually available wheelsets for FLEAs and auxilliary gearbox:

			GEARED \$7.95(1/pkg)	UNGEARED \$12.95 (4/pkg)
HO	33"/110	shouldered axle	2001-6	37107-4
HO	36"/110	shouldered axle	2002-6	37108-4
HO	40"/110	shouldered axle	2003-6	37131-4
HO	42"/110	shouldered axle	2004-6	37132-4
HO	26"/110	shouldered axle	2005-6	37103-4
HO	26"/88	shouldered axle	2008-6	37203-4
HO	33"/88	shouldered axle	2009-6	37207-4
HO	36"/88	shouldered axle	2010-6	37208-4
On2	20"/110	shouldered axle	2015-6	37851-4
Sn3	24"/88	shouldered axle	2016-6	37791-4
Sn3	26"/88	shouldered axle	2017-6	37790-4
HOn3	26"/88	shouldered axle	2018-6	37303-4
HOn3	26"/88	flush axle	2019-6	37323-4
HOn3	30"/88	shouldered axle	2020-6	37306-4
On3	26"/110	flush axle	2021-6	37823-4
On3	26"/110	shouldered axle	2022-6	37803-4

206-6 shown with 9-spoke wheels
and 10253-9 motor



Component Parts:

- 2023-6 \$6.95 axle and gear (no wheels) 3/32" diameter x 1.015" length
- 31015-6 \$6.00 axle gear only, 3/32" bore, 15 tooth
- 221-6 \$29.95 25-1 Transfer GEARBOX, 1.5mm shafts
- 207-6 \$8.50 Auxiliary gearbox, 15:1 ratio, no axle (see page 51 also)

Need different specifications? Give us a call!

01/01/2016

Prices subject to change without notice.

MAGIC CARPET

*Fits Standard O gauge / P:48
only*

**For Powering:
STREETCARS, INTERURBANS,
RAILCARS, SPEEDERS, DIESEL
LOCOMOTIVES, etc.**



A REAL 'NOSE-HUNG' TRACTION MOTOR UNIT

EASY TO INSTALL

- Just like installing a plain wheelset in a truck
- Completely underfloor within the truck,
- Easy power truck exchange between cars
- Leaves car floor intact enabling interior detail, if desired.
- Allows complete interior detailing - even in diesel locomotives.

VERSATILE Most any wheelbase, any sideframes, complete flexibility of operation with truck swing limited only by wiring. Fits almost any truck that a plain wheelset will! Allows power trucks to be sprung or equalized just like the prototype for better tracking and traction. Power one axle, two or all as appropriate for your power requirements, how the prototype was powered, etc. NWSL recommends all axles be powered on a locomotive, at least 2 axles on an interurban. Makes powering maximum traction trucks a snap. Because everything to provide power is completely within the truck, you can quickly interchange power trucks from one model to another just like the prototype - gives you 'many' powered cars from one (or a few) power truck(s). Wire unpowered cars with a plug (not included) or on 2 rail, you can just depend on truck mounted pickup wipers (you supply) without car wiring if desired.

POWERFUL FOR ITS SIZE A heavy interurban or gas-electric with two axles powered can pull several trailers or freight cars (depending on grades and curves) just like the prototype. A car or locomotive with 4 axles powered will pull 15 to 20 cars, fewer on grades or very sharp curves. A streetcar may be powered on just one axle, but two powered axle will provide more reliable operation (less wheel slip problem).

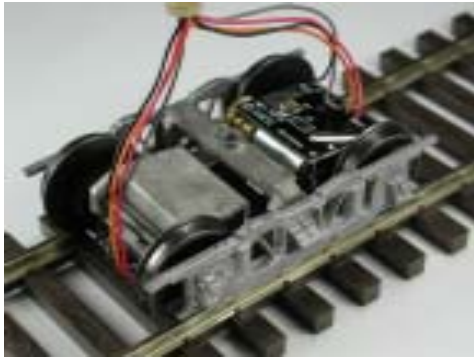
PROTOTYPICAL The real streetcars, diesel-electric locomotives, etc. are driven by motors mounted to the wheelset axle and geared to a large wheel gear. They are spring mount attached to the truck frame and are called 'nose-hung'. The size, shape, mounting and gearing of the Super Magic Carpet is very similar to these 'nose-hung' design prototype electric motor units used for over 100 years on streetcars, interurbans, electric locomotives and diesel-electric locomotives. Speed range (no load) is 0-40 SMPH (scale miles per hour) for switcher, 0-60 SMPH for freight and 0-80 SMPH for passenger.

POWER REQUIREMENT DC only, 12 volt, 0.2 to 0.5 amp per unit. Not for AC operation. Units can be wired in series or parallel to suit your requirements (NWSL recommends parallel wiring). Series provides slower speeds approximately one half that of parallel as well as protection against excess voltage but requires closely matched units for reliable coincident starting. Operates on any 12 volt DC power pack; exceeding 12 volts is not recommended.

CHOICE OF WHEEL SIZES and TREADS NWSL manufactures 4 tread widths suitable for 'O' scale modeling in wheel diameters ranging from 22" (minimum size for Magic Carpets is 26") to 40" on 1/8" axle. The traditional 'O' wheel tread is known as NMRA /172 (but generally referred to as /172) width wheel. The NWSL/145 tread wheel provides better looking models with fewer modeling compromises found with excess width /172 wheels interfering with truck or underbody detailing, while retaining satisfactory tracking on track laid to NMRA gauging standards. The NWSL/135 tread is commonly used in traction modeling while the /115 tread (P:48) tread is used for finescale modeling. Caution - the latter two treads will not operate reliably on common 'O' gauge trackage.

RELIABLE Designed for long life and smooth, quiet operation. Gearhead motor with nitrogen hardened steel gears and precision manufactured NWSL gears and wheels assure fine operation. Weight of the model is carried on truck journals just like the prototype avoiding excessive motor or gearbox wear.

SOUND The MAGIC CARPET is compatible with sound systems. Operating noise is low and similar to the prototype.



Two Magic Carpets installed in a Q Car Company Baldwin truck.

MAGIC CARPET **\$74.95**
Axle: Shouldered 1/8" x 1.760" x .088"

Part Numbers

2-RAIL (insulated)					3-RAIL (non-insulated)			
Wheel	Switcher	Freight	Passenger	Matching Wheelset	Switcher	Freight	Passenger	Matching Wheelset
Size	MCI	MCH	MCIII	\$17.95 (Pkg/4)	MCI	MCH	MCIII	\$17.95 (Pkg/4)
26/115	n/a	n/a	9320-4	8350-4	n/a	n/a	9300-4	8165-4
28/115	n/a	9236-4	9326-4	8355-4	n/a	9204-4	9304-4	
30/115	9121-4	9221-4	9321-4	8354-4	9101-4	9201-4	9301-4	8169-4
33/115	9149-4	9249-4	9349-4	8351-4	9102-4	9202-4	9302-4	8166-4
36/115	9150-4	9250-4	9350-4	8352-4	9103-4	9203-4	9303-4	8167-4
40/115	9117-4	9217-4	9317-4	8353-4	9105-4	9205-4	9305-4	8168-4
26/135	n/a	n/a	9327-4	8194-4	n/a	n/a	9306-4	8176-4
28/135	n/a	9229-4	9329-4	8195-4	n/a	9207-4	9307-4	8178-4
30/135	9143-4	9243-4	9343-4	8196-4	9108-4	9208-4	9308-4	8180-4
33/135	9144-4	9244-4	9344-4	8197-4	9109-4	9209-4	9309-4	8183-4
36/135	9145-4	9245-4	9345-4	8198-4	9110-4	9210-4	9310-4	8186-4
40/135	9146-4	9246-4	9346-4	8199-4	9111-4	9211-4	9311-4	8190-4
26/145	n/a	n/a	9319-4	8250-4	n/a	n/a	9312-4	n/a
28/145	n/a	9218-4	9318-4	8255-4	n/a	9213-4	9313-4	n/a
30/145	9116-4	9216-4	9316-4	8254-4	9114-4	9214-4	9314-4	n/a
33/145	9134-4	9234-4	9334-4	8251-4	9122-4	9222-4	9322-4	n/a
36/145	9135-4	9235-4	9335-4	8252-4	9123-4	9223-4	9323-4	n/a
38/145	9128-4	9237-4	9328-4	8259-4	9125-4	9225-4	9325-4	n/a
40/145	9115-4	9215-4	9315-4	8253-4	9124-4	9224-4	9324-4	n/a
42/145	9151-4	9251-4	9351-4	8258-4				

#1 Gauge Power Truck

A basic power truck for simplicity in modeling powered prototypes
 Easy-to-use, just put it on the track and apply power.
 Quality operation with versatility to match your creativity

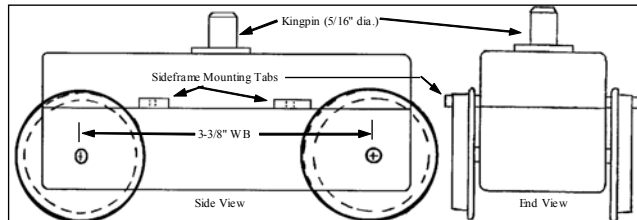
GAUGE

A self-contained power truck for #1 (1-3/4") gauge railroad modeling providing fine operation and prototypical speed range from a fine crawl to full speed with common 12 volt DC model railroad control power packs. High efficiency NWSL 2940 size can motor provides low amp draw (under 3/4 amp per power truck) and long motor life. Works with any power supply providing 12 volt DC, exceeding 18 Volts or using AC will damage the motor. All wheel electrical pickup via wheel wipers enables the truck to run independently or you can use the wiring exiting through the kingpin into the carbody to connect directional lighting circuits or control circuits and/or connect wiring between trucks for better pickup continuity and thereby more reliable operation. Nickel plated brass wheels (units manufactured before May 1989 had aluminum wheels) for reliable, long lasting electrical pickup and heavy weight in the truck for more reliable tracking. Made in USA by NWSL, motor made in Japan. This truck powers the GREAT TRAINS F40 (AMTRAK) and F7 (*shown at right*) diesel locomotives. This truck has been continually improved and upgraded since introduction with substantial improvement in life and efficiency. The ball bearing upgrade released April 1991 improves and extends operation life even more for your modeling enjoyment.



#1
32
29
24
22
20

Two axle EMD #1 Gauge (1.75") Power Truck Selections TREAD -->	/270	/236	/172
#1 gauge power truck, 9'0" wheelbase, 40" wheels (1:32 scale) with 2940 motor R-T-R LESS SIDEFAMES, 12V no load speed is 79 S MPH	8690-4	28690-4	48690-4
Same as above except NOT POWERED	8691-4	28691-4	48691-4
Same as above except NO ELECTRICAL PICKUP	8692-4	28692-4	48692-4
Sideframes, plastic (2)	8694-4		
SERVICES - ACCESSORIES			
Custom assembly surcharge (\$20) for alternate wheel size/tread option on above (36", 33", tread)	8697-4	28697-4	48697-4



Illustrated actual size to provide you an accurate feeling for the size of these units and permit easy spatial fitting determination in your model.



Illustrating two #8690-4 powering projects to add operation or improve operation of #1 gauge models—Mr. Rogers trolley (left) and Bachmann #1 gauge trolley (right), etc.—what do you want to build and/or power? Installation descriptions can be found in the NWSL catalog section 6 pages 5 and 19.



6 wheel power trucks for 1:32 Scale EMD Diesel Locomotives

This 6 wheel truck is manufactured by NWSL in three versions with proper scale wheelbases modeling all 3 EMD 6 wheel truck wheelbases for your special craftsman project permitting you to model and power almost any EMD prototype diesel in 1:32 scale for #1 gauge. The #8695-4 was used by GREAT TRAINS on their fine new EMD E9 diesel model. Size and cross-section is same as illustrated above except added axle and truck length for overall frame length of almost 5-1/2". Modeler must supply or construct own non-functional sideframes, sideframes cannot be supplied. **SOLD IN MATED PAIRS ONLY.** Truck design same as above drawing, longer but with same cross-section.

PROTOTYPE APPLICATION (Where used)	WHEEL TREAD --->	/270	/236	/172
EMD HT-C as used on SD40, SD45, etc. 13'7" WB, uneven axle spacing, 40"/270 (1-1/14") w heels		8693-4	28693-4	48693-4
EMD Flexicoil as used on F45, FL9, FP45, SD7, SD9, SD40; 13'7" WB, even axle spacing 40"/270 (1-1/14") w heels		8694-4	28694-4	48694-4
EMD E-2 thru E-9 passenger diesels; 14'1" WB, 36"/270 (1-1/8") w heels		8695-4	28695-4	48695-4