INSTALLATION MANUAL
SOLO II SYSTEM

SINGLE LEVER TWO STATION CONTROL

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GENERAL DESCRIPTION

INTRODUCTION:

The SOLO II System was designed and built as a heavy duty, high performance SINGLE LEVER mechanical control system for throttle/reverse gear, to be used on boats 25-50 foot in length for two station applications.

SOLO is comprised of three major components: the KRF 2050 (single) / 5000 (dual) Control Head, the KRF 3000 Ball-Bearing Flexible Control Cable, and the KRF 2500 Transfer Head.

Due to the Modular design, quick disconnect fittings and high efficiency of these components the SOLO System can be used in lieu of existing mechanical, hydraulic, electronic and wire control systems, with improved performance, less maintenance, less cost, less space requirement and simple, quick installation.

I. KRF 2050 and 5000 SINGLE AND DUAL CONTROL HEAD

The SOLO Rack and Pinion Control heads are manufactured from an “ALMAG” casting with stainless steel hears, shaft and racks. The internal bushings are made of brass and Delrin* material. The main body is provided with a black grain urethane finish, optional finish can be provided at customers request. The units have ports with which the KRF 3000 control cables connect. The control cable will be routed to the transfer head unit. The connection between control head and control cable is accomplished by a simple quick disconnect fitting, there are no loose parts to assemble or handle and no adjustments required.

II. KRF 3000 FLEXIBLE CONTROL CABLE

The control cable used in the SOLO System is a highly efficient ball bearing control cable, that gives a precise feel of motion transfer between control head and transfer unit. Control runs of 50+ feet between stations are possible with no loss of feel or performance. The control cable is of stainless steel construction with minor amounts of brass which makes the assembly non-magnetic, and corrosion resistant.

III. KRF 2500 TRANSFER HEAD

The transfer head is constructed of a cast “ALMAG” body with the remaining components being comprised of machined brass, stainless and Delrin* bushings material. These materials are of non-magnetic variety and are corrosion resistant.

KRF 2500 TRANSFER HEAD CONTINUED:

The function of the transfer head KRF 2500 is to work as the lower station control head and also to take the singular motion of the upper control head by way of the control cable and translate it into two separate motions. These motions operate in a sequential order, one operating the shift mode and the other operating the throttle mode. The transfer head is connected to the engine and transmission lever arms by way of KRF 7050 sliding control. Adjustments of these controls are the only systems adjustment required.

The transfer head has been provided with a clutch disengage to allow throttle up condition without engaging the transmission. Simply pull the hand lever out from the body and advance lever for throttle only operation.

As an additional option a neutral start switch can be provided.

The SOLO System has a wide range of application, which can solve many inherent control problems found in the marine industry.

IV. SPECIFICATIONS

CONTROL HEAD KRF 2050:

Mounting Dimensions: 5 ¾" long x 3" wide x 10 ½" high including handle

Approximate weight: 7 pounds

Space Requirements Below Mounting Surface: First bend, in the KRF 3000 flexible control, can be started at 7" below mounting surface. 14" total space recommended.

TRANSFER UNIT KRF 2500:

Mounting Dimensions: 12 ¾" long x 6" width x 3 1/8" maximum depth. Allow 6" additional length for start of bend from port of entry.

Approximate weight: 7 ½ pounds.

FOR APPLICATION INFORMATION:

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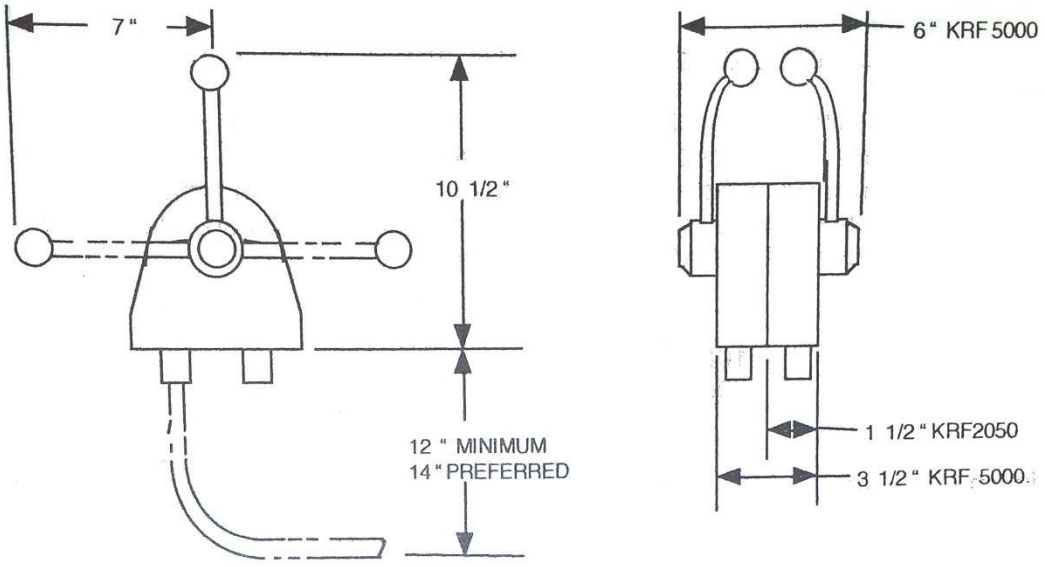
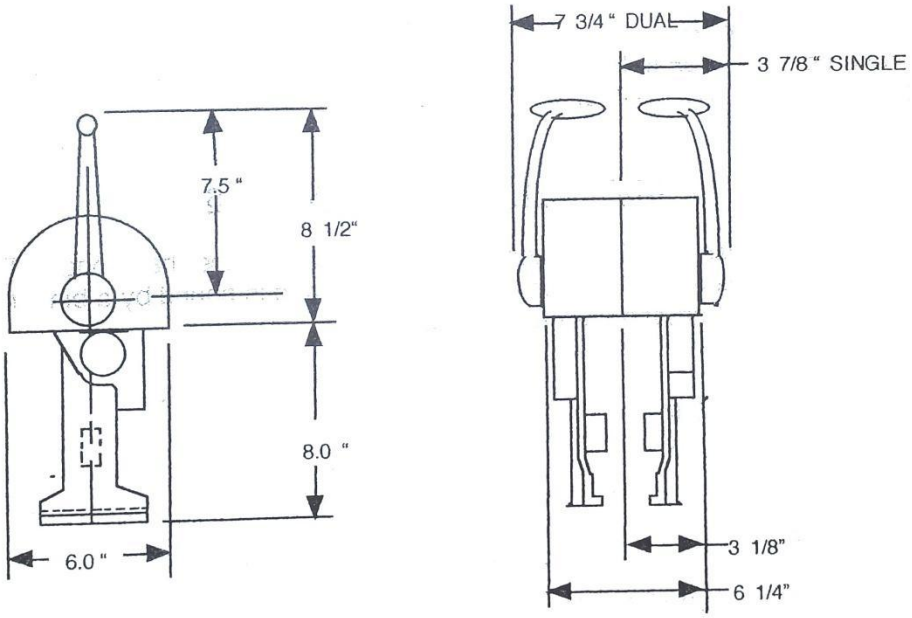


KRF 2050 AND KRF 5000 CONTROL HEADS



KRF 2500 TRANSFER HEAD

KRF 3000 FLEXIBLE BALL-BEARING CONTROL CABLE

All stainless steel contruction, non-magnetic. Vinyl covered. Auto locking cam to anchor outer races. This unique design enables the control to bend +/- 180 degrees from the straight position without change in stroke dimension which simplifies installation and guarantees full stroke regardless of configuration load. Both outer races share the reactive load. Modular mating parts.

Load capacity:
Continuous cycling 100#
Occassional cycling 300#

Bend Radius:
Minimum 4”
Recommended 7”

Weight: Approximately 0.19 lbs/ft

Lubrication: Non Required

Temperature Range:
Vinyl covered: -40F to 220F
Bare: -65F to 450F

KRF 7050 SLIDING CONTROLS

Special design for use with SOLO controls. Inner steel member has bonded Teflon cover and slides inside a Nylon liner. The condult strand is bound by a binder wrap, and covered with an extruded urethane cover.

Load capacity:
Working load range 80#
Maximum input 120#

Bend Radius:
Minimum 3”

Lubrication: Non Required

Temperature Range: -65F to 310F

SOLO
SINGLE LEVER THROTTLE/CLUTCH SYSTEM

INSTALLATION PROCEDURES

The SOLO system was designed for fast simple installation. There are three major components to the control system, the KRF 2050 (single) KRF 5000 (dual) Control Head, the KRF 2500 Transfer Head and the KRF 3000-Ft. Flexible Control Cable. The KRF 2500 Transfer Head is connected to the throttle and clutch levers by way of the KRF 7050 control cables. The system described is a dual station single engine system.

1.0 KRF 2050/5000 CONTROL HEAD INSTALLATION

1.1 Located control head, check clearance for handle movement thru full range of motion, check clearance below mounting surface for any possible interference (minimum clearance required 14”)

1.2 Using template, provided with each KRF 2050/5000 Control Head, drill and cut mounting holes.

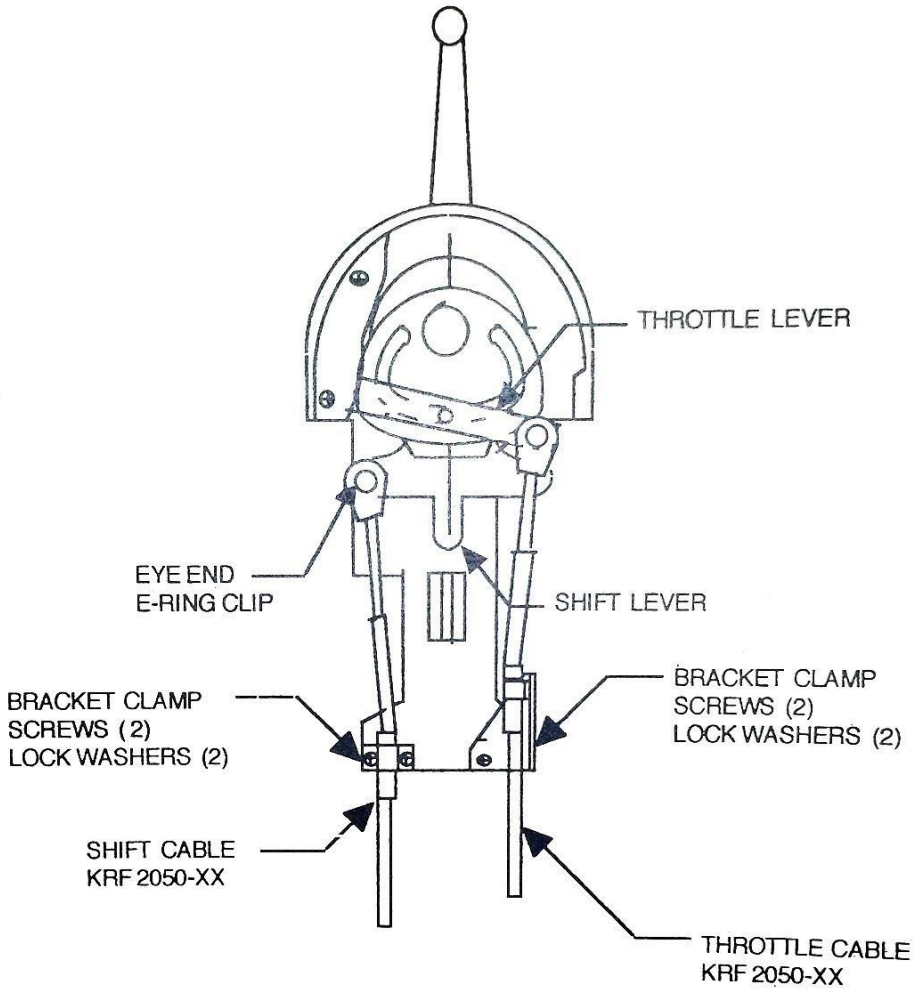
1.3 Secure KRF 2050/5000 Control Head in place

2.0 INSTALLATION OF THE KRF 7050 THROLLTEL AND SHIFT CONTROL CABLE TO THE KRF 2500 TRANSFER HEAD.

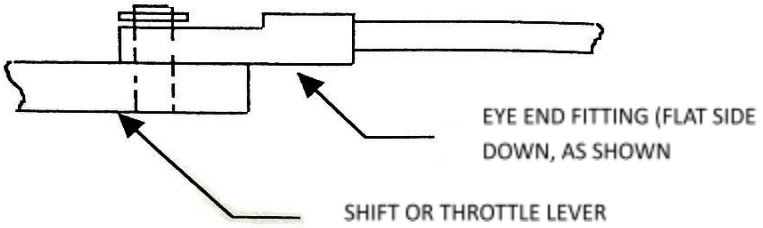
2.1 Locate transfer head, check clearance for handle movement thru full range of motion, check clearance below mounting surface for any possible interference (minimum clearance required 18”)

2.2 Using template, provided with each KRF 2500 Transfer Head, drill and cut mounting holes.

2.3 With the KRF 2500 Transfer Head in neutral position attach the KRF 7050 Shift Control Cable using hardware provided. See Figure 1 – Next Page



2.3.1 KRF 2050 Shift Control Cable must attach to the shift arm, with the eye end screwed completely on the KRF 2050 end rod. Also, the eye end must be placed on the shift arm flat side down. See Figure 2



2.3.2 Be sure the proper side of the shift arm is used for correct forward/reverse shift motion. Attaching to opposite side of shift arm reverses shift pattern.

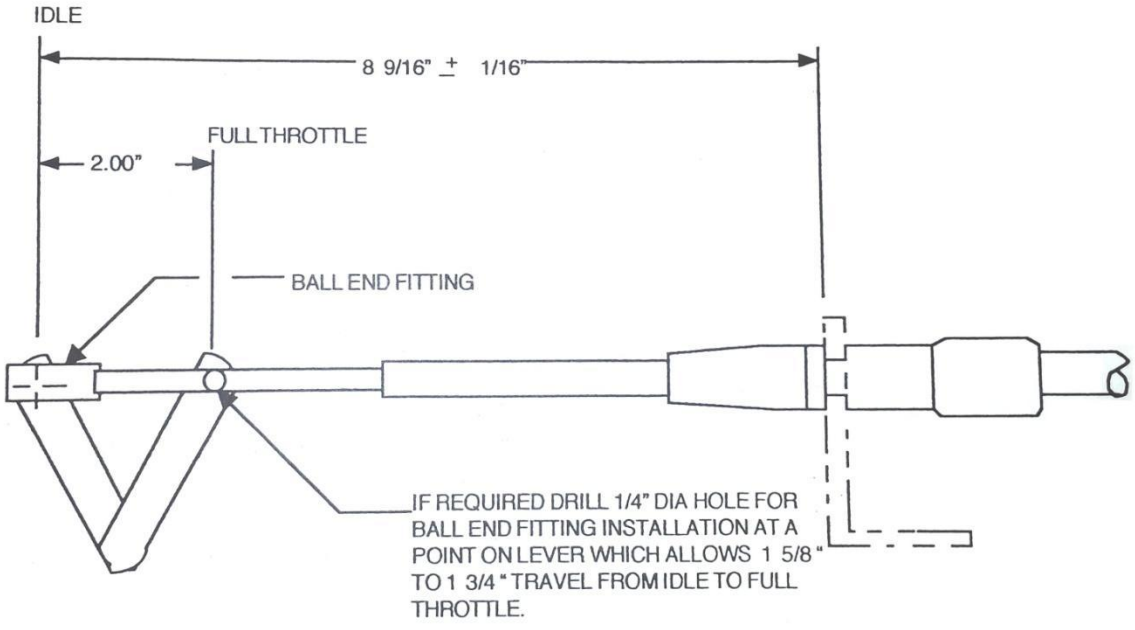
2.4 With KRF 2500 Transfer Head in neutral position, attach KRF 7050 Throttle Control Cable, using hardware provided, to swivel bracket and throttle arm. See Figure 2 (previous page)

2.4.1 KRF 7050 Throttle Control Cable must be attached to the throttle arm with the red eye screwed completely on the KRF 7050 end rod. Also, the red eye end must be placed on the throttle arm flat side down.

3.0 LOCATE AND MOUNT KRF 2500 TRANSFER HEAD AT LOWER STATION

3.1 With KRF 2500 Transfer Head in neutral position, route KRF 7050 Throttle and Shift Control Cables to throttle and reverse gear levers. **IMPORTANT:** KRF 2500 Transfer Head must be mounted so the KRF 7050 Throttle Control Cable exits the KRF 2500 Transfer Unit and runs straight for a minimum of 18".

3.1.1 Attach KRF 7050 Throttle Control Cable to governor arm, using hardware provided. See Figure 3.



3.1.2 Adjust ball end fitting (KRF 7050 terminal end) at governor arm, with governor arm in idle position and KRF 2500 Transfer Unit in neutral position, so that no preload in tension or compression exists within the KRF 7050 Throttle Control Cable.

3.1.3 The return spring rate in certain engine governors is very high, which causes the SOLO system to creep back while in throttle mode. The SOLO compensating spring may be required, i.e. Detroit Diesel type compensating governor spring. Contact factory.

3.2 Attach KRF 7050 Shift Control Cable to reverse gear shift lever using hardware provided. See Figure 4.

3.2.1 Adjust spring link fitting (KRF 7050 terminal end) at transmission shift lever, with KRF 2500 Transfer Head, in neutral position, so that the transmission shift lever is in neutral.

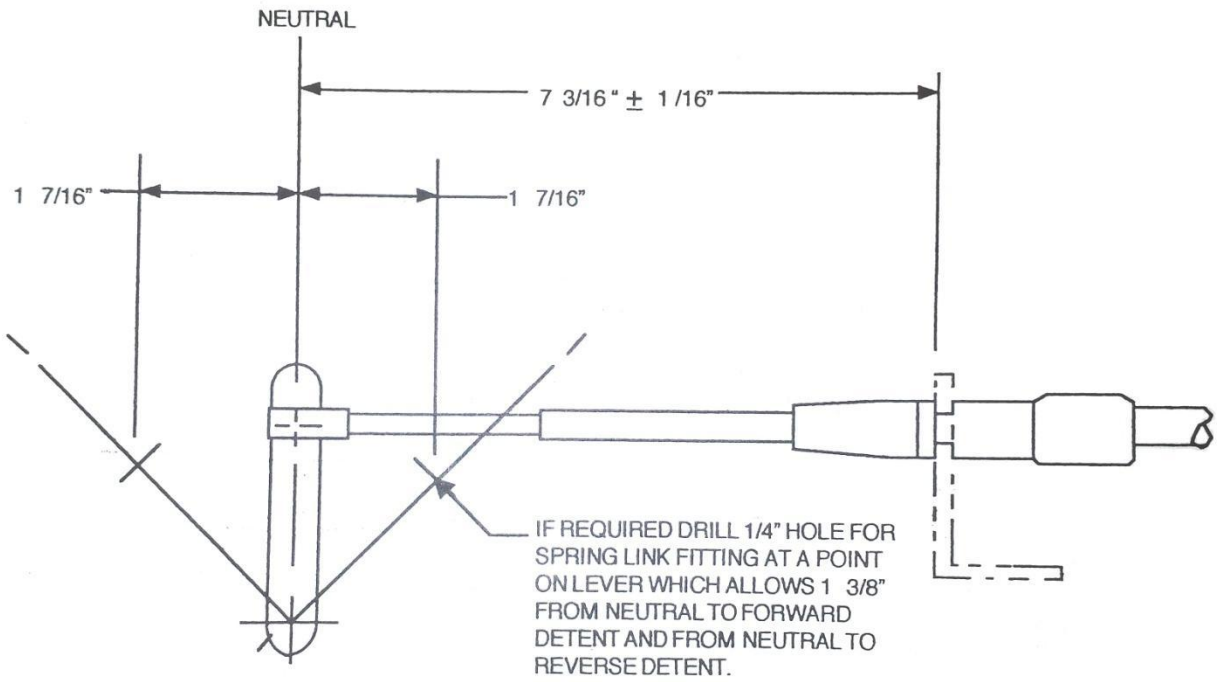


FIG. 4

TERMINAL END KRF 7050 SHIFT CONTROL SHOWN IN NEUTRAL POSITION

3.2.2 Some reverse hears have stiff neutral detents, for smoother operation these can be backed off or removed since the KRF 2500 Transfer Head provides for detent action.

4.0 KRF 3000 FLEXIBLE CONTROL CABLE INSTALLATION

4.1 **IMPORTANT:** See handling and routing instructions for KRF 3000 Control Cable.

4.2 After reading control cable handling and routing instructions, route control from upper station location to lower station location. Make routing as direct as possible with fewest number of bends. Don't force or restrict control cable routing, let it take the natural position assumed during routing.

4.3 Connect KRF 3000 Flexible Control Cable to KRF 2050 Control Head, using quick disconnect male to female fitting, then push support tube into control head port until it bottoms out, run retainer nut into control head port and tighten securely. There should be no movement in support tube after nut is tightened. See Figure 5. DO NOT reroute KRF 3000 Control Cables after they have been connected at either end. If rerouting is required, disconnect cables at both ends. See Figure 6 (next page) for routing of KRF 3000 into control head.

4.4 Connect control cable to KRF 2500 Transfer Unit, procedure same as 4.3 above.

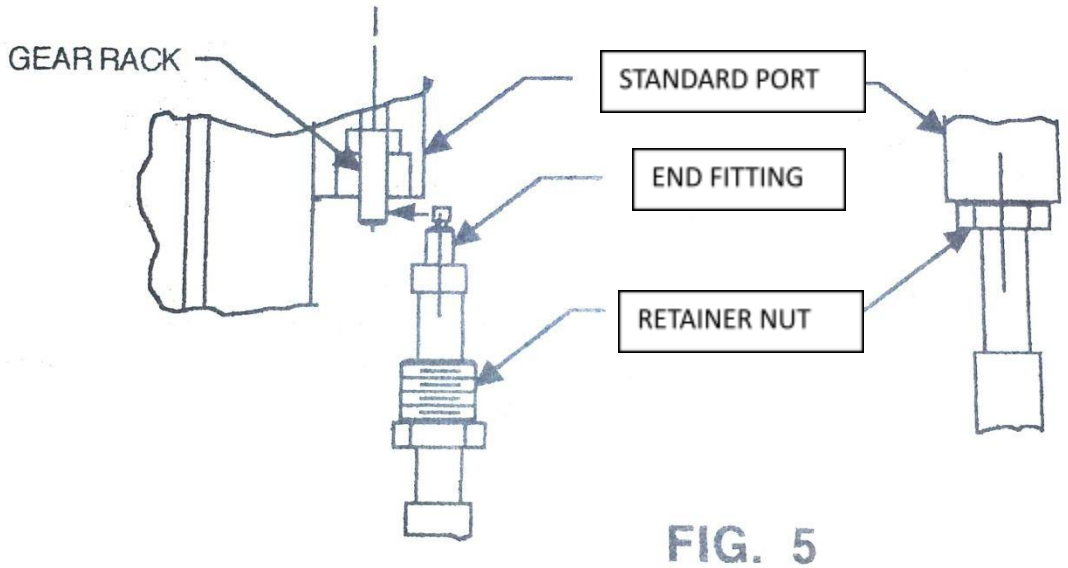


FIG. 5

WRONG

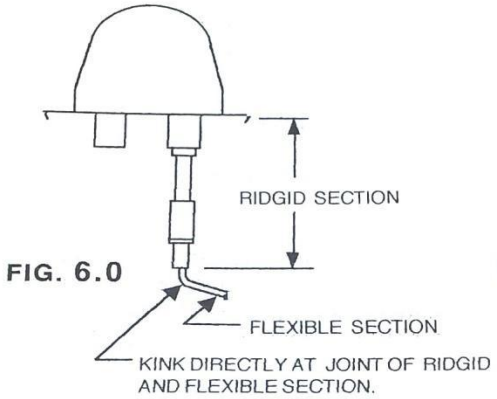


FIG. 6.0

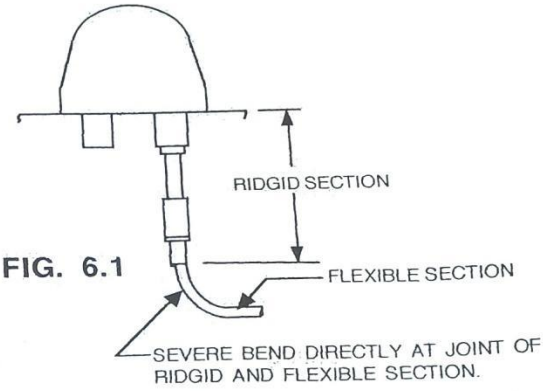


FIG. 6.1

THE TWO EXAMPLES SHOWN FIG. 6.0 AND 6.1 WILL CREATE SEVERE PROBLEMS WITHIN THE KRF 3000 BALL BEARING CONTROL AND RESULT IN THE SOLO SYSTEM BEING VERY STIFF AND ROUGH FEELING DURING OPERATION.

RIGHT

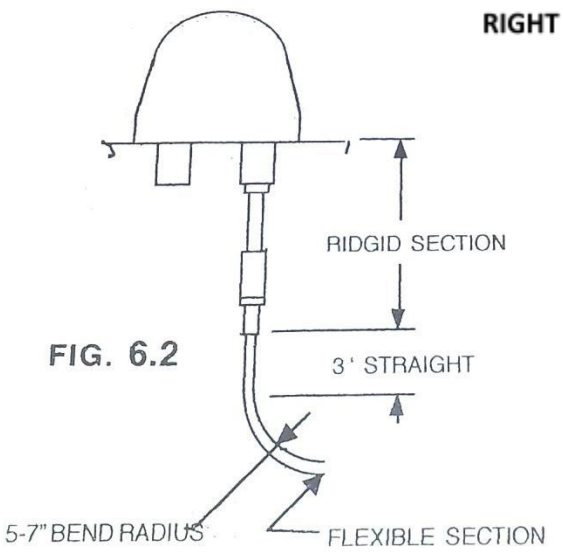


FIG. 6.2

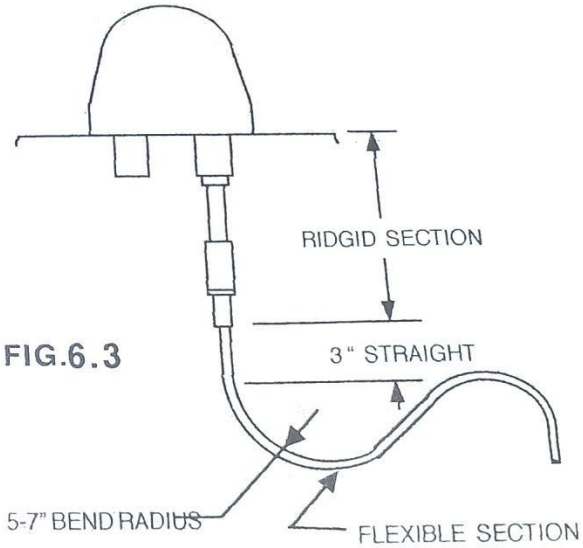


FIG.6.3

FIGURES 6.2 AND 6.3 SHOW PROPER ROUTING FROM CONTROL HEAD , WHICH WILL MAKE THE SOLO SYSTEM OPERATE SMOOTH AND FREELY . FIGURE 6.3 SHOWS "S" ROUTING USED FOR SITUATIONS WHERE SPACE IS TIGHT AND A SECOND BEND DOWN IS REQUIRED WITHIN A SHORT DISTANCE.

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SOLO TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
A. Will shift into forward or reverse, but not both. Will shift into both forward and reverse detents, but requires excessive force to move into throttle range.	A. Misadjustment of KRF 7050 Shift Control between KRF 2500 Transfer Head and Reverse Gear shift lever.	A. Red eye end must be screwed all the way onto the KRF 7050 threaded end fitting. Then connect to KRF 2500 Shift arm with flat side of red eye end on shift arm. See Figure 2 **IMPORTANT:** The KRF 7050 Control Cable from the KRF 2500 Transfer Head Shift Arm must attach to the reverse gear shift arm at a point that allows 1 3/8" movement on either side of neutral. See Figure 4.
B. Increase in RPM at idle forward or reverse detent position. Solenoid for declutching doesn't actuate.	**B.** Misadjustment of KRF 7050 throttle control between KRF 2500 Transfer Head and Governor Throttle Arm.	B. Adjust terminal ends of KRF 7050 control cable KRF 2500 Transfer Head and Governor throttle lever to relieve any preload in KRF 7050 control cable. (Red eye end fitting at KRF 2500 must be screwed completely onto the KRF 7050 threaded end fitting. Then connect to throttle arm, flat side down. See Figure 2 and 3.

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SOLO TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
C. Rough or less smooth feel during throttle operation of KRF 2050/5000 Control Head.	C. Improper routing of KRF 7050 throttle control between KRF 2500 Transfer Head and Governor Throttle Arm.	C. KRF 7050 Throttle Control Cable exiting the KRF 2500 Transfer Head MUST run a minimum of 18” straight out of KRF 2500 and then be loosely clamped so that the KRF 7050 control is allowed to freely move during system actuation.
D. Rough or less then smooth feel thru full stroke of KRF 2050 control head.	D. Improper routing of KRF 3000 control cable i.e. bending radius too tight, restricting control routing with clamps or tie-wraps, too sharp bend radius coming out of KRF 2050/5000 Control Head or KRF 2500 Transfer Head. **CAUTION:** **KRF 3000 MUST NOT BE** attached or anchored at either end when being routed.	D. When KRF 3000 control exits or enters an attachment port, a minimum of six inches of straight section should be maintained before bending occurs. Minimum bend radius 7”, recommended for extended life, 12”. Remove any clamps which are too tight on control cable or any clamps which are focing the control cable into a restricted routing position. See Cable Handling and Installation Instruction.