

# BAKER FACTORY 5 SPEED REVERSE

## INSTALLATION INSTRUCTIONS



### FITMENT & OPTIONS

PN F5-RV-1 1990-1997, All Factory 5 Speed Models  
 PN F5-RV-2 1998-1999 Softail, 1998-2000 FLT, FLH & Dyna, 1999 FXR  
 PN F5-RV-3\* 2000-2006 Softail, 2001-2006 FLT, FLH, 2001-2005 Dyna

Add: -P Suffix For Polished Door And Side Cover

Add: -C Suffix For Chrome Door And Side Cover

Add: -U Suffix For Upgrade To A BAKER DD5 Builder's Kit Or Complete Build

Add: -H Suffix For Hydraulic Side Cover Version

PN SHB-A H-D™ Hand Control Mounted Switch Housing, Satin Black Powdercoat

PN SHC-A H-D™ Hand Control Mounted Switch Housing, Chrome

PN 423-F5R 1" Handlebar Mounted Switch Housing Assembly, Polished

\*2000-2006 Softail Models Require BAKER PN TCSO-A, Oil Line Adapter Kit

# **BAKER FACTORY 5 SPEED REVERSE**

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# BAKER FACTORY 5 SPEED REVERSE

## OVERVIEW

We introduced the F6R kit, or Factory 6-speed Reverse, for the 2007-later H-D® 6-speed bike. The biggest advantage of the F6R is the ability to engage reverse from one switch in the handle bar area without the need to reach down near the hot exhaust. Minimal clutch modulation is required in reverse to launch the vehicle due to the short gear ratio. We finally got off our duff and are doing the same for the 1990-2006 5-speed bikes. We call it the F5R or Factory 5-speed Reverse. The contents in the F5R kit are similar to the F6R; door, side cover, countershaft, reverse gear train and hardware. Existing gearset (except countershaft), shift system and top cover will be re-used with the F5R installation. The F5R will be appreciated by those with heavy GVW applications (trikes, side cars and trailers) or those with compromised leg mobility.

## FEATURES:

- Reverse selection controlled by aircraft grade shifting solenoid & bell crank assembly. Electronic reverse safety lock-out solenoid must first be energized with the provided handle bar or inner fairing mounted momentary toggle switch. Shift safely into reverse every time!
- No need to use the starter motor for reverse maneuvers.
- Includes ready to install solenoids and neutral safety switch wiring.
- Reverse can only be selected when bike is in neutral by tying the solenoid function to the neutral switch on the transmission.
- No case modifications required for reverse gearset installation.

## REQUIRED READING

Regardless of the skill level or experience of the technician installing the F5R Retro Fit Kit or F5R Builder's kit, it is highly recommended that a genuine H-D® Parts Catalog and Factory Service Manual be available for your model of motorcycle.

## TOOLS & PARTS

- |  |  |
|--|--|
| • Common Hand Tools                                  | • 'Silver' Anti-Seize  |
| • Wire Cutters/ Strippers                            | • Access To A 20 Ton Hydraulic Press                         |
| • Heat Gun   | • Primary Drive Service Kit (Gaskets, Seals, Lock Tabs, etc) |
| • Voltmeter  | • 6" Calipers or 6" Machinists Scale                         |
| • Torque Wrench: 3/8" & 1/2" Drive                   |  |
| • 1 3/16" 6 pt Socket (Clutch Nut)                   |  |
| • 1 1/2" 6 pt Socket (Motor Sprocket Nut)            |  |
| • Primary Inner Race Service Kit (BAKER PN TOOLB-56) |  |
| • 32oz Primary Fluid (Spectro PN R.GAPCL)            |  |
| • 22-24oz Transmssion Fluid (Spectro PN BD75140)     |  |
| • 'Blue' & 'Red' Thread Lock                         |  |

## HYDRAULIC VERSION PARTS

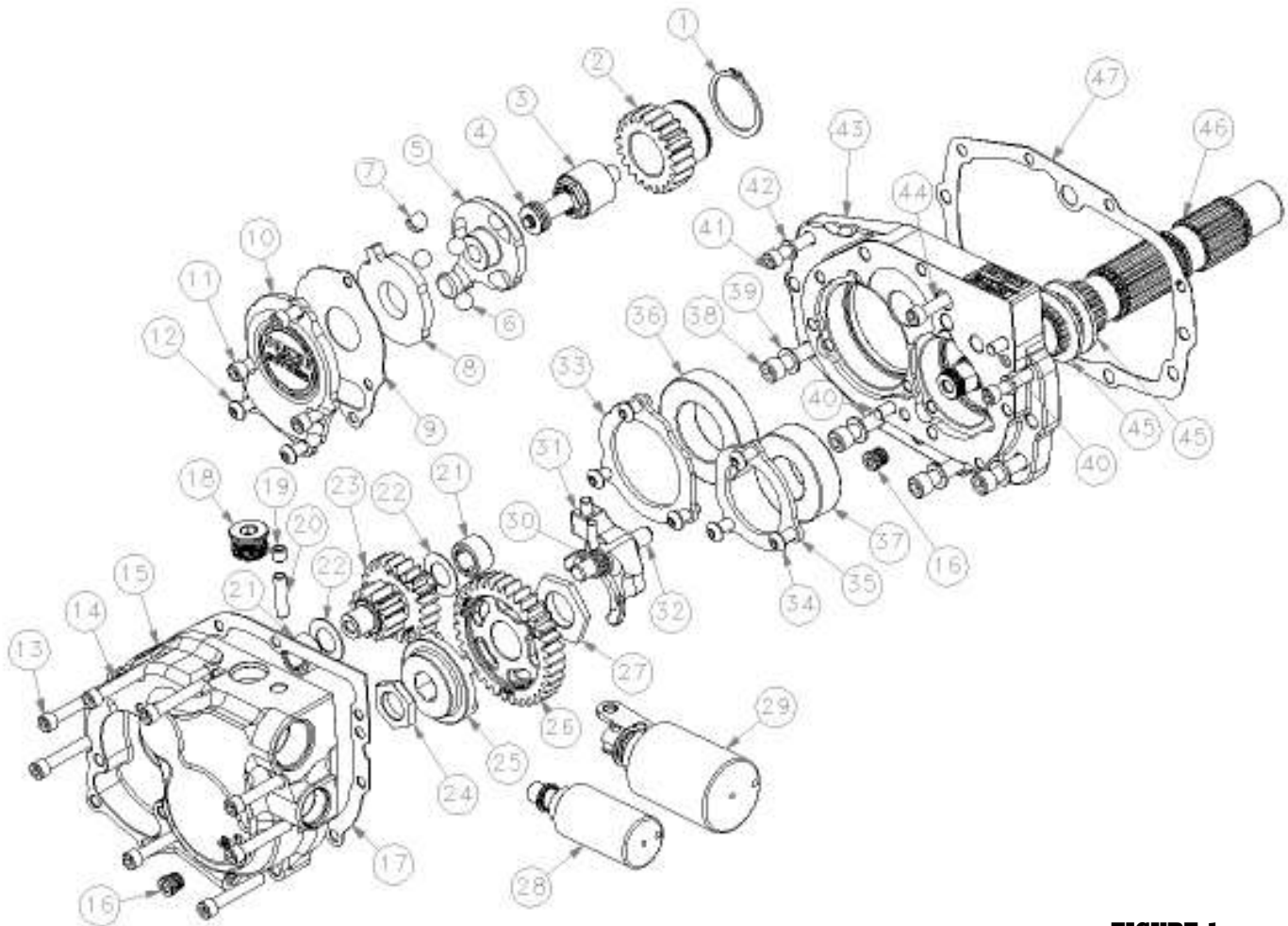
- 11/16" Bore Master Cylinder Clutch Lever Assembly
- 3/8-24" Thread Banjo Bolt
- DOT 5 Silicone Based Brake Fluid
- 10mm Banjo Fitting (Angle Depends On Exhaust Bracket Style)

## F5R BUILDER'S KIT OR COMPLETE BUILD TRANSMISSIONS

Portions of these installation instructions do not apply to you if you bought a F5R Builder's kit or a complete transmission with F5R upgrade, but the wiring installation notes, reverse function tests, and the general F5R riding usage instructions do. If you have a builders kit, reference your Factory Service for the instructions on how to swap out the main drive gear, main drive gear roller bearing and main drive gear roller bearing seal. As well as the installation of your secondary drive belt pulley or chain sprocket for torque specs.

## BAKER FACTORY 5 SPEED REVERSE

### F5R, MECHANICAL SIDE COVER, RETRO FIT KIT EXPLODED VIEW



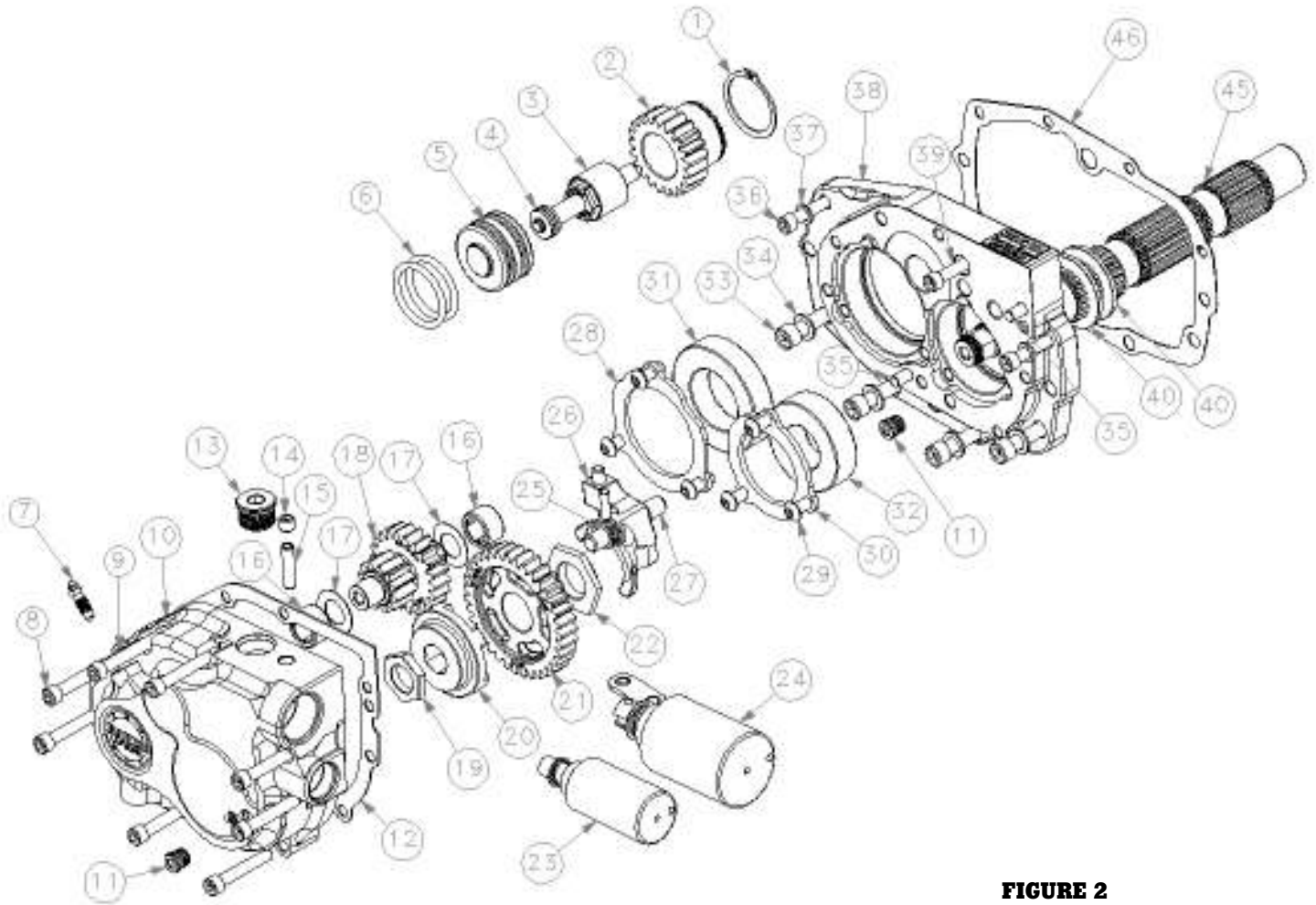
**FIGURE 1**

## BAKER FACTORY 5 SPEED REVERSE

<b>TAG</b>	<b>PN</b>	<b>QTY</b>	<b>DESCRIPTION</b>
1	137RRRE	1	Snap Ring, External Ø1.375" Shaft
2	RV-7000	1	Driven Pinion Gear
3	RV-7051	1	Retainer Nut, Mainshaft
4	37089-84	1	Actuator Rod Assembly (2.625" Overall)
5	3096-F5R	1	Ball Ramp, Inner
6	987687	3	Ball Bearing, Ø3/8"
7	3094-DSSC	1	Ferrule, Clutch Cable
8	3196-F5R	1	Ball Ramp, Outer
9	415-F5R	1	Gasket, Ball & Ramp Cover
10	584-F5R	1	Ball & Ramp Cover
11	25C62KCSS	3	¼-20 x .625", SHCS, SS
12	73753	2	¼-20 x .625", BHCS, SS
13	25C150KCSS/P	7	¼-20 x 1.50", SHCS, SS
14	25C225KCSS/P	1	¼-20 x 2.25", SHCS, SS
15	401-F5R	1	Side Cover, Mechanical
16	51740-001	2	Drain & Oil Level Plug, 3/8-24
17	414-F5R	1	Gasket, Side Cover
18	51970S-008-01	1	Fill Plug, Zero Leak, ¾-16
19	31F31KKCS	1	5/16-24 x 5/16" Set Screw, SS
20	25R75PDP	1	¼" x ¾" Pull Dowel
21	HK1412	2	Needle Bearing, Split Idler Gear
22	TRA-916	2	Thrust Washer, Split Idler Gear
23	RV-7010	1	Split Idler Gear
24	408-F5R	1	Jam Nut, Countershaft
25	RV-7030	1	Dog Clutch
26	RV-7020	1	Slider Gear
27	168-F5R	1	Retainer Nut, Countershaft
28	420-F5R	1	Solenoid Assembly, Lockout
29	420S-F5R	1	Solenoid Assembly, Shifting
30	LW 05611 0325S	1	Redux Return Spring
31	404-F5R	1	Shift Fork, Reverse
32	412-RV07	1	Fork Rod, Reverse
33	407-F5R	1	Bearing Retainer Plate, Mainshaft
34	24050	6	¼-20 x .625", BHCS, Black Oxide
35	406-F5R	1	Bearing Retainer Plate, Countershaft
36	6007	1	Roller Bearing, Mainshaft
37	6205	1	Roller Bearing, Countershaft
38	31C125KCSS/P	4	5/16-18 x 1.25", SHCS, SS
39	6100	4	5/16" AN Washer, SS
40	26749	2	¼"x ½" Alignment Dowel
41	25C125KCSS/P	2	¼-20 X 1.25", SHCS, SS
42	6099SS	2	¼" AN Washer, SS
43	1-5ERV	1	Bearing Door, F5R
44	23207	1	¼-20 X 1.25", SHCS, Black Oxide
45	LS2542	2	Thrust Washer, Countershaft
46	412-F5R	1	Countershaft, F5R
47	35652-79B	1	Gasket, Bearing Door

# BAKER FACTORY 5 SPEED REVERSE

## F5R, HYDRAULIC SIDE COVER, RETRO FIT KIT EXPLODED VIEW



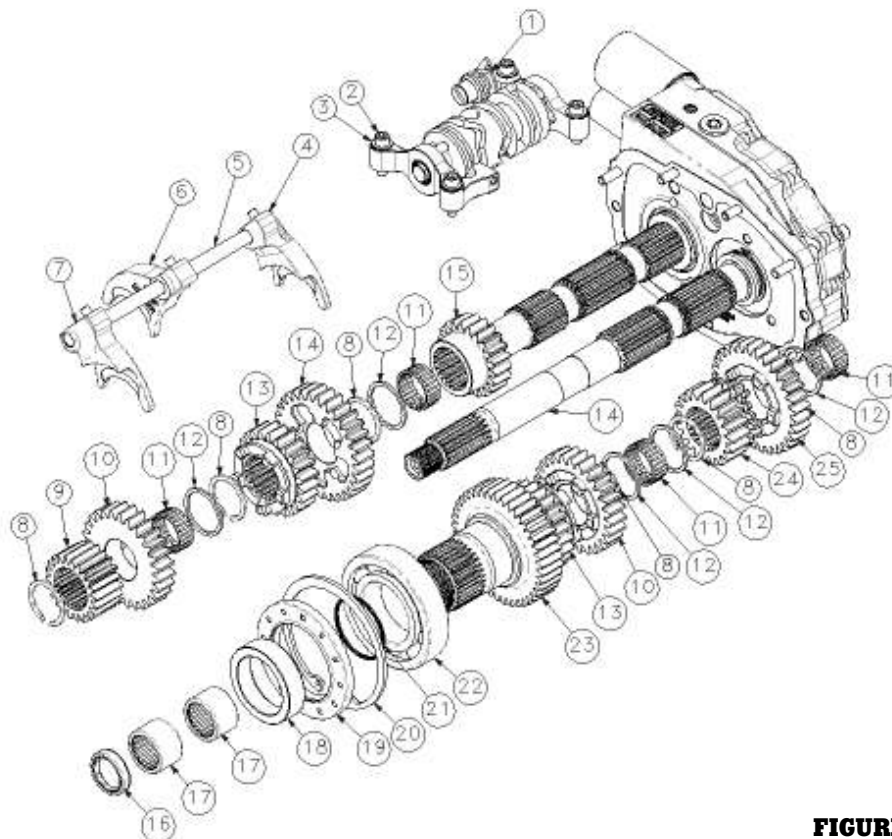
**FIGURE 2**

## BAKER FACTORY 5 SPEED REVERSE

<b>TAG</b>	<b>PN</b>	<b>QTY</b>	<b>DESCRIPTION</b>
1	137RRRE	1	Snap Ring, External Ø1.375" Shaft
2	RV-7000	1	Driven Pinion Gear
3	RV-7051	1	Retainer Nut, Mainshaft
4	37089-84L	1	Actuator Rod Assembly (2.810" Overall)
5	124-56L	1	Piston, LSD
6	66827	2	O-Ring, Buna, Hydraulic Piston
7	45-9404	1	Bleeder Valve
8	25C150KCSS/P	7	1/4-20 x 1.50", SHCS, SS
9	25C225KCSS/P	1	1/4-20 x 2.25", SHCS, SS
10	429-F5R	1	Side Cover, Hydraulic
11	51740-001	2	Drain & Oil Level Plug, 3/8-24
12	414-F5R	1	Gasket, Side Cover
13	51970S-008-01	1	Fill Plug, Zero Leak, 3/4-16
14	31F31KKCS	1	5/16-24 x 5/16" Set Screw, SS
15	25R75PDP	1	1/4" x 3/4" Pull Dowel
16	HK1412	2	Needle Bearing, Split Idler Gear
17	TRA-916	2	Thrust Washer, Split Idler Gear
18	RV-7010	1	Split Idler Gear
19	408-F5R	1	Jam Nut, Countershaft
20	RV-7030	1	Dog Clutch
21	RV-7020	1	Slider Gear
22	168-F5R	1	Retainer Nut, Countershaft
23	420-F5R	1	Solenoid Assembly, Lockout
24	420S-F5R	1	Solenoid Assembly, Shifting
25	LW 05611 0325S	1	Redux Return Spring
26	404-F5R	1	Shift Fork, Reverse
27	412-RV07	1	Fork Rod, Reverse
28	407-F5R	1	Bearing Retainer Plate, Mainshaft
29	24050	6	1/4-20 x .625", BHCS, Black Oxide
30	406-F5R	1	Bearing Retainer Plate, Countershaft
31	6007	1	Roller Bearing, Mainshaft
32	6205	1	Roller Bearing, Countershaft
33	31C125KCSS/P	4	5/16-18 x 1.25", SHCS, SS
34	6100	4	5/16" AN Washer, SS
35	26749	2	1/4"x 1/2" Alignment Dowel
36	25C125KCSS/P	2	1/4-20 X 1.25", SHCS, SS
37	6099SS	2	1/4" AN Washer, SS
38	1-5ERV	1	Bearing Door, F5R
39	23207	1	1/4-20 X 1.25", SHCS, Black Oxide
40	LS2542	2	Thrust Washer, Countershaft
45	412-F5R	1	Countershaft, F5R
46	35652-79B	1	Gasket, Bearing Door

# BAKER FACTORY 5 SPEED REVERSE

## F5R BUILDER'S KIT GEARSET EXPLODED VIEW



**FIGURE 3**

<b>TAG</b>	<b>PN</b>	<b>QTY</b>	<b>DESCRIPTION</b>
1	2-5RN-A	1	Shift Drum Assembly
2	23207	4	1/4-20 X 1.25", SHCS, Black Oxide
3	33001	4	Washer, #10, Plain
4	103-5E	1	Shift Fork, 1 <sup>st</sup> Gear, Mainshaft
5	122-6R-FF	1	Shift Fork Rod, F5R (6.500" Overall)
6	102-5F	1	Shift Fork, 3 <sup>rd</sup> Gear, Countershaft
7	101-56E	1	Shift Fork, 2 <sup>nd</sup> Gear, Mainshaft
8	11067A	5	Snap Ring, External, Gearset
9	61005C	1	5 <sup>th</sup> Gear, Countershaft
10	62212M	2	2 <sup>nd</sup> Gear C/S, 3 <sup>rd</sup> Gear M/S
11	8876A	4	Split Cage Needle Bearing
12	6003B	5	Thrust Washer, Gearset
13	603M2C	2	3 <sup>rd</sup> Gear M/S, 2 <sup>nd</sup> Gear C/S
14*	52491C	1	2.94 1 <sup>st</sup> Gear, Countershaft
14*	51324C	1	3.24 1 <sup>st</sup> Gear, Countershaft
15	51234C	1	4 <sup>th</sup> Gear, Countershaft
16	12035B	1	Oil Seal, Main Drive Gear
17	HK2520	2	Caged Needle Bearing, 5 <sup>th</sup> M/S
18	33344-94	1	Pulley Spacer
19	12067B	1	Seal, Roller Bearing, 5 <sup>th</sup> M/S
20	1302-334PP	1	Snap Ring, Internal, Beveled, 3 11/32"
21	11165A	1	Quad Seal
22	6209	1	Roller Bearing, 5 <sup>th</sup> M/S
23	61005M	1	Main Drive Gear (5 <sup>th</sup> M/S)
24*	51294M	1	2.94 1 <sup>st</sup> Gear, Mainshaft
24*	51324M	1	3.24 1 <sup>st</sup> Gear, Mainshaft
25	61234M	1	4 <sup>th</sup> Gear, Mainshaft



# BAKER FACTORY 5 SPEED REVERSE

## DISASSEMBLY



**SIMILAR TO ANY OTHER DRIVETRAIN RELATED PROJECT, THE FIRST STEP THAT YOU WANT TO TAKE IS TO REMOVE THE SEAT AND DISCONNECT THE BATTERY FOR YOUR OWN SAFETY. NOW IS ALSO A GOOD TIME TO DRAIN THE PRIMARY AND TRANSMISSION FLUID. FOR LOCATIONS OF APPLICABLE DRAIN PLUGS, CHECK YOUR SERVICE MANUAL.**

- 1) While referencing your Factory Service Manual (section 7), follow the gearset removal procedure. If you are installing the F5R Retro Fit Kit on your stock 5 speed, you do not need to remove your main drive gear, but do need to remove the secondary drive pulley/sprocket in order to install the provided fork rod (pn 122-6R-FF) during the F5R gearset install.
- 2) With the gearset out of the motorcycle, begin stripping the gears off of the shaft down to the bearing door. Care must be taken to ensure that no gear teeth are damaged during the disassembly process as you are re-using all of your gears, except the stock countershaft. When removing the factory split cage needle bearings, only open them enough to slide up the shaft, rather than pulling them off to the side. This will help prevent cracks to the plastic cage of the bearings. Press the mainshaft out of the bearing door.
- 3) Clean the transmission case out with brake cleaner or another suitable cleaner at this time and inspect it for issues that may affect the installation of the gearset or cause leaks down the road. Including, but not limited to, bad threads in the case, gouges in the gaskets surfaces, residual build up of thread lock and that the case bearings spin freely and smoothly. Also take this time to inspect the split cage needle bearings for any cracks, heat spots or evidence of being run low on oil or without oil. **IF THERE IS ANY DOUBT ABOUT THE VIABILITY TO RE-USE ANY OF THE SPLIT CAGE NEEDLE BEARINGS AFTER THEY ARE INSPECTED, REPLACE THEM.**
- 4) Install the provided Main Drive Gear Oil Seal (PN 12035B), roller bearing seal (PN 12067B) and quad seal (PN 11165A) at this time. With the old seal out of the main drive, check to make the outboard most needle bearing has not 'walked' towards the transmission. If so, reference your Factory Service Manual in order to replace it with a new bearing.

## GEARSET ASSEMBLY, F5R RETRO FIT KIT

- 1) Press the stock mainshaft into the provided BAKER F5R bearing door (pn 1-5ERV) making sure to fully support the inner race of the bearing to maintain it's integrity. Re-use the stock mainshaft spacer, (H-D® PN 35064-79) with stepped side of the spacer facing away from the bearing door. Now press in the provided BAKER F5R countershaft (PN 412-F5R) while using the two provided thrust washers (PN LS2542). Make sure to fully support, and only press on the inner race, of the door bearing (PN 6205) to install the countershaft. With both shafts fully 'bottomed out' on their applicable thrust washers. Re-assembly of the stock gears onto the shafts can commence at this time while reference the factory service manual for your model of motorcycle.
- 2) Provided are seven gearset snap rings (PN 11067A) Six are needed and one is extra as they are easy to overstretch. Pre-lube all of the split cage needle bearings with new transmission fluid before installing them.

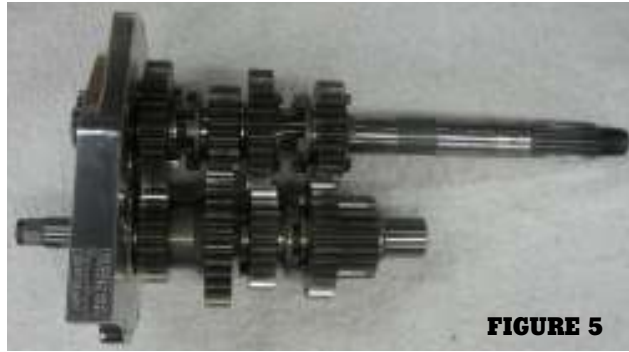


**FIGURE 4**



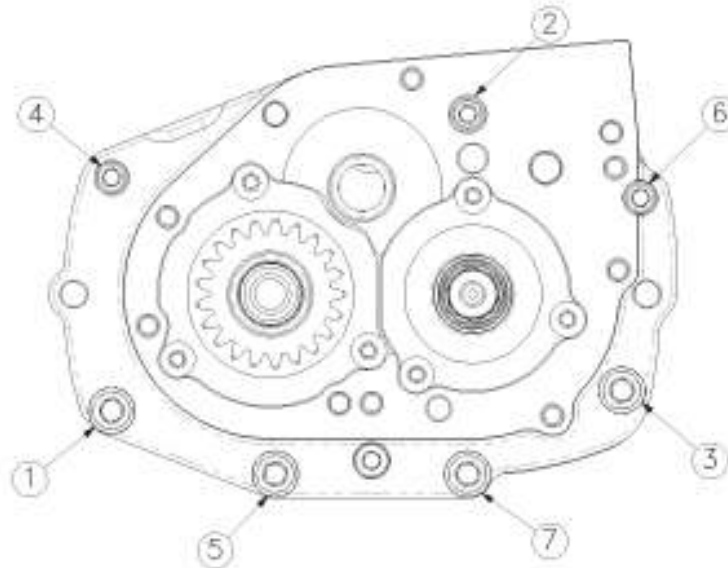
**TAKE CARE TO ONLY OPEN UP THE GEARSET SNAP RINGS ENOUGH TO SLIDE THEM DOWN THE SPLINES INTO THEIR PROPER POSITION ON THE SHAFTS.**

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**FIGURE 5**

- 3) Hang the provided door gasket (PN 35652-79B) on the transmission case door pins.
- 4) With the gearset assembled, wrap the clutch nut threads and splines on the mainshaft with electrical tape before sliding the gearset into the case to protect the new oil seal (PN 12035B) in the main drive gear.
- 5) Depending on the brand of exhaust that you have on your motorcycle and the subsequent mounting brackets, now is a good time to do a 'dry fit' of the exhaust bracket and side cover (PN 401-F5R Mechanical or PN 429-F5R Hydraulic), with side cover gasket (PN 414-F5R) to determine if any modifications need to be made to your exhaust bracket. Also install the crush washers, banjo fitting and hydraulic clutch line at this time (on hydraulic side cover models) to assess the clearance for those parts as well. When satisfied with the exhaust bracket mounting, proceed with 'blue' thread lock to install the four 5/16-18 x 1.25" door bolts (PN 31C125KCSS/P), with washers (PN 6100) and three, 1/4-20 x 1.25" door bolts (PN 25C125KCSS/P & PN 23207) with washers (PN 6099SS) at this time. Torque the 5/16" bolts to 220 in-lbs and the 1/4" bolts to 130 in-lbs in the order shown in figure 5.



**FIGURE 6**

- 6) Slide the gears in the transmission to lock it in two gears and remove the countershaft retainer plate (PN 406-F5R) to ensure full socket contact with the retainer nut on the countershaft. While using 'red' thread lock, torque the countershaft (PN 168-F5R, 'snout' of nut facing door bearing) and mainshaft (PN RV-7050) nuts to 45-50 ft-lbs.



**DO NOT USE AN IMPACT GUN TO TIGHTEN EITHER SHAFT RETAINING NUT AS YOU RISK DAMAGE TO THE NUTS AND/OR SHAFTS BY DOING SO.**

## BAKER FACTORY 5 SPEED REVERSE

- 7) Install the countershaft retainer plate using 'red' thread lock and torque each 1/4-20 x .625" button head (pn 24050) to 130 in-lbs.
- 8) Install the shift system at this point, while referencing your Factory Service Manual. Install the provided fork rod (PN122-6R-FF) from the primary side of the motorcycle and run the transmission through all the gears multiples time before proceeding with the F5R reverse gear train installation to ensure the gearset was correctly assembled.
- 9) With correct transmission function validated, install the secondary drive pulley/ sprocket and belt/ chain at this time while referencing your Factory Service Manual.
- 10) Install the reverse side cover components while referencing the exploded views on pg 4 and legend on pg 5. Remember to place a thrust washer (PN TRA-916) behind the split idler gear (PN RV-7010). Install slider gear (PN RV-7020) and dog clutch (PN RV-7030). Torque the countershaft Jam Nut (PN 408-F5R) to 33-35 ft-lbs using 'red' thread lock.
- 11) Slide the shift fork (PN 404-F5R) onto the slider gear and rotate up into place to slide the provided fork rod (PN 412-RV07) into the bore in the bearing door. Fully seat the fork rod with your hand, but do not hit it with a hammer, you do not need to do so and will struggle to remove it in the future by binding it in the bearing door. Place the redux return spring (PN LW 05611 0325S) on the fork rod. Place the other provided thrust washer (PN TRA-916) on the outboard pinion of the split idler gear. Hang the side cover gasket (PN 415-F5R) on the door at this time as well.
- 12) Re-use and install your center clutch rod and slide the provided clutch push rod assembly (PN 37089-84 Mechanical or PN 37089-84L Hydraulic) into the mainshaft

**FIGURE 7**



***\*\*INSTALLATION PICTURES TAKEN USING THE BAKER 1999 ROAD KING, WHICH HAS CUSTOM EXHAUST AND THEREFORE HAS NO EXHAUST BRACKET ON THE FACE OF THE BEARING DOOR***



**FIGURE 8**

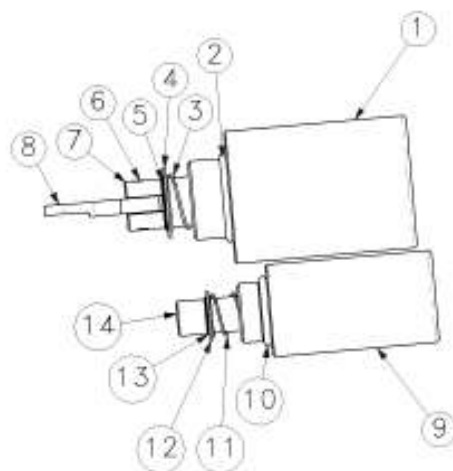
- 13) Install the top cover with the provided neutral switch (PN varies depending on the kit you ordered) per your Factory Service Manual at this time. Torque the neutral switch to 135 in-lbs. Double check that the transmission is in neutral and that you have proper neutral switch function by using a voltmeter to check for continuity.

# BAKER FACTORY 5 SPEED REVERSE

## F5R MECHANICAL SIDE COVER COMPONENTS INSTALLATION

### PN 420S-F5R, Shifting Solenoid Assembly

TAG	PN	QTY	DESCRIPTION
1	S-22-150	1	R22x22 12V, Pull Solenoid
1	410-F5R	1	Shifting Solenoid Cover
2	OR568119	1	O-ring, 1.00" ID
3	LP 032N 01 S316	1	Return Spring, .720" ID
4	PB26165	1	Spring Seat, .625" ID
5	WSM-62	1	Spiral Snap Ring, .625"
6	26735	1	3/16" X 1/2" Solid Dowel
7	185-F5R	1	Shifting Plunger
8	409-F5R	1	Shifting Bell Crank



**FIGURE 9**

### PN 420-F5R, Reverse Lock Out Solenoid Assembly

TAG	PN	QTY	DESCRIPTION
9	S-062311	1	R16x16, 12V, Pull Solenoid
10	66827	1	O-ring, .750" ID
11	LP 026K 01 S316	1	Return Spring, .475" ID
12	716NWSFS	1	Spring Seat, .440" ID
13	91665A350	1	Spiral Snap Ring, .440" ID
14	182-F5R	1	Lockout Plunger

- 1) Apply anti-seize to the threads and install the mechanical clutch cable into the side cover. Check to make sure the clutch cable o-ring is in good working condition, if it is not, replace it at this time.



**DO NOT OVER TIGHTEN THE CLUTCH CABLE FITTING OR IT WILL BREAK OFF IN THE SIDE COVER.**

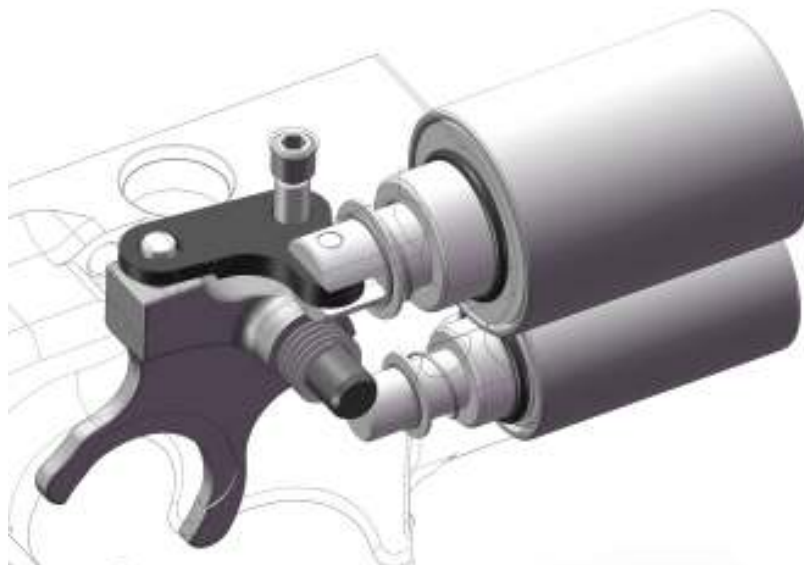
- 2) Insert the plunger (PN 185-F5R) with bell crank installed on it in the solenoid port from the inside of the side cover without the washer or spring. Refer to Figure 10 for orientation of the bell crank when installed. Slide the washer and spring over the plunger from the solenoid port side.
- 3) Apply anti-seize to the threads on the solenoids and thread them in by hand with the side cover off of the motorcycle. Install the lockout solenoid (PN 420-F5R) as a complete assembly as shown in Figure 9.



**DO NOT TIGHTEN THE SOLENOIDS WITH ANYTHING OTHER THAN YOUR HANDS. RUN THE SOLENOIDS ALL THE WAY IN UNTIL THEY BOTTOM OUT IN THE SIDE COVER. TAKE CARE WHEN THREADING THE SOLENOIDS IN TO NOT GET THE WIRES TWISTED AT THE POINT THEY COME OUT THE BACK OF THE SOLENOID. ANYTIME THE SOLENOIDS NEED TO BE REMOVED IN THE FUTURE FOR REGULAR MOTORCYCLE SERVICE, MAKE SURE THEY ARE UNPLUGGED SO YOU ARE NOT PINCHING THE WIRES CAUSING A POSSIBLE FAILURE POINT.**

## BAKER FACTORY 5 SPEED REVERSE

- 4) With the solenoids installed slide the pull dowel (PN 25R75PDP) part of the way into the side cover to hold bell crank out of the way while installing the side cover on the bearing door. Make sure to have the threaded end (8-32 thread) of the dowel facing up when you install it.
- 5) Grab two of the side cover bolts and thread them into the door to hold the side cover in place during installation of the bell crank (PN 409-F5R) on to the reverse shift fork (PN 404-F5R).
- 6) Remove the pull dowel and with a pick or a small screwdriver, slide the bell crank slot over the fork pin. Final installation should like Figure 10. Reinstall the pull dowel. A little wiggling of the bell crank may be necessary to line up the pivot hole with the pull dowel. Install the set screw (PN 31F31KKCS) with 'blue' thread lock and screw in until it is flush with the top of the side cover.
- 7) Remove the ball and ramp cover (PN 584-F5R) and gasket (PN 415-F5R).
- 8) Lay the inner ball ramp (PN 3096-F5R) on a workbench and fill each of the three pockets with enough axle grease to hold the ball bearings (PN 987687) in place during assembly. Place the ball bearings in the greased pockets and then the outer ball ramp (PN 3196-F5R) on top. While making sure to hold the ramps together, slide them into the side cover. Align the tab on the outer ramp with the corresponding pocket in the side cover. The cable attachment boss of the inner ramp should be pointing towards the rear of the motorcycle when installed.
- 9) With all of the adjustment out of the clutch cable (full slack) slide the clutch cable through the inner ball ramp enough that you can then slide the ferrule (PN 3094-DSSC) over the end of the cable. Carefully pull on the clutch lever enough to get the ferrule seated in the ball ramp pocket.
- 10) Place the ball and ramp cover (PN 584-F5R) and gasket (PN 415-F5R) back on the side cover and install the top bolt (PN 25C62KCSS) and one of the bottom bolts, (PN 73753) to hold the ball and ramp assembly in place during installation of the F5R solenoid wiring harness and reverse function testing. Skip to page 15 for wiring harness installation.



**FIGURE 10**

## BAKER FACTORY 5 SPEED REVERSE

### F5R HYDRAULIC SIDE COVER COMPONENTS INSTALLATION

- 1) Insert the plunger (PN 185-F5R) with bell crank installed on it in the solenoid port from the inside of the side cover without the washer or spring. Refer to Figure 10 for orientation of the bell crank when installed. Slide the washer and spring over the plunger from the solenoid port side.
- 2) Apply anti-seize to the threads on the solenoids and thread them in by hand with the side cover off of the motorcycle. Install the lockout solenoid (PN 420-F5R) as a complete assembly as shown in Figure 9.



**DO NOT TIGHTEN THE SOLENOIDS WITH ANYTHING OTHER THAN YOUR HANDS. RUN THE SOLENOIDS ALL THE WAY IN UNTIL THEY BOTTOM OUT IN THE SIDE COVER. TAKE CARE WHEN THREADING THE SOLENOIDS IN TO NOT GET THE WIRES TWISTED AT THE POINT THEY COME OUT THE BACK OF THE SOLENOID. ANYTIME THE SOLENOIDS NEED TO BE REMOVED IN THE FUTURE FOR REGULAR MOTORCYCLE SERVICE, MAKE SURE THEY ARE UNPLUGGED SO YOU ARE NOT PINCHING THE WIRES CAUSING A POSSIBLE FAILURE POINT.**

- 3) With the solenoids installed slide the pull dowel (PN 25R75PDP) part of the way into the side cover to hold bell crank out of the way while installing the side cover on the bearing door. Make sure to have the threaded end (8-32 thread) of the dowel facing you when you install it.
- 4) Grab two of the side cover bolts and thread them into the door to hold the side cover in place during installation of the bell crank (PN 409-F5R) on to the reverse shift fork (PN 404-F5R).
- 5) Remove the pull dowel and with a pick or a small screwdriver, slide the bell crank slot over the fork pin. Final installation should like Figure 10. Reinstall the pull dowel. A little wiggling of the bell crank may be necessary to line up the pivot hole with the pull dowel. Install the set screw (PN 31F31KKCS) with 'blue' thread lock and screw in until it is flush with the top of the side cover.
- 6) Install two crush washers, and banjo fitting (3/8-24 thread) at this time. Hold off fully tightening the banjo bolt and line fittings until the side cover is fully installed with all the bolts in place.



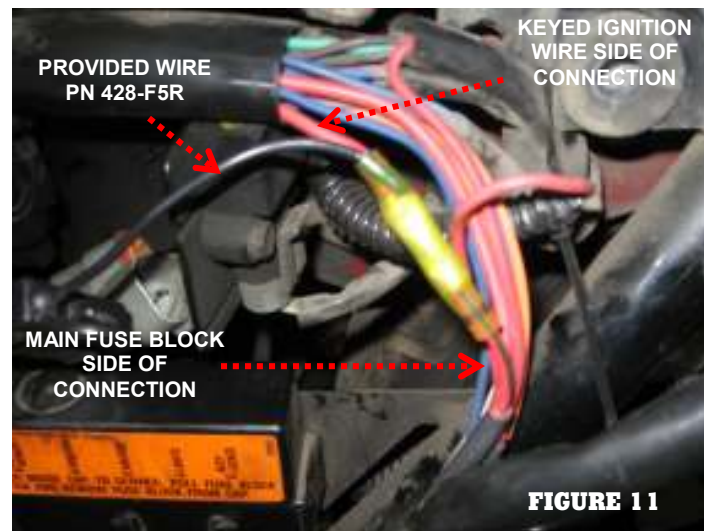
# BAKER FACTORY 5 SPEED REVERSE

## F5R WIRING HARNESS INSTALLATION

Based on the year and model of your motorcycle there are 3 different configurations of the same basic wiring harness used, as laid out in Figure 17. The following steps will lay out, in detail, how to install the wires and switches.

### IGNITION WIRE, 12V POWER SOURCE

- 1) While referencing your Factory Service Manual, trace down the main ignition wire on your motorcycle as shown in Figure 11. Cut the wire a few inches before it splits off to enter the main fuse block and strip the insulation back 1/4" on each wire. You are going to splice in the power wire for the reverse shifting and safety toggles switches here. Take care to install the provided inline fuse holder in such a manner that it easily accessible should you ever need to change the standard size 20A blade fuse.
- 2) The provided step down, heat shrink butt connector (PN SCB-646) needs to be crimped in the same manner as a standard butt connector but also has the added feature of containing heat activated glue to further adhere the wires together and provide a weather tight seal. Twist the keyed ignition side wire together with the bare wire end of the provided toggle switch to 12V power wire assembly (PN 428-F5R) and slide into the plain end of the PN SCB-646 splice butt connector. Crimp the connector to the two wires, making sure that you have them securely in place. Insert the fuse block side ignition wire into the striped end of the connector and crimp it in place. Using a heat gun, shrink the connector to the wires.



**FIGURE 11**

- 3) Run the wires up to the handlebars via the back bone, under the gas tank and by the right side of the neck in preparation for installing the switch housing that you ordered. Take care to make sure the wires are securely in place to prevent, chaffing, binding or pinching.

# BAKER FACTORY 5 SPEED REVERSE

## H-D BRAKE LEVER PERCH MOUNTED SWITCH HOUSING

- 1) If you choose either switch housing assembly, Satin Black (PN SHB-A) or Chrome (PN SHC-A) installation is the same. Both units have the Toggle Switches (PN 7200018, Momentary, Screw Terminals & PN 73185, ON-OFF, Screw Terminals) installed in them and the rubber boots are snug. Remove the factory handle bar inner clamp, reusing the factory torx head bolts, & washers, with 'blue' thread lock, torque to 120 in-lbs. Set the factory clamp aside.
- 2) Locate the solenoid toggle switch wires (PN 424-F5R) and run them up through the battery box from the transmission, up the back bone under the gas tank and by the neck to the toggle switches. Take care to make sure the wires are securely in place to prevent, chaffing, binding or pinching. Before sliding all 4 wires into the switch housing (PN 422-F5RB), slide the provided protective sleeve over the wires. (refer to figure 17)
- 3) Arrange the wires as shown in Figure 12, The wires are a tight fit, and no different than dealing with the factory switch housing for the RUN/OFF & START buttons, care needs to be taken to prevent shorting out the wires by crimping them in the housing, or chaffing on each other. After installing them on the toggle switches, wrap the terminals and wires with electrical tape. Gently slide the 4 wires back through the housing and install the two provided 10-24x 1/2" Stainless Bolts. (PN 10C50KCSS) Torque to 85 in-lbs with 'blue' thread lock.
- 4) While referencing your Factory Service Manual, locate the neutral switch wires and cut off the factory end(s) at the neutral switch on the transmission top cover. Slide on the provided 1/8" dia heat shrink and eyelet(s) (PN A-321-10), crimp the eyelets in place, and slide the heat shrink over the crimp. Shrink the tubing with a heat gun.
- 5) Install the neutral switch to solenoid ground wire (PN 426-F5R) as shown in Figure 17. Also install the other neutral switch terminal wire at this time as shown in Figure 17. (Model year dependent).





## BAKER FACTORY 5 SPEED REVERSE

### HANDLEBAR MOUNTED SWITCH HOUSING

- 1) If you ordered a separate handlebar mounted switch housing assembly (PN 423-F5R) it comes with the toggle switches already installed and ready to go. All you have to do is find a spot on your 1" diameter handlebars that will allow the housing to fully clamp to the bars. This spot will need to clear the gas tank with the bars at full lock in either direction and ensure the wires will not get pinched or experience chaffing from the bars turning.
- 2) Locate the solenoid toggle switch wires (PN 424-F5R) and run them up through the battery box from the transmission, up the back bone under the gas tank and by the neck to the toggle switches. Take care to make sure the wires are securely in place to prevent, chaffing, binding or pinching. refer to figure 17)
- 3) Replace the #6 stud ring terminals with 4pcs of the provided (PN A-850) female blade terminals, make sure to slide on the provided Shrink tube to each wire before crimping the terminals.
- 4) Torque the four 10-24 x 1/2" SHCS, SS (PN 10C50KCSS) screws to 85 in-lbs in a 'X' pattern using 'blue' thread lock to ensure the housing and switches stay in place on the handlebars.

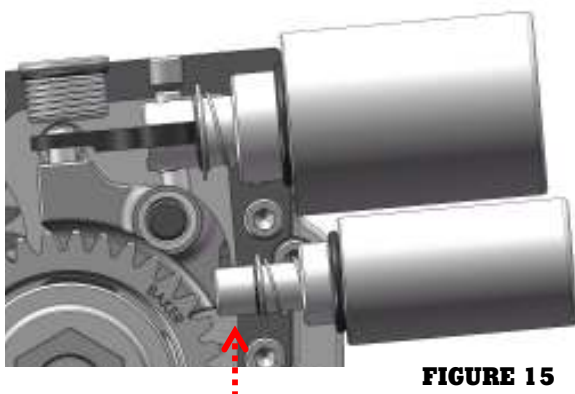


# BAKER FACTORY 5 SPEED REVERSE

## REVERSE FUNCTION TEST

- 1) With all of the wires hooked up and double checked against Figure 17, you are ready to do a reverse functionality test. Temporarily hook up the battery. With the bike ignition on, and the bike in neutral, the first check is that the Safety Switch (the momentary style switch) activates the Safety solenoid. You will hear an audible 'click' of the solenoid. This let's you know that you have the wires hooked up correctly. If you do not hear an audible click then, you need to double check that the safety (smaller diameter, lower solenoid) is hooked up to the momentary switch.
- 2) With the bike in neutral and the back tire off of the lift or shop floor, spin the back tire by hand to enable the shifting dogs on the reverse gears to get aligned. In one motion activate the safety switch, hold it 'ON' and then hit the shifting switch. The transmission should be in reverse at this time. Perform this test a few times until you are satisfied that the reverse shifting function works properly. More complete reverse usage instructions can be found on page 21

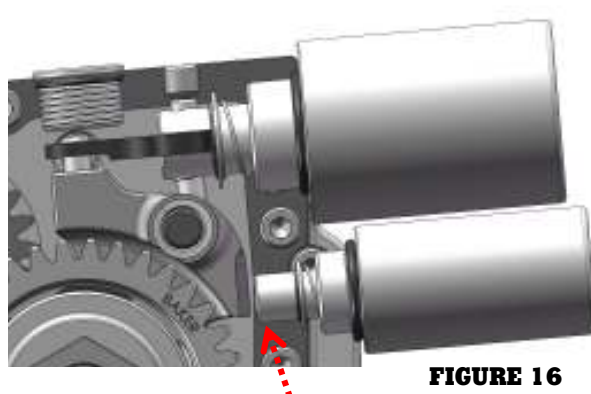
### SAFETY SWITCH 'OFF'



**FIGURE 15**

*In the 'OFF' position the plunger of the Safety solenoid mechanically blocks the bike from being shifted into reverse.*

### SAFETY SWITCH 'ON'



**FIGURE 16**

*In the 'ON' position the plunger of the Safety solenoid clears the shift fork and allows the bike to be shifted into reverse.*

The motorcycle will remain in reverse as long as the shifting solenoid is powered and the bike is neutral. If you turn off the shifting switch, the F5R will automatically shift back to neutral by nature of the redundant return spring design on the shifting solenoid and shift fork. If you shift the bike out of neutral, it will kill the power to the solenoid, and automatically shift out of reverse the moment power is cut.

If the bike was running, and you were to shift the foot lever out of neutral while the shifting switch is ON, and you did not first turn it off, there is no chance that the bike would try to shift into reverse the next time that you go into neutral by nature of the reverse safety solenoid design. When the power was cut to the solenoids the return spring (PN LP 026K 01 S316) fired the lockout plunger (PN 182-F5R) in the way of the reverse fork, mechanically preventing you from accidentally shifting into reverse.



**BEFORE YOU START PUTTING THE REST OF THE MOTORCYCLE BACK TOGETHER DISCONNECT THE BATTERY. THIS IS SOLELY FOR YOUR SAFETY WHILE WORKING ON THE MOTORCYCLE.**

# BAKER FACTORY 5 SPEED REVERSE

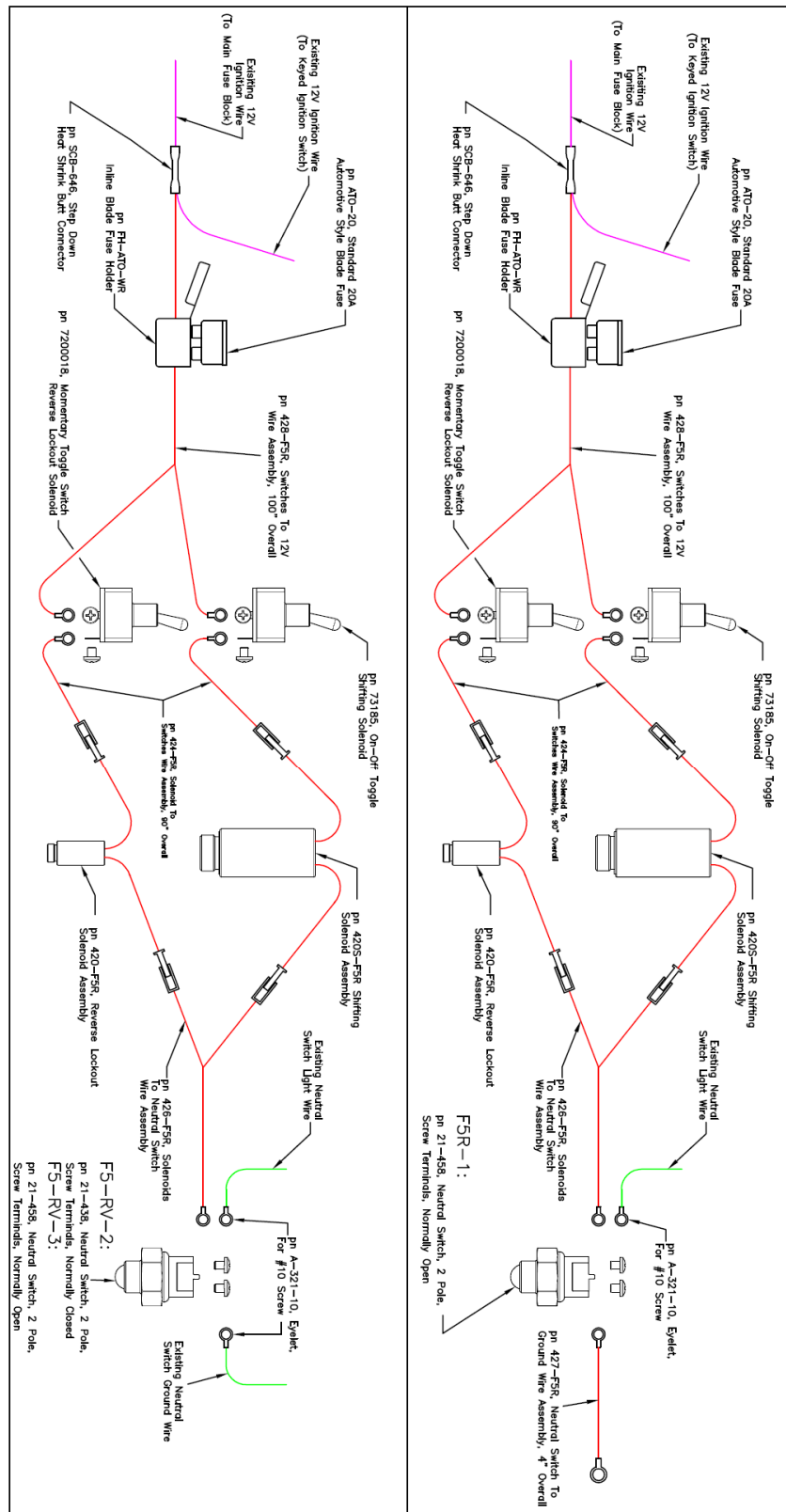
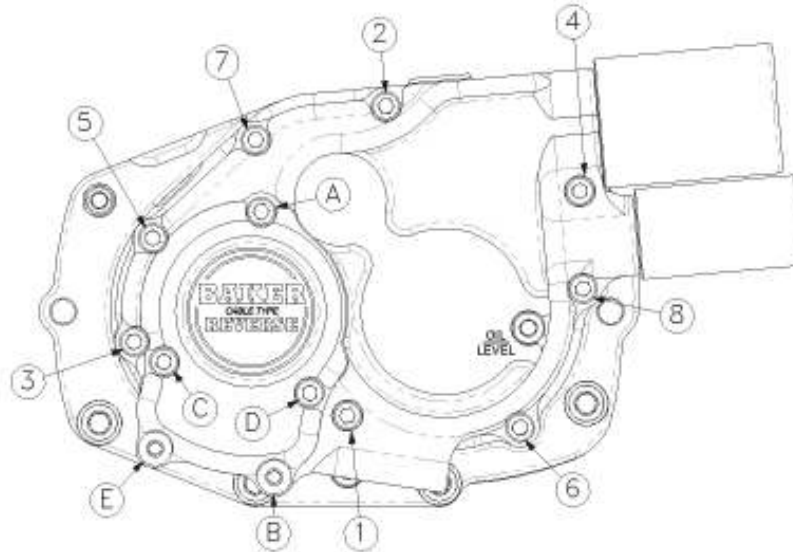


FIGURE 17

# BAKER FACTORY 5 SPEED REVERSE

## FINISH LINE

- 1) With reverse installation validated by passing the reverse function test, you ready to install the side cover and ball and ramp cover for good (mechanical side cover version). For the hydraulic versions, you can now fully tighten the banjo fitting and hydraulic line fittings. Using 'blue' thread lock, install all of the side cover bolts and torque to them to 130 in-lbs using the numerical torque sequence in Figure 18. Following the alpha torque sequence in Figure 18, and using 'blue' thread lock, torque the ball and ramp cover bolts to 130 in-lbs as well.



**FIGURE 18**

- 2) Fill transmission with 22-24 oz of transmission via the 3/4"-16 fill plug (PN 51970S-008-01) hole on top of the side cover. Put a small amount of anti-seize on the fill plugs threads and install, turn until snug. Do not over tighten or you risk damaging the o-ring.
- 3) The BAKER Hydraulic side cover pistons are designed for use **ONLY** with DOT 5, Silicone Based Brake Fluid. Fill the clutch reservoir with clean fluid and bleed the air out of the system in the same manner as Hydraulic Motorcycle Brake systems.
- 4) Finish installing the primary drive and adjust the clutch cable while referencing your Factory Service Manual. Exhaust, controls, outer fairing and then the battery can be hooked up for good. You are ready for a full test ride.

## BAKER FACTORY 5 SPEED REVERSE

**PLEASE REMOVE THIS PAGE FROM THE INSTRUCTIONS AND  
KEEP WITH YOUR MOTORCYCLE FOR REFERENCE.**

### **HOW TO OPERATE YOUR BAKER F5R:**

- **WITH YOUR MOTORCYCLE IN NEUTRAL, PULL IN THE CLUTCH LEVER AND HOLD IT**
- **ACTIVATE AND HOLD BOTH TOGGLE SWITCHES IN THE 'ON' (UP) POSITION**
- **SLOWLY LET THE CLUTCH LEVER OUT JUST ENOUGH TO FEEL REVERSE ENGAGE. ONCE ENGAGED PULL THE CLUTCH LEVER BACK IN.**
- **LET GO OF BOTH TOGGLE SWITCHES.**
- **SLOWLY LET OUT THE CLUTCH LEVER AND WHILE USING CAUTION, BACK UP IN REVERSE.**
- **WHEN YOU ARE DONE BACKING UP, COME TO A COMPLETE STOP, WITH THE CLUTCH LEVER PULLED IN, TURN THE REVERSE SHIFTING SWITCH 'OFF' (DOWN). YOU ARE NOW IN NEUTRAL, AND LOCKED OUT OF REVERSE.**
- **PULL THE CLUTCH LEVER IN AND SHIFT INTO FIRST GEAR, TAKE OFF, AND HIT THE OPEN ROAD...**

Safety Switch  
(Momentary)

Reverse Shifting Switch  
(ON-OFF)



**FIGURE 19**

# BAKER FACTORY 5 SPEED REVERSE

## TERMS:

### SPECIAL ORDERS

A minimum \$500 deposit is required with all special orders. Special orders include unique case finishes, unique side door requests (i.e.; wrinkle black door or no logo).

### ALL OTHER ORDERS

Orders can be pre-paid using VISA, Mastercard or American Express.

Prices shown are F.O.B. Haslett, MI. BAKER™ provides free UPS ground shipping on all retail orders for complete transmissions or transmission kit. UPS air shipment is available upon request. Customer is responsible for air shipment premiums.

### LIMITED WARRANTY

BAKER™ Inc F5R Retro Fit Kit is guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of 2 years from the date of purchase.

BAKER™ Inc. F5R transmission assemblies and transmission builder's kits are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of 5 years from the date of purchase or up to 50,000 miles - whichever is sooner.

If the product is found by BAKER™ to be defective, such products will, at the option of BAKER™, be replaced or repaired at cost to BAKER™.

In the event warranty service is required, the original purchaser must call or write BAKER™ immediately with the problem. If it is deemed necessary for BAKER™ to make an evaluation to determine whether the transmission assembly or transmission kit is defective, the entire transmission assembly, whether originally purchased as an assembly or kit, must be properly packaged and returned prepaid to BAKER™ with a copy of the original invoice of purchase.

If after an evaluation has been made by BAKER™ and a defect in materials and/or workmanship is found, BAKER™ will, at BAKER™ option, repair or replace the defective part of the assembly.

Warranty card must be returned within 45 days of purchase to be valid.

### ADDITIONAL WARRANTY PROVISIONS

This limited warranty does not cover labor or other costs or expenses incidental to the repair and or replacement of BAKER™ products. This warranty does not apply if one or more of the following situations is judged by BAKER™ to be relevant: improper installation, accident, modification (including but not limited to use of unauthorized parts), racing, high performance application, mishandling, misapplication, neglect (including but not limited to improper maintenance), or improper repair.

BAKER™ shall not be liable for any consequential or incidental damages arising out of or in connection with a BAKER™ transmission assembly, transmission kit, swingarm, fender, component or part. Consequential damages shall include without limitation, loss of use, income or profit, or losses sustained as the result of injury (including death) to any person or loss of or damage to property.

BAKER™ transmissions, transmission kits, and Wide Tire Kits are designed exclusively for use in Harley-Davidson® motorcycles. BAKER™ shall have no warranty or liability obligation if a BAKER™ part is used in any other application.

If it is determined that a BAKER™ transmission assembly has been disassembled during the warranty period for any reason, this limited warranty will no longer apply.

## **BAKER FACTORY 5 SPEED REVERSE**

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It is the sole responsibility of the user to determine the suitability of this product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other as well as all other obligations, duties and risks associated therewith.

### **CUSTOMER SUPPORT**

For any installation or service questions, please contact our BAKER technical department toll free: 1-877-640-2004.

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On the web:  
[www.bakerdrivetrain.com](http://www.bakerdrivetrain.com)

