

Pull/Push DC Solenoids for Diesel Engines

RP Series

The Murphy Push/Pull DC Solenoids provide single unit versatility for engine applications, such as shutdown. One solenoid offers pull/push operation. The RP Series has no internal switches, reduces coil burnout and reduces adjustments while boosting reliability. The solenoid offers high force in its small size. It can be used with most engines' start systems.

A choice of two models and two voltages is available. All models come complete with return spring and rubber seal boot.

An SD85 Solenoid Drive Time Delay is also available to greatly reduce possibility of coil burnout and to facilitate low current-piloted operation.



Basic Models

Models RP2307B and RP2308B give a full 1 in. (25 mm) stroke at 11 pounds (49 N) and hold up to 27 pounds (120 N) at full voltage, continuous duty. They will operate at any stroke less than maximum; see chart below.

Models RP2309B and RP2310B can pull 17 pounds (75 N) with a 1-1/2 in. (38 mm) stroke. They hold up to 35 pounds (155 N) at full voltage, continuous duty. See chart below for holding force at any stroke less than maximum.

SD85 Solenoid Drive Time Delay

The SD85 is used when the solenoid is duty cycled for short time periods such as two-position throttle operation. It also provides enhanced operational control for normal on-off applications. Using the SD85 ensures the energize coil is only powered for one to two seconds with each operation. If the plunger does not seat in that time, it is highly unlikely it will seat. The SD85 activates both coils of the solenoid for a short time then de-energizes the Energize coil. The Hold-in coil is energized as long as the signal to the SD85 is active. This ensures long life of the RP solenoid.

Input voltage: 8 to 30 VDC. See chart below for current ratings.

Watts Power/Cold Force in Pounds at 100% Voltage/Inches Stroke

Solenoid Model Number	Max Stroke In. (mm)	Power in Watts		Force* in Pounds [Kilograms] at 100% Voltage† Stroke in Inches (Millimeters)							
		Hold Coil	Energize Coil	Hold Continuous	1/8 (3)	1/4 (6)	1/2 (13)	3/4 (19)	1 (25)	1-1/4 (32)	1-1/2 (38)
RP2307B	1 (25)	18	624	25 [11.34] <13> [5.90]	22 [9.98] <12> [5.44]	21 [9.53] <11> [4.99]	17 [7.71] <10> [4.54]	14 [6.35] <8> [3.63]	10 [4.54] <6> [2.72]	—	—
RP2308B	1 (25)	12	696	27 [12.25] <15> [6.80]	25 [11.34] <14> [6.35]	23 [10.43] <13> [5.90]	19 [8.62] <12> [5.44]	15 [6.80] <9> [4.08]	11 [4.99] <7> [3.18]	—	—
RP2309B	1-1/2 (38)	18	1029	32 [14.52] <19> [8.62]	30 [13.61] <18> [8.16]	27 [12.25] <16> [7.26]	22 [9.98] <14> [6.35]	18 [8.16] <11> [4.99]	13 [5.90] <9> [4.08]	8 [3.63] <6> [2.72]	6 [2.72] <4> [1.81]
RP2310B	1-1/2 (38)	12	960	35 [15.88] <20> [9.07]	34 [15.42] <19> [8.62]	31 [14.06] <17> [7.71]	26 [11.79] <15> [6.80]	22 [9.98] <12> [5.44]	17 [7.71] <9> [4.08]	12 [5.44] <7> [3.18]	7 [3.18] <4> [1.81]

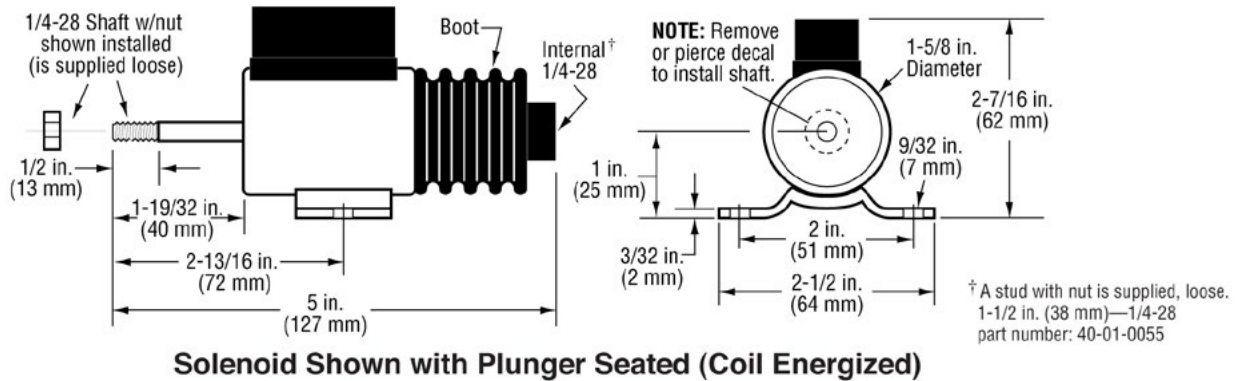
* Forces shown are without return spring. Forces shown < > are with return spring. Forces shown in [] are in kilograms.

† To determine the operating current, divide the power (watts) indicated in the above table by the applied voltage. Solenoids will operate at any stroke less than maximum.

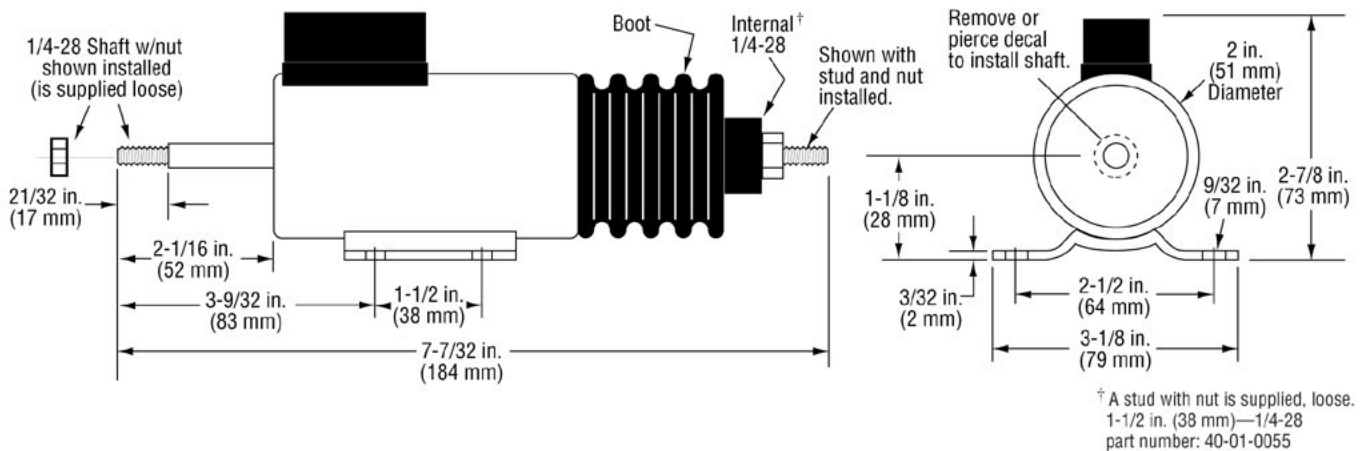
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Dimensions

RP2307B & RP2308B



RP2309B & RP2310B



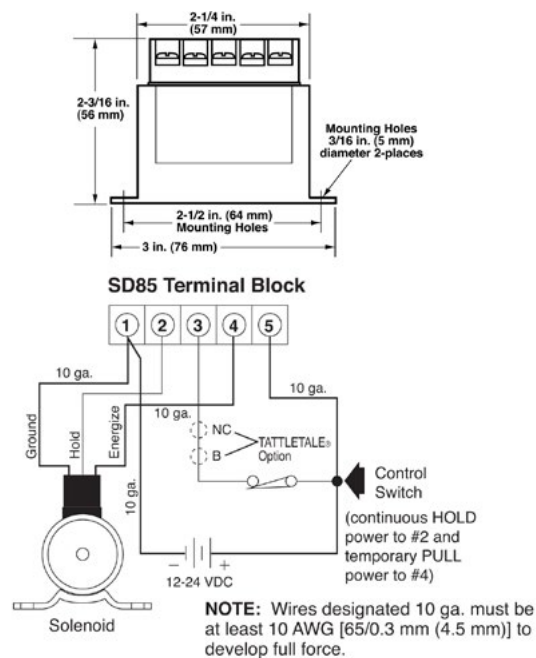
NOTES:

1. Typical operating temperature for single 15 second operation of the energize coil is less than:
 140° F (60° C) ± 10° F (6° C) for 1 in. (25 mm) Stroke Solenoids (70° F/21° C rise above ambient)
 120° F (49° C) ± 10° F (6° C) 1-1/2 in. (38 mm) Stroke Solenoids (50° F/10° C rise above ambient)

See **CAUTION** statement in **Operations** section on previous page and note maximum housing temperature is **185° F (85° C)**.


2. The energize coil should not be activated for more than 15 seconds. Longer energize coil activation times will damage the solenoid.
3. Allow minimum 15 minutes for cooling between activations of energize coil to avoid damaging the solenoid. (Depends on length of time energize coil is energized.) Contact Enovation Controls for high cycle rate applications.
4. The energize coil must fully seat the plunger to allow the hold-coil to function properly.

SD85



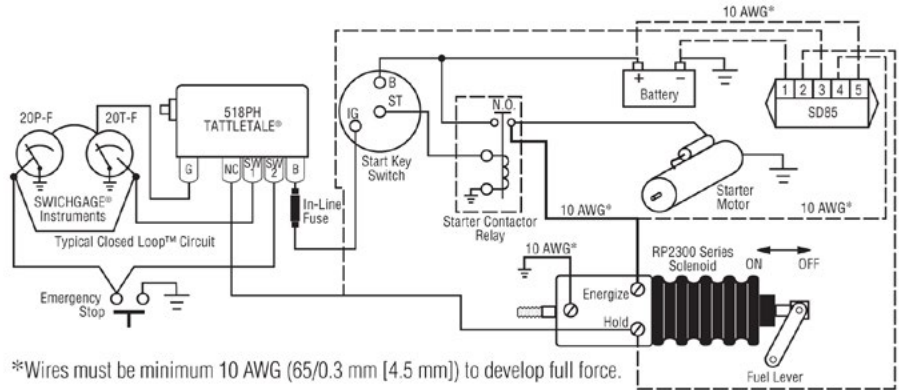
Typical Wiring Diagrams

NOTE: In either application if the starter hangs on starters with integral solenoids, the energize coil remains energized.

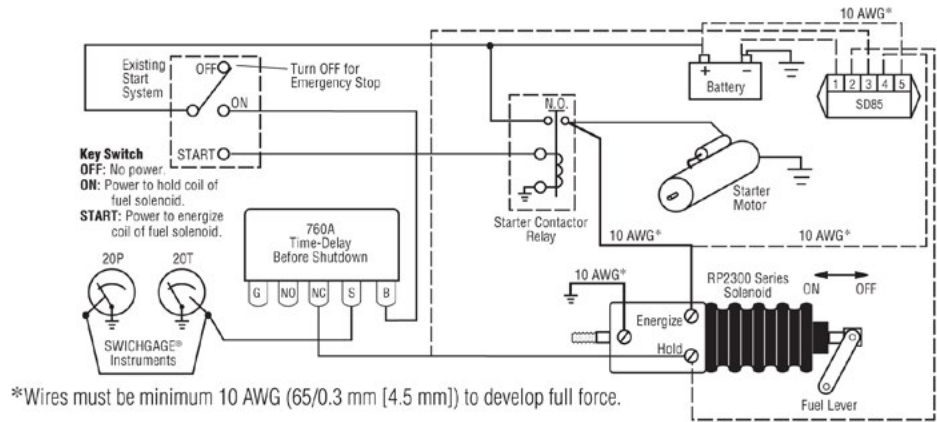


CAUTION: On certain starter solenoids/contactor relays, current can feed back through the energize terminal from the hold coil and provide a parallel path to ground through the device connected to the energize terminal.

Typical time-delayed shutdown using a 518PH magnetic switch (SD85 is optional)



Typical time-delayed shutdown using a 760A magnetic switch (SD85 is optional)



Mechanical Installation

1. Bolt the solenoid securely to the mounting bracket.
2. Connect linkage and check for binding. Plunger should move freely throughout the complete stroke and be allowed to bottom at the internal stop of the solenoid.

DO NOT MOUNT WITH BOOT DOWN. DO NOT APPLY ANY GREASE OR LUBRICATION TO PARTS.

IMPORTANT: If the plunger does not seat, it will release prematurely when shifted to the holding mode of operation. Re-adjust linkage to lengthen the plunger stroke. Adjust the yoke in increments of 1/2 turn until plunger will remain in hold position.

Electrical Installation

1. Refer to the diagrams above for typical electric wiring.
2. Use minimum 10 AWG [65/0.3 mm (4.5 mm)] wire size, as noted in the wiring diagrams. A smaller wire will reduce the current available and thus the pulling force. Wire length must be kept to a minimum.

Operation

The solenoid coil is connected to the existing engine starter system or an equivalent circuit. A SD85 is recommended. At starting, both the Energize and Hold-in coils are energized. In the run mode, the Hold-in coil is continuously energized while the Energize coil has to be disconnected, reducing the heating effect and power consumption and avoiding damage to the device.

NOTE: Coils that burn out due to improper electrical hookup, misadjustment or improper operation are not covered by Murphy factory warranty.



CAUTION: The solenoid housing is hot to the touch. A temperature rise to 185° F (85° C) is permissible.

NOTE: A cool down period of 15 minutes minimum should be allowed between energized pull in cycles.

* Always provide proper circuit protection with fuses or circuit breakers.

How to Order

Part Number	Model and Description	Notes
40700092	RP2307B — 12VDC, 1 in. (25 mm) stroke, 10 lbf (44 N) pull, 25 lbf (111 N) hold	DC Solenoids
40700093	RP2308B — 24VDC, 1 in. (25 mm) stroke, 11 lbf (49 N) pull, 27 lbf (120 N) hold	
40700094	RP2309B — 12VDC, 1-1/2 in. (38 mm) stroke, 13 lbf (58 N) pull, 32 lbf (151 N) hold	
40700095	RP2310B — 24VDC, 1-1/2 in. (38 mm) stroke, 17 lbf (75 N) pull, 35 lbf (155 N) hold	
40700067	SD85 Solenoid Drive Time Delay	
65010108	Clevis yoke assembly	
65010110	Clevis yoke chain assembly	
40050315	Threaded rod (1-1/2 in.)	
00002457	RPS in-line ball joint	
00002458	RPS 90° ball joint	

Shipping Weights:

RP2307B: 24oz. (0.7 kg)
 RP2308B: 24 oz. (0.7 kg)
 RP2309B: 48 oz. (1.4 kg)
 RP2310B: 48 oz. (1.4 kg)
 SD85: 6.4 oz. (0.2 kg)

Clevis yoke: 1 oz. (.03 kg)
 Clevis yoke chain assembly: 2 oz. (.04kg)
 Threaded rod (1-1/2 in.): .05 oz. (.001 kg)
 RPS in-line ball joint: .05 oz. (.001 kg)
 RPS 90° ball joint: 1 oz. (.03 kg)