THREE DISC CLUTCH
for KART RACING ENGINES

Vortex RED

PATENTS
6,279,711
6,536,574
New 9,151,346

IMPORTANT - The Vortex RED clutch is designed to rotate in only one direction. The sprocket is attached to the drum with a left-hand thread and must be run inboard (sprocket adjacent to engine block) to prevent clutch damage.

Performance Notes - The Vortex clutch was designed to engage very smoothly in order to avoid "bogging" the engine.

Assembly -

1. Check the engine's crankshaft for smoothness and cleanliness. Remove all dirt, rust and burrs.
2. Install the short spacer with the chamfered edge of the spacer against the chamfer on the crankshaft.
3. If using a large sprocket, mount the sprocket followed by the long spacer. If using a small sprocket, mount the long spacer followed by the sprocket.
4. Install the clutch assembly and key followed by the end cap.
5. Install the hex head cap screw and torque to 460 inch pounds if threads are clean and dry, 270 inch pounds if the threads are coated with an anti-seize compound.

Adjustment - Set the engagement speed to the engine's peak torque RPM (typically 4000 RPM). The engagement speed is adjusted by removing the Vortex springs and repositioning the lower leg of each spring in another hole. The optional Vortex Spring Wrench, Part Number 4018 simplifies spring removal and replacement. The #2 position causes engagement at approximately 4000 RPM. The difference between adjacent holes is approximately 180 RPM. This is a starting point, remember, every motor is different thus engagement in the #2 position may be different.

Maintenance - Clutches like tires get dirty quickly. It is important to clean clutch discs every race weekend if not every heat if you want maximum acceleration.

Upon disassembly use an appropriate marker to identify the top sides of the drive plates and clutch discs if they will be reused. It is very important to replace each disc and drive plate in its original orientation. Heat and pressure force the drive plates into a permanently cupped shape and the soft discs will quickly wear into a conforming shape. These five pieces become a matched set. An upside down clutch disc or drive plate can cause poor contact between members and require another break-in process. Even if only one of these seven parts is damaged, replace all seven parts for maximum performance.

The Vortex clutch is not sensitive to air gap. Clutch disc thickness and taper do not affect performance. The criteria for replacing a disc are heat and chemistry i.e. replace the discs when they become glazed.

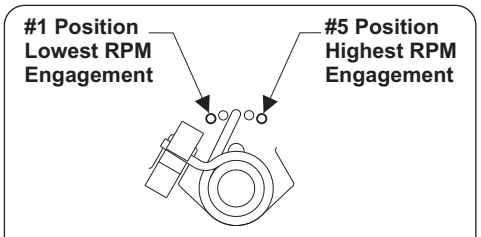
SMC highly recommends cleaning clutch (friction) discs mechanically NOT chemically. Brake cleaner and other chemicals are inadequate for removing dirt and other fine particles packed into the tiny voids. Do not use sandpaper on the 12 tab disc. A stainless steel utility brush (aka platers' brush) with a wire diameter of .006 is ideal for removing the hard-to-get-at dirt. The friction material is very porous and unfortunately works well as a dirt collector. Once the voids are filled and packed, the dirt starts to act as a lubricant (think tiny ball bearings) and causes the clutch to slip for a greater distance.

Drive plates that are tan, yellow, light blue or dark blue in very small areas and distorted less than 0.020 inch from flat may be reused. Heat and pressure cause friction material to separate from the clutch disc and bond to the drive plates. This friction material should be removed from the drive plates with sandpaper.

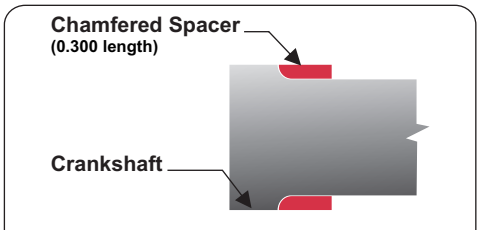
Use a Torx® T25 wrench with 90 inch-pounds (eight foot-pounds) of torque to tighten the six button head cap screws.

Protect the clutch from moisture. Corrosion will diminish performance.

Additional information is available at the SMC web site www.kartclutches.com



VORTEX Spring Adjustment



Cross Section

THREE DISC CLUTCH
for KART RACING ENGINES

SMC Roller Levers

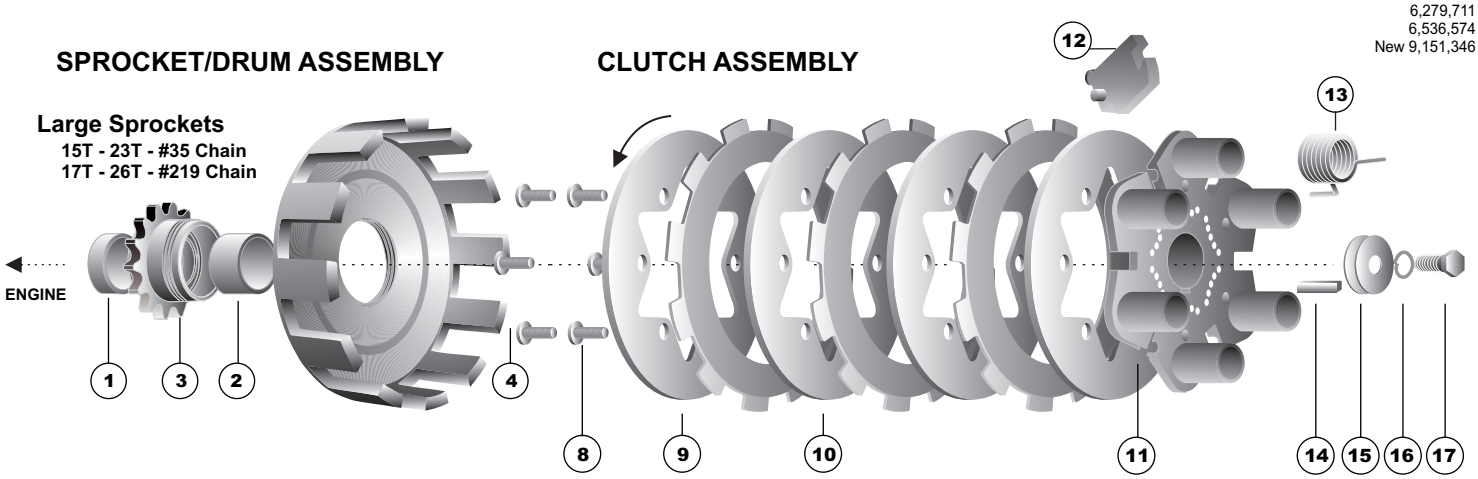
Vortex RED

PATENTS
6,279,711
6,536,574
New 9,151,346

SPROCKET/DRUM ASSEMBLY

Large Sprockets
15T - 23T - #35 Chain
17T - 26T - #219 Chain

CLUTCH ASSEMBLY



PARTS

Ref. No.	Part No.	Price Each	Description (Number Required)
	4203	**367.50**	**VORTEX RED, Three Disc Clutch, No Sprocket**
1	4212	4.00	Chamfered Spacer (0.300 length)
2	4213	4.00	Spacer (0.575 length)
3	xxxx		SMC Sprocket (See Sprocket Chart)
4	4233	34.95	Drum, 12-Slots, Three Disc
8	4006	0.25	Button Head Cap Screw (6)
9	4003	16.00	Drive Plate (4)
10	4250	24.75	Clutch Disc, Twelve Tabs (3)
11	4243	145.00	Drive Hub, Three Disc
12	4120	20.00	SMC Roller Lever (6)
13	4068	3.00	VORTEX Spring, Gold (6) (See Spring Chart)
14	4036	0.50	Key, (0.875 length)
15	4016	0.60	Crankshaft Washer (2)
16	4025	0.25	Lock Washer
17	4217	0.75	Hex Head Cap Screw

OPTIONAL PARTS

Ref. No.	Part No.	Price Each	Description (Number Required)
9T & 10T #35 Chain, 11T & 12T #219 Chain Sprockets:			
1	4206	4.00	Chamfered Spacer (1.125 length)
4	4237*	29.95	Drum, 12-Slots, Three Disc, R.H.
16	4205	0.75	Socket Head Cap Screw
11T #35 Chain, 13T & 14T #219 Chain Sprockets:			
2	4210	4.00	Spacer (0.813 O.D. x 0.575 length)
	4267	120.00	**Rebuild Kit, Three Disc Clutches** (4 drive plates, 3 12-T clutch disc, 6 cap screws)

TOOLS

Part No.	Price Each	Description (Number Required)
4218	20.00	SMC Sprocket Wrench
4018	15.00	VORTEX Spring Wrench
4055	9.00	T-Handle, T25 Torx (Tool for #4006)

SMC RED SPROCKET CHART - #35 CHAIN

		Part No.	Price Each	Description
PTO Assembly	Small Sprockets	4659*	22.50	9T Sprocket Assembly
		4660*	22.50	10T Sprocket Assembly
		4661	22.50	11T Sprocket Assembly
		4662	22.50	12T Sprocket Assembly
		4663	22.50	13T Sprocket Assembly
		4683*	22.50	13T Sprocket Assembly
		4664	22.50	14T Sprocket Assembly
		4684*	22.50	14T Sprocket Assembly
	Large Sprockets	4665	22.50	15T Sprocket Assembly
		4685*	22.50	15T Sprocket Assembly
		4666	22.50	16T Sprocket Assembly
		4686*	22.50	16T Sprocket Assembly
		4667	22.50	17T Sprocket Assembly
		4668	22.50	18T Sprocket Assembly
		4669	22.50	19T Sprocket Assembly
		4670	24.75	20T Sprocket Assembly
		4671	24.75	21T Sprocket Assembly
		4672	27.00	22T Sprocket Assembly
		4673	27.00	23T Sprocket Assembly

SMC RED SPROCKET CHART - #219 CHAIN

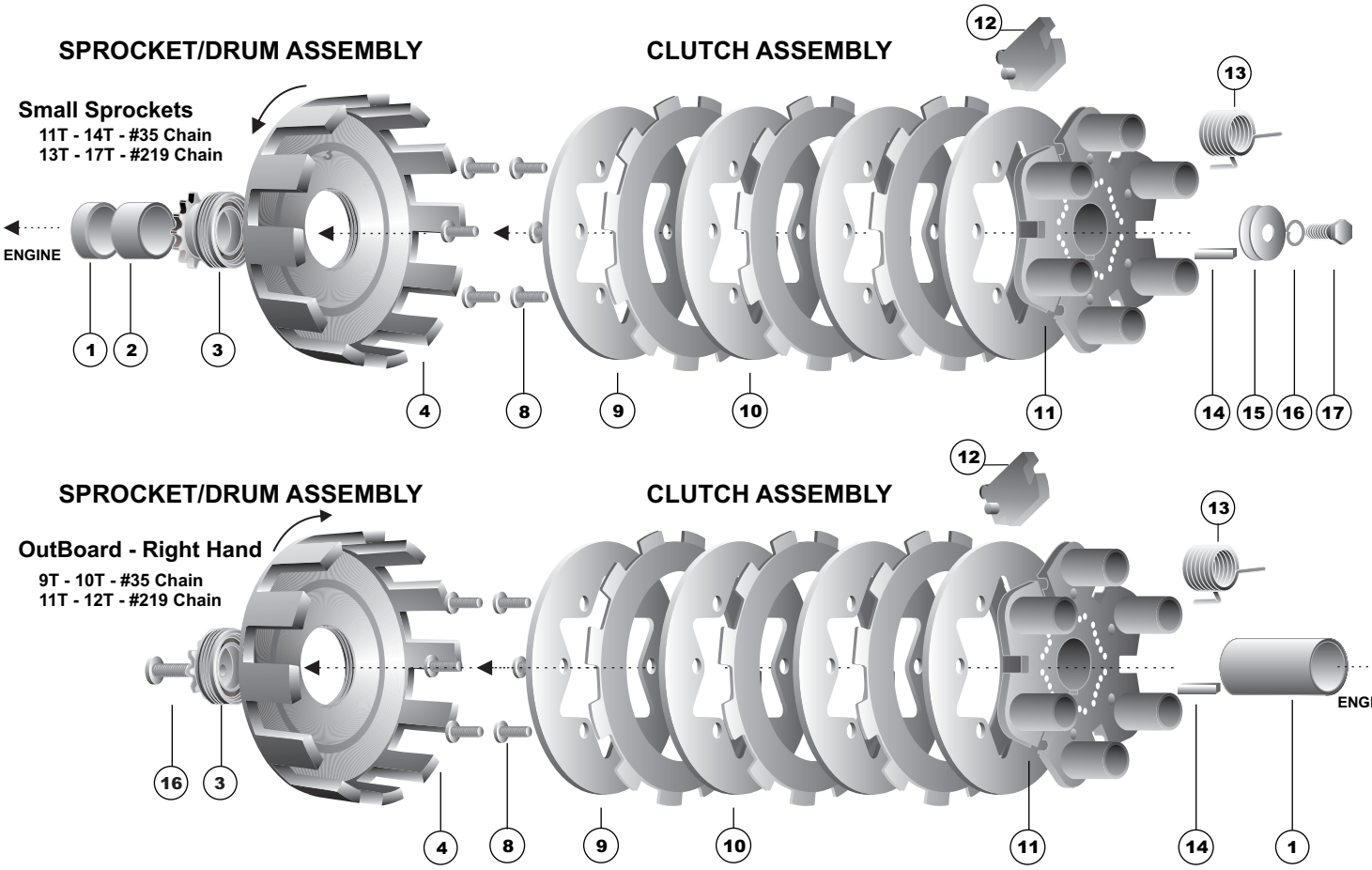
		Part No.	Price Each	Description
PTO Assembly	Small Sprockets	4761*	22.50	11T Sprocket Assembly
		4762*	22.50	12T Sprocket Assembly
		4763	22.50	13T Sprocket Assembly
		4764	22.50	14T Sprocket Assembly
		4765	22.50	15T Sprocket Assembly
		4766	22.50	16T Sprocket Assembly
		4767	22.50	17T Sprocket Assembly
		4768	22.50	18T Sprocket Assembly
	Large Sprockets	4769	22.50	19T Sprocket Assembly
		4770	22.50	20T Sprocket Assembly
		4771	22.50	21T Sprocket Assembly
		4772	22.50	22T Sprocket Assembly
		4773	22.50	23T Sprocket Assembly
		4774	24.75	24T Sprocket Assembly
		4775	24.75	25T Sprocket Assembly
		4776	24.75	26T Sprocket Assembly
		4778	24.75	28T Sprocket Assembly

NOTES: 1. Sprockets include Ball Bearing and Retaining Rings
2. * Right Hand Thread

01.15.16

THREE DISC CLUTCH
for KART RACING ENGINES

PATENTS
6,279,711
6,536,574
New 9,151,346



Spring Chart - Estimated Engagement RPM

Engine	Silver 1	Silver 2	Silver 3	Silver 4	Silver 5	Black 1	Black 2	Black 3	Black 4	Black 5	Gold 1	Gold 2	Gold 3	Gold 4	Gold 5
Honda/clone, Stock	3000	3160	3320	3480	3640	3600	3825	4050	4275	4500	4200	4425	4650	4875	5100
Honda/clone, Restricted	3100	3260	3420	3580	3740	3700	3925	4150	4375	4600					
Honda/clone, Modified	3200	3360	3520	3680	3840	3800	4025	4250	4475	4700	4400	4625	4850	5075	5300
B & S Animal, Stock	3200	3360	3520	3680	3840	3800	4025	4250	4475	4700	4400	4625	4850	5075	5300
B & S Animal, Restricted	3300	3460	3620	3780	3940	3900	4125	4350	4575	4800					
B & S Animal, Modified	3400	3560	3720	3880	4040	4000	4225	4450	4675	4900	4600	4825	5050	5275	5500
B & S flat head	3400	3560	3720	3880	4040	3600	3825	4050	4275	4500	4600	4825	5050	5275	5500
B & S flat head, Restricted	3500	3660	3820	3980	4140	3700	3925	4150	4375	4600					

If you plot the engine's torque vs. rpm curve and the clutch's torque vs. rpm curve on the same graph, the two lines will cross. At that point the clutch and engine are in equilibrium. The equilibrium point defines the engagement rpm. At lower rpm the clutch slips because the engine produces more torque than the clutch can accommodate. At higher rpm the clutch is locked up because it can handle much more torque than the engine can produce. If you modify the engine by changing cam, jets, bore, stroke, valve position, fuel type et cetera, the shape of the engine's torque vs. rpm curve will change. If you modify the clutch by changing spring position, the shape of the clutch's torque vs. rpm curve will change. When either curve changes shape, the equilibrium point moves. The table is merely an estimate of where that point occurs for various combinations of engines and springs.

See Spring Chart for Estimated Engagement RPM.

Structure Mechanics Corporation
PO BOX 58148 • Cincinnati, OH • 45258
513-598-1600 • caf@kartclutches.com

kartclutches.com

01.15.16