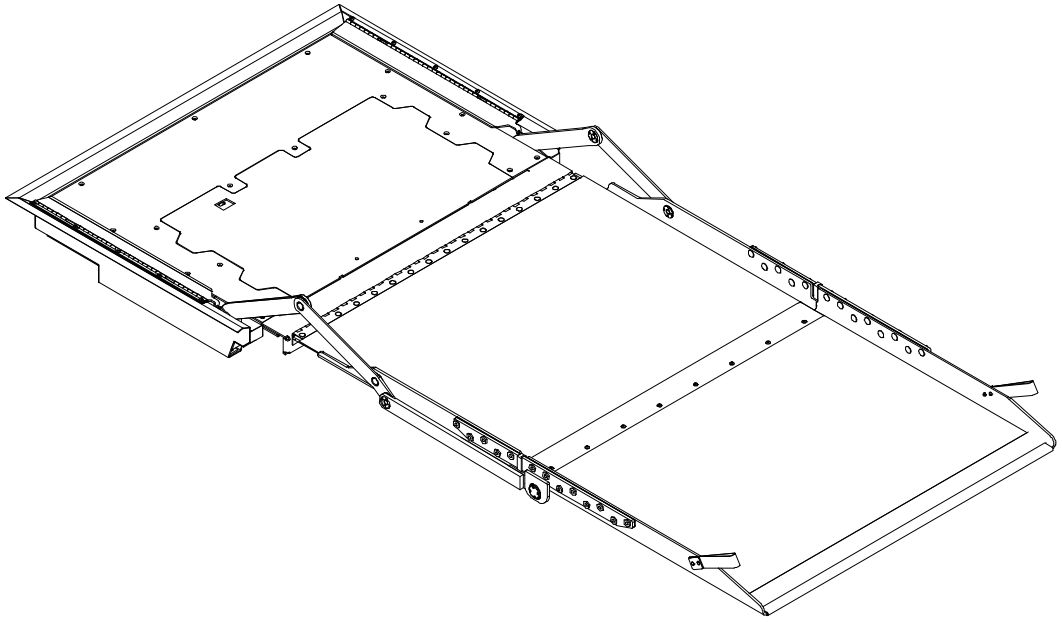
Ricon®
A Wabtec subsidiary

BiFold®

BR2 Commercial Series Low-Floor Vehicle Access Ramp for Transit Buses



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Service Manual

06/30/16

32DFR116.A.3

HOME

This Ricon service manual is for use by Ricon dealers or qualified service technicians, and is not intended for use by non-professionals (do-it-yourselfers). The manual provides essential instructions and reference information, which supports qualified service technicians in the correct installation and maintenance of Ricon products.

Qualified service technicians have the training and knowledge to perform maintenance work properly and safely. For the location of a Ricon dealer or qualified service technician in your area, call Ricon Product Support at 1-800-322-2884.

Customer Name:_____

Installing Dealer:_____

Date Installed:_____

Serial Number:_____

Revision Record

REV	PAGES	DESCRIPTION OF CHANGE	ECO
32DFR116. A.3	Cvr	Update to cover	6663
	1-1	Update company address.	
	5-7	Update item 8A, Superseded P/N 44784	
	5-8	Added item 48A.	

Chapter

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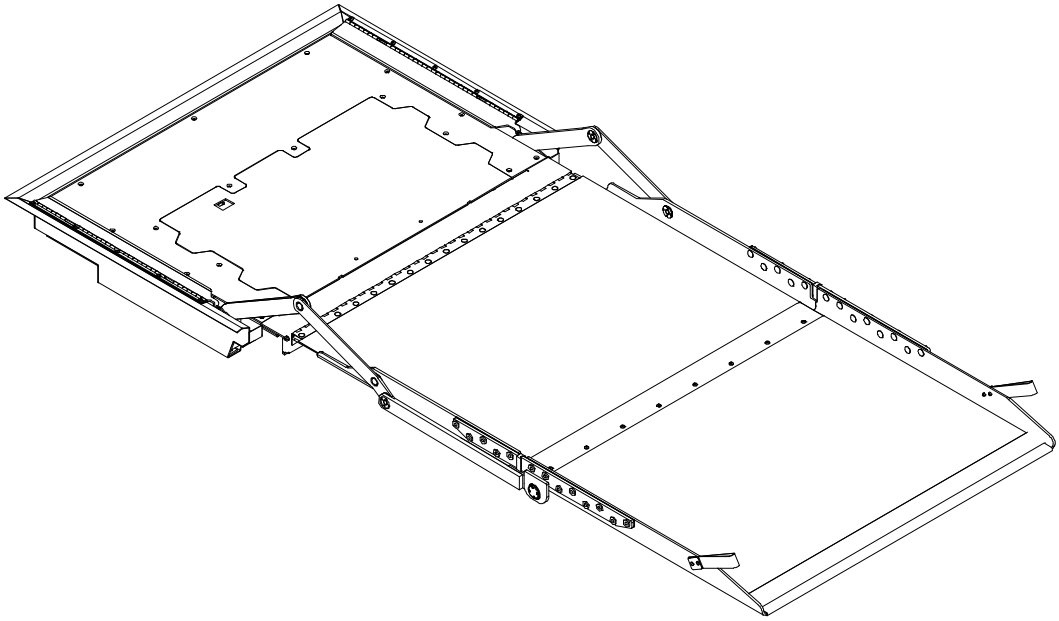
I. BIFOLD® RAMP INTRODUCTION

This manual applies to the Ricon BR2C Series BiFold® Low-Floor Vehicle Access ramp when installed in transit vehicles. The chapters in this service manual contain a product description, maintenance instructions, a trouble-shooting guide, and a spare parts list.



A. RICON PRODUCT SUPPORT

If you have questions about this manual, or you need additional copies, please contact Ricon Product Support at the locations listed. Also, refer to the Ricon website at: http://ricondealer.wabtec.com

Ricon Corporation
1135 Aviation Place
San Fernando, CA 91340 ..... (818) 267-3000
Outside (818) Area Code ..... (800) 322-2884
Website ..... http://ricondealer.wabtec.com

Vapor Ricon Europe Ltd.
Meadow Lane
Loughborough, Leicestershire 0044 (9) 1509 635 920
LE 1HS United Kingdom
Website ..... http://ricondealer.wabtec.com

B. RICON TWO-YEAR LIMITED WARRANTY

The following warranty provides two years of limited coverage for the Ricon BR2C Low-Floor Vehicle Access ramp.

RICON BIFOLD® RAMP
TWO-YEAR LIMITED WARRANTY

Ricon Corporation (Ricon) warrants to the original purchaser of this product that Ricon will repair or replace, at its option, any parts that fail because of defective material or workmanship as follows:

- Repair or replace parts for a period of two years starting from the date ramp is put into service. Obtain a complete list of parts covered by this warranty from Ricon Product Support.
- Labor costs for specified parts replaced under this warranty for a period of two years from the date put into service. A Ricon rate schedule determines parts covered and labor allowed.

This Warranty Does Not Cover:

- Malfunction or damage of product parts caused by accident, misuse, lack of proper maintenance, neglect, improper adjustment, modification, alteration, mechanical condition of vehicle, road hazards, overloading, failure to follow operating instructions, or acts of nature (i.e., weather, lightning, flood).

NOTE: Ricon recommends this product be inspected by a Ricon dealer or qualified service technician at least once every six months, or sooner if necessary. Perform required maintenance at this time.

⚠ WARNING!

THIS PRODUCT HAS BEEN DESIGNED AND MANUFACTURED TO EXACT SPECIFICATIONS. ANY MODIFICATION OF THIS PRODUCT CAN BE HAZARDOUS.

This Warranty is Void If:

- The product is not installed and maintained by a Ricon dealer or qualified service technician.
- The product is modified, in any respect from its original design, without written authorization from Ricon.

Ricon disclaims liability for any personal injury or property damage that results from operation or use of a Ricon product that is modified from the original Ricon design. No person or company is authorized to change the design of this Ricon product without written authorization from Ricon.

e Ricon obligation under this warranty is exclusively limited to the repair or exchange of parts that fail within the applicable warranty period.

Ricon assumes no responsibility for expenses or damages, including incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

Important: The warranty registration card must be completed and returned to Ricon within 20 days after product installation to validate this warranty. The warranty is not transferable.

The warranty gives specific legal rights. There may be other rights that vary in each state.

C. SHIPPING INFORMATION

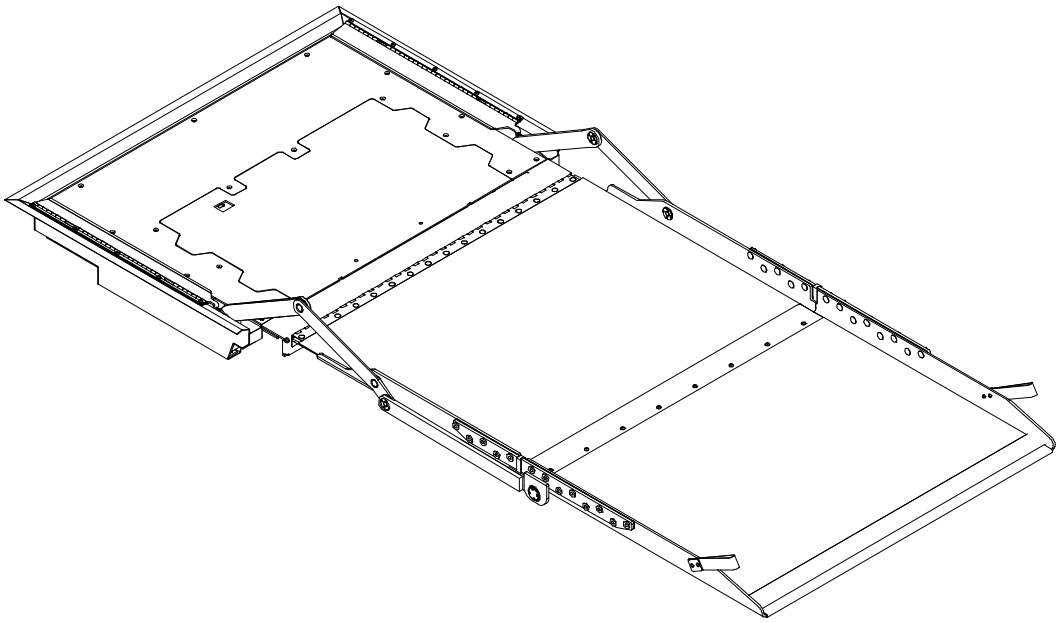
Check the received product for freight damage. Make damage claims immediately to the freight carrier.

Be sure the ramp assembly contains all items listed on the included bill of material. Please report any missing items immediately to Ricon Product Support. Save bill of material for later reference. Return the completed warranty and owner registration cards to Ricon within 20 days to validate warranty.

II. BIFOLD® RAMP DESCRIPTION

The descriptions in this chapter apply to the Ricon BiFold® BR2C-Series Low-Floor Vehicle Access ramp when installed in transit vehicles. The BiFold ramp is installed in transit vehicles to accommodate people with disabilities who cannot easily climb steps or are using mobility-aid equipment. The hydraulically powered ramp folds into the vehicle vestibule flooring when not in use.

BR2C-series ramps have a 363 kg (800 lb) load limit. Passengers must use the ramp one at a time. Be certain that passenger mobility-aid equipment fits between the left and right side ramp barriers without any interference before allowing on ramp.



A. RAMP FEATURES

1. INTERLOCK SUPPORT

The ramp electronics can be interfaced with the vehicle interlock circuitry to prevent unintentional vehicle departure with the ramp deployed. The ramp interlock circuitry senses the position of the ramp, stowed or deployed, and provides this information at the J6 harness connector. A typical vehicle interlock circuit might require that the following conditions be met before operating power is supplied to ramp:

- Park vehicle and set parking brake.
- Place transmission in neutral.
- Open vehicle door adjacent to ramp.

2. AUDIBLE ALERT

The ramp supports an audible alert device that will sound while the ramp is in motion. This optional alert device is not present in every ramp installation.

3. RAMP CONTROL PANEL

Refer to **Figure 2-1.** Ricon does not supply a ramp control panel because this device is typically installed by the vehicle builder.
The ramp can be operated with one similar to that shown; however, the actual panel will vary between transit authorities and vehicles. The control panel is normally installed in the driver area. As a minimum, it should have a power ON/OFF switch, a power on indicator light, and a three-position ramp control switch (center position is off). The ramp receives power from the vehicle when the interlock conditions are met and the power ON/OFF switch is on. The three-position ramp control switch can then be used to transmit a deploy or stow signal to the ramp hydraulic system.

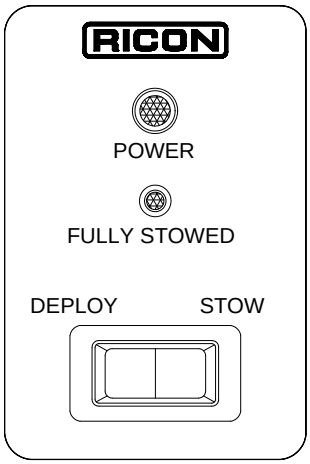


FIGURE 2-1: TYPICAL CONTROL PANEL

4. HEATER MAT (OPTIONAL)

Some BR2C installations include an electrically heated mat that is incorporated into the ramp component access cover located on the upper surface of the ramp housing. The heater mat helps keep the ramp and vehicle vestibule area clear of snow and ice. A two-position HEATER POWER ON-OFF switch must be installed to operate the heater mat.

B. RAMP CAPACITY AND SIZE

The load bearing capacity for the ramp is 800 pounds, or 363kg. For that reason, passengers must use the ramp one at a time; **do not overload ramp**.

Several models of the BR2C are available. The ramp dimensions for useable width vary from 32” to 34” and for useable length there is a range from 52” to 62”. Be certain that passenger mobility-aid equipment fits easily between the ramps left and right side barriers before allowing use of ramp.

C. MAJOR RAMP COMPONENTS

Figure 2-2 shows major components of the BR2C BiFold Ramp. A description of each component is provided in **Table 2-2**.

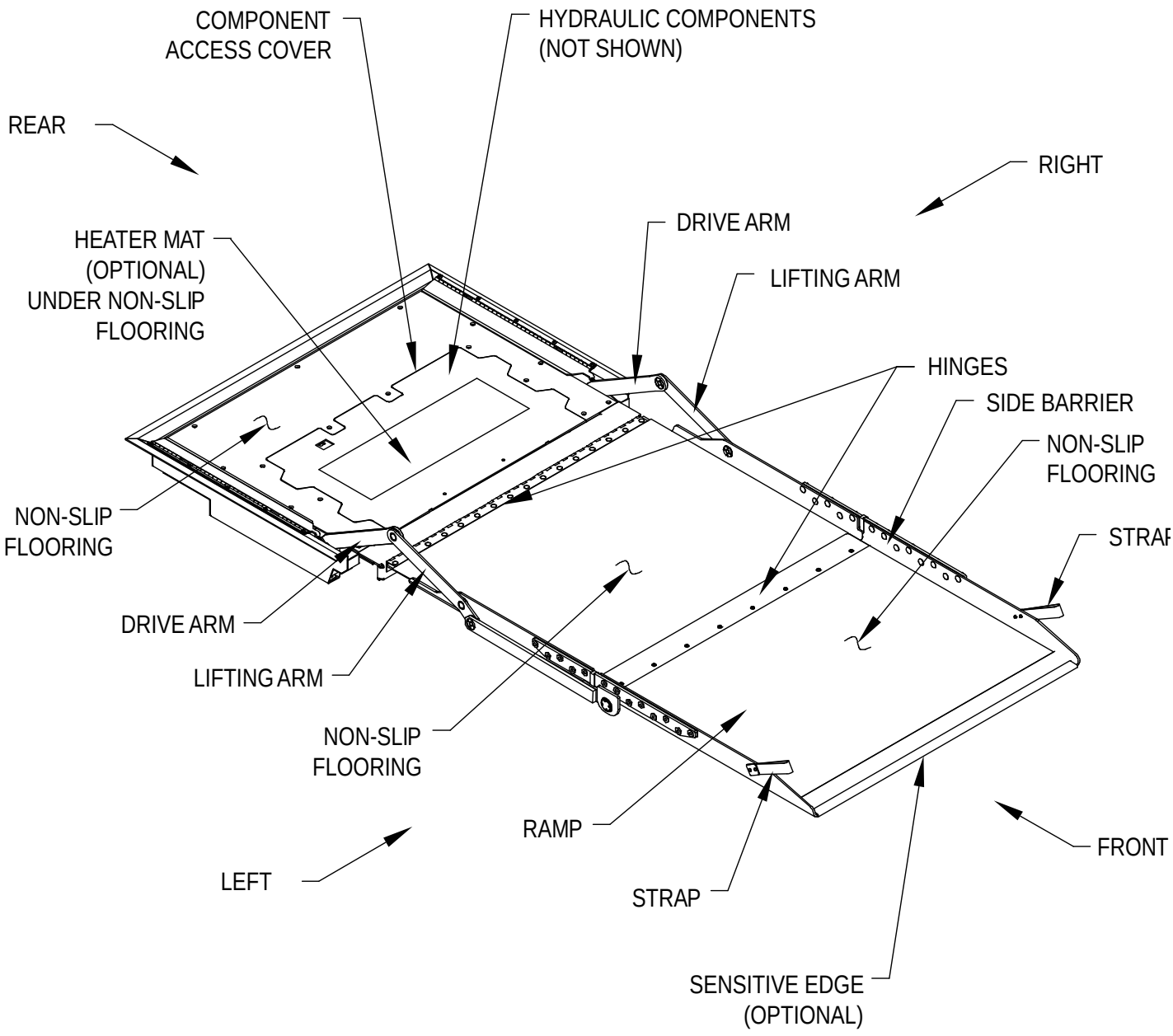


FIGURE 2-2: MAJOR BR2C RAMP COMPONENTS

TABLE 2-2: MAJOR BR2C BIFOLD RAMP COMPONENTS	
NAME	**DESCRIPTION**
Component access cover	Provides access to ramp hydraulic and electrical components.
Electronic controller	Translates electrical commands from bus control panel into signals that control ramp hydraulic components. Monitors ramp position and drives counter.
Driveshafts (left and right side)	Transmits actuator torque to drive arms.
Drive arms (left and right side)	Ramp linkage arms attach to outboard end of driveshafts.
Lifting arms (left and right side)	Ramp linkage arms attach to ramp.
Flow control valves (deploy and stow)	Manually adjusted valves control rate of deploy and stow ramp motion.
Arm hardware (screws, bushings, thrust washers)	Pivoting, load-bearing parts at both ends of driven arms. Bushings and washers are oilite material.
Floor heater mat (optional)	Helps keep ramp floor clear of ice and snow.
Heater mat wiring access cover (optional)	Provides access to wiring for optional heater mat.
Hinges (center hinge is hidden from view)	Pivoting connection between ramp and ramp frame.
Hydraulic rotary actuator	Hydraulic powered component provides torque used to deploy and stow ramp.
Hydraulic pump assembly	Provides hydraulic pressure for use by ramp hydraulic components. The hydraulic pump contains a motor, pump assembly, reservoir, and directional valve.
Manual stow and deploy tool (optional)	Use to manually deploy or stow ramp.
Manual stow/deploy tool slots	Insertion point for optional stow/deploy tool.
Non-slip flooring	Bonded to ramp to reduce foot slippage.
Pillow blocks (left and right side)	Provide support for outer ends of driveshafts.
Proximity sensors (deploy and stow)	Located near left driveshaft. Detect position of ramp, either stowed or deployed.
Ramp	Unfolds (deploys) to provide access for handicapped passenger use. Folds into vestibule floor (stows) when not used.
Side barriers (left and right side)	Vertical curbs help restrict passenger to ramp area.
Sensitive edge	Pressure sensitive edge signals controller when ramp strikes an object.
END OF TABLE	

D. RAMP SPECIFICATIONS

RICON BR2C LOW-FLOOR-VEHICLE ACCESS RAMP

Power System ..... Electro-hydraulic pump and rotary actuator

Power Requirements:

Electric * ..... 12 VDC or 24 VDC

Rated Load Capacity ..... 800 lbs. (363kg)

Nominal Ramp Weight ..... approx. 298 lbs. (135kg)

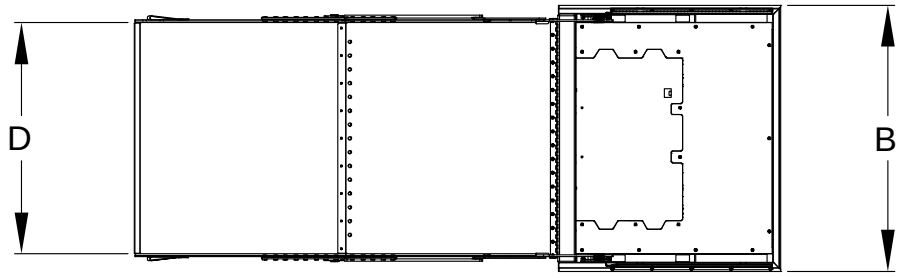
Cycle Times ..... Adjustable from 7 to 12 seconds

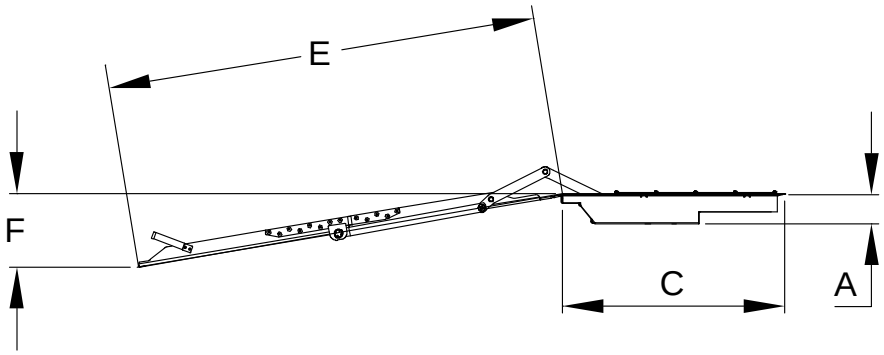
Operating Temperatures ..... -20F to 120F

Max Usable Platform Length ..... 62 in. (1578.1 mm)

Max Usable Platform Width ..... 34 in. (863.6 mm)

* Certain applications employ +12 VDC power, which have a maximum current draw of 50A .





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DIMENSIONS – inches (mm)

	A	B	C	D	E	F	
MODEL	Ramp frame height	Ramp trim width	Ramp trim length	Useable platform width	Sloped surface length	Max. Floor-to-Ground (1:6)	Max. Floor-to-Ground (1:4)
BR2C00	4.26 (108.2)	36.88 (936.8)	28.65 (727.7)	32.0 (812.8)	52.75 (1339.9)	8.7 (220.9)	12.8 (325.1)
BR2C01	4.26 (108.2)	36.88 (936.8)	28.65 (727.7)	32.0 (812.8)	57.00 (1447.8)	8.7 (220.9)	12.8 (325.1)
BR2C02	4.30 (109.2)	38.55 (979.2)	32.37 (822.2)	34.0 (863.6)	62.13 (1578.1)	10.25 (259.1)	15.1 (383.5)

END OF TABLE

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III. BIFOLD® RAMP MAINTENANCE

The maintenance information in this chapter applies to the Ricon BiFold® BR2C-Series Low-Floor Vehicle Access ramp installed in transit vehicles. The information consists of safety precautions, a maintenance schedule, component information, and diagrams for the hydraulic and electrical systems. This chapter is intended to supplement related sections of the vehicle manufacturer Owner and Service Manuals.

A. GENERAL SAFETY PRECAUTIONS

⚠ WARNING

THIS RAMP IS DRIVEN WITH HYDRAULIC PRESSURE GENERATED BY A HYDRAULIC PUMP SYSTEM. THE FLUID IS HIGHLY PRESSURIZED AND POSSIBLY VERY HOT. USE EXTREME CAUTION WHEN DOING MAINTENANCE AND REPAIRS. DO NOT DISCONNECT HOSES OR FITTINGS WHEN RAMP IS IN MOTION.

Follow these safety precautions during service of the Ricon BiFold ramp:

- Under no circumstances is maintenance, repair, or adjustment of the BiFold ramp to be performed without the presence of an individual capable of giving aid.
- Give immediate attention to all injuries, and administer first-aid or seek medical attention as necessary.
- Protective eye shields and clothing should be worn during maintenance, repair, and adjustment of the BiFold ramp.
- The user must be cautious when operating the ramp. Be certain that hands, feet, legs, and clothing are not in the path of ramp movement.
- Batteries contain acid that can burn. Wear protective clothing and eye protection at all times. If acid comes in contact with skin, immediately flush affected area with water and wash with soap. Do not place anything electrically conductive on top of battery. Do not smoke or use an open flame near battery.
- Work in a properly ventilated area.
- Read and understand all instructions before attempting to operate the BiFold ramp.
- Inspect the ramp before use for unsafe conditions, unusual noises, or erratic movements. Do not use ramp if any of these are present, and arrange to have an authorized Ricon dealer or qualfied service technician inspect ramp.
- Keep others clear of the ramp while it is operating.
- Ricon strongly recommends that the vehicle be parked on level ground when using ramp. Using the ramp when vehicle is sloped may result in a ramp angle that is too steep for safe use. In addition, the sloped vehicle may not allow the ramp to make complete contact with the ground.
- The BiFold ramp and other system components require periodic maintenance. Ricon recommends a thorough vehicle inspection by an authorized Ricon dealer or qualified service technician at least once every six months. To maximize safety, the ramp and related components should be maintained at their highest level of performance.
- Read and comply with warning labels attached to ramp.

B. DAILY INSPECTION

Check ramp daily, following the Daily Inspection outlined in **Table 3-1**. Meet all inspection criteria before allowing passengers on ramp.

TABLE 3-1: DAILY INSPECTION

INSPECTION POINT	CHECK
Ramp controller	• Power ON/OFF switch operates correctly. • Power On indicator illuminates when Power ON/OFF switch is ON. • DEPLOY/STOW switch operates correctly.
Ramp and surrounding area	• No unusual noises or erratic movements when ramp is in motion. • Vestibule area is free of loose objects, and the actuator drive arms are free of debris.
Ramp non-slip surfaces	• Surface is clean and free of slippery or sticky substances that could compromise user safety. • Surface is intact and secure, and loose edges, if present, cannot create a stumbling hazard.

END OF TABLE

C. MAINTENANCE SCHEDULE

Regular maintenance and inspection of the Ricon BiFold ramp provides optimum performance and reduces the need for repairs. Maintain the ramp as directed in **Table 3-2**. Perform ramp maintenance more frequently during heavy use (more than 20 cycles per day).

⚠ CAUTION!

~ This Ricon Product Is Complex ~

Required warranty period maintenance and repairs must be done at a Ricon authorized facility. Improper maintenance, use of non-Ricon replacement parts, or product modification will void warranty and can result in unsafe operating conditions. We recommend that an authorized Ricon facility continue maintenance inspections when warranty ends.

TABLE 3-2: MAINTENANCE SCHEDULE

INSPECTION POINT	ACTION
– 6,000 MILE INSPECTION –	
Hydraulic fluid leaks	Check all hoses and fittings; check fluid level. Tighten, fill, or replace as necessary. Use Texaco No.1554 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606G oil).
Setscrews	Check for loose or missing setscrews at these locations: • Driveshaft couplers (4 per coupler) • Sensor target (1 ea) • Pillow blocks (2 per block) Tighten, or replace, as necessary.
Drive arm sex bolt	Check for looseness; tighten as necessary; apply thread locker (Loc-tite blue), as necessary. Refer to **Figure 3-4** for drive arm hardware configuration.
Ramp interior (for debris)	Check area below floor plate, and remove any accumulated dirt or debris.
Non-slip surface	Visually check for damage to surface, and for loose or missing non-slip material.

TABLE 3-2: MAINTENANCE SCHEDULE	
INSPECTION POINT	**ACTION**
Decals	Visually check for illegibility or damage, replace as necessary.
– 12,000 MILE INSPECTION –	
Wiring harnesses	Check wiring insulation for heavy abrasions, and connectors for looseness. Replace as necessary.
Fasteners	Check all threaded fasteners for tightness and retighten as necessary.
Non-slip surfaces	Check non-slip surface for excessive wear or damage (rips, tears, peeling, etc.), and replace as necessary.
– 24,000 MILE INSPECTION –	
Pillow blocks	Lightly grease pillow blocks with a lithium complex grease, such as Mobilith AW2. Lubricate through grease fitting.
Bushing & thrust washer	Refer to **Figure 3-4.** Check the drive arm hardware parts for excessive play, and replace if necessary.
END OF TABLE	

D. RAMP COMPONENT INFORMATION

The Ricon BiFold Ramp uses electrical power from the host vehicle to deploy and stow the ramp. Vehicle electrical power is converted to hydraulic force, which is used to move the ramp. Electrical and hydraulic components are described below. Please refer to **Figures 3-7, 3-8,** and **3-9** for hydraulic schematics and flow diagrams.

1. HYDRAULIC PUMP

The ramp employs an electro-hydraulic pump (contained within the ramp enclosure) to pressurize hydraulic fluid. Pressure is regulated in the pump body and is preset at Ricon.

The hydraulic pump provides pressure to the rotary hydraulic actuator when either the DEPLOY or STOW switch is activated. Ricon recommends operating the ramp while the vehicle engine is running in order to minimize current drain on the vehicle battery.

2. FLOW CONTROL VALVES

Two manually adjusted flow control valves (needle valves) control the volume of hydraulic fluid passing through the rotary actuator. Their adjustment determines the rate of ramp movement. There is one valve for ramp deployment and one valve for stowing. Turning the valves **counterclockwise** increases the rate of ramp movement, and **clockwise** decreases the rate of ramp movement.

Refer to the Installation Guideline section in Chapter IV for the Flow Control Valve Adjustment procedure.

3. DEPLOY AND STOW PRESSURE SETTING VALVES

Separate pressure adjustments are available for the deploy and stow motions to control the rate of movement in each direction. The two valves used to make these adjustments are located on the pump body.

Refer to the Installation Guideline section in Chapter IV for the Adjusting Individual Deploy and Stow Pressure Settings procedure.

4. ELECTRONIC CONTROLLER

The electronic controller interprets DEPLOY and STOW requests and controls ramp functions. It contains a programmable integrated circuit (IC), relays, two fuses, and associated parts. The programmable IC cannot be accessed externally. The ramp harness, which is connected to controller connector J1, supplies STOW and DEPLOY requests. Connector J1 also provides positive and negative interlock signals. Connectors J2 and J3 receive signal inputs from the RAMP STOWED and RAMP DEPLOYED sensors, respectively. Connector J4 provides directional control signals to the hydraulic pump. Connector J5 provides a timing signal to the auxiliary counter.

Refer to **Figures 3-1** and **3-2** on following page for a side view and top view of controller, showing locations of J1, J2, J3, J4, J5, and J6 connectors. The controller cover is sealed with silicone rubber and is not easily removed. Note the four mounting holes at the corners of enclosure. Note locations of fuses F1 and F2 at left center of **Figure 3-2**. Refer to **Table 3-3** on following page for functions and ratings of fuses located inside controller. Access to the controller is gained by removing access cover from ramp. Reseal the cover with silicone rubber before reinstalling.

Refer to **Figure 3-3** on following page for connector pin numbering and wire colors. Refer to **Table 3-4** for a signal description of each connector pin.

TABLE 3-3: CONTROLLER FUSES		
SE	**RATING**	**CIRCUIT**
F1	3.0 AMP	Interlock output (positive output on J-1 pin 4)
F2	7.5 AMP	Main power (programmable controller, solenoid valves, sensors)
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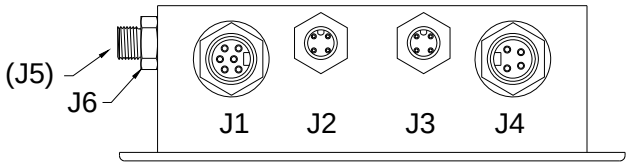


FIGURE 3-1: CONTROLLER SIDE VIEW

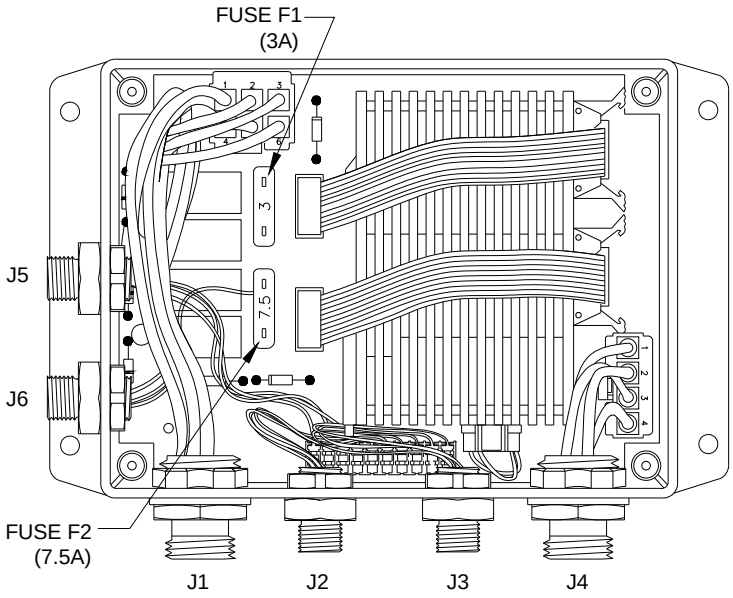


FIGURE 3-2: CONTROLLER TOP VIEW

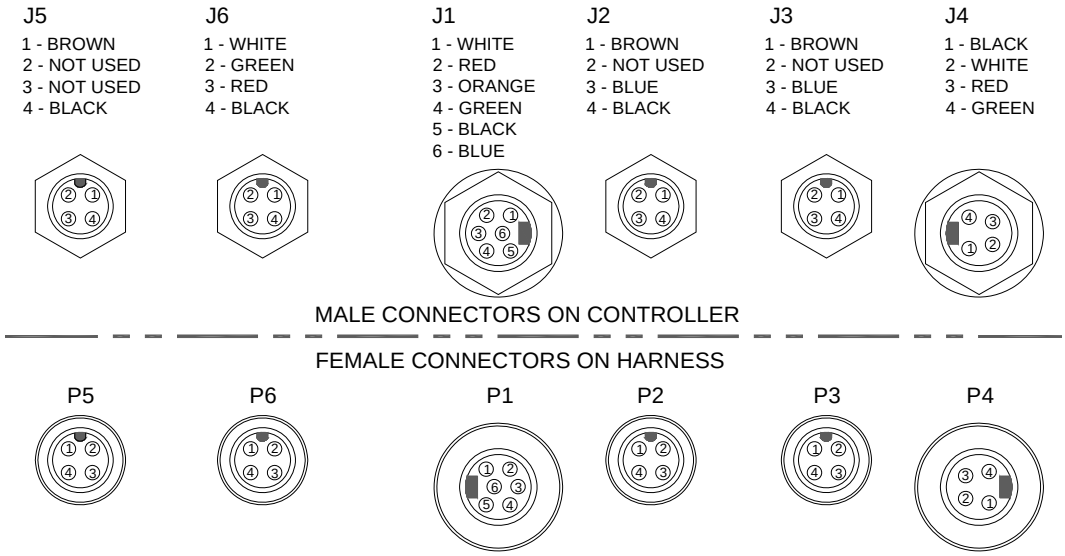


FIGURE 3-3: CONTROLLER CONNECTOR-PIN NUMBERING

TABLE 3-4: CONNECTOR-PIN DESCRIPTIONS FOR CONTROLLER					
PIN		**COLOR**	**FUNCTION**	**AT REST**	**IN ACTION**
J1	1	White	Output signal to vehicle interlock	Common; stowed	No signal; ramp not stowed
	2	Red	STOW request from control switch	0 volts	24 volts; STOW switch activated
	3	Green	Common	Common	Common
	4	Orange	Output signal to vehicle interlock	Off; stowed	24 volts; ramp not stowed (deployed)
	5	Black	DEPLOY request from control switch	0 volts	24 volts; DEPLOY switch activated
	6	Blue	24 volts to controller (constant)	24 volts	24 volts
J2	1	Brown	Power to stowed sensor	24 volts	24 volts
	2	Not used			
	3	Blue	Common	Common	Common
	4	Black	Stowed sensor controller input	0 volts; sensor off	24 volts when sensor is activated
J3	1	Brown	Power to deploy sensor	24 volts	24 volts
	2	Not used			
	3	Blue	Common	Common	Common
	4	Black	Deployed sensor controller input	0 volts; sensor off	24 volts when sensor is activated
J4	1	Black	DEPLOY output to hydraulic pump	0 volts	24 volts; DEPLOY function engaged
	2	White	STOW output to hydraulic pump	0 volts	24 volts; STOW function engaged
	3	Red	Common	Common	Common
	4	Green	Output to hydraulic pump relay	0 volts	24 volts; STOW/DEPLOY function engaged
J5	1	Brown	Output signal to auxiliary counter	Off	24-volt pulse each stow cycle
	2	Not used			
	3	Not used			
	4	Black	Common for auxiliary counter	Common	Common
J6	1	White	Hold valve output	0 volts	24 volts
	2	Grn	Sensitive edge normally open	0 volts	24 volts
	3	Red	24VDC to sensitive edge	24 volts	24 volts
	4	Black	Hold valve common	Common	Common
END OF TABLE					

NOTE: Some applications employ 12 VDC system power and signal levels.

5. SENSOR LIGHT ACTIVITY DURING RAMP MOVEMENT

The latest BiFold ramps have a third ramp position that is monitored by the controller. This position is very near to the fully stowed position. The ramp must be within this area before the electrical interlock output signal will turn on (12VDC). This is done to reduce the possibility of a passenger tripping on the front edge of the ramp when it is not stowed competely. Failure to stow completely could be caused by accumulated debris beneath the ramp (within the frame). The following information will provide an aide to troubleshoot ramp problems using the indicator lights on each sensor.

Refer to **Figure 3-4.** This is an illustration showing the location of the target (installed on a driveshaft), the stow and deploy sensors, and the sensor lights.

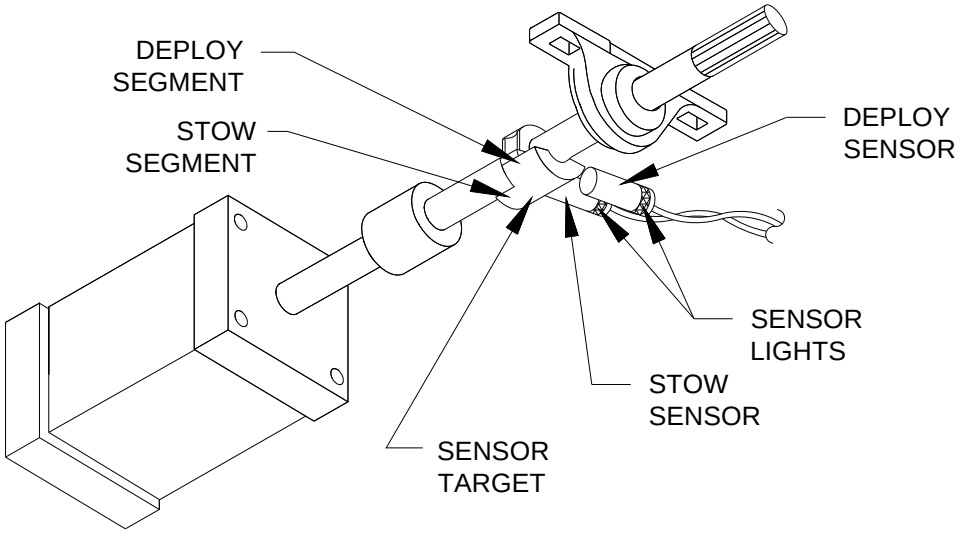


FIGURE 3-4: TARGET AND SENSOR LOCATIONS

Refer to **Figure 3-5** for an illustration showing the four ramp positions. The controller determines the ramp angles shown by using the signals from the two sensors. The ramp "A" angle shown in the figure is greater than actual for clarity; the actual height of the ramp above the floor is about one inch. This angle can be adjusted by turning the sensor target very slightly.

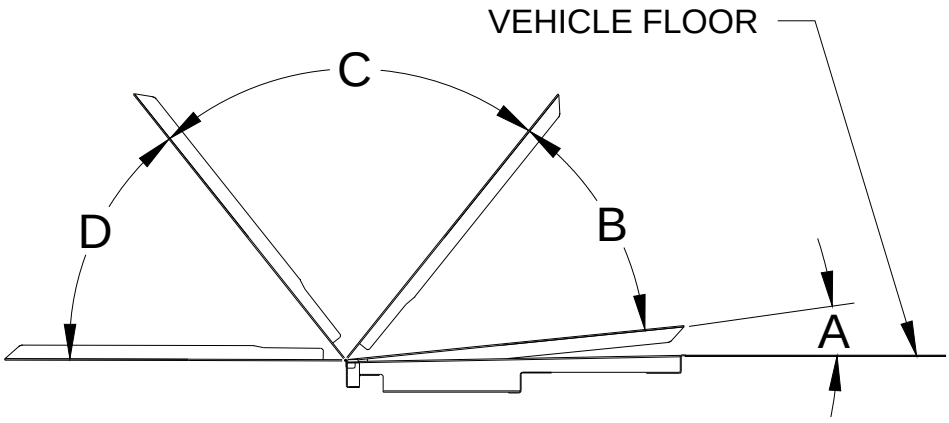


FIGURE 3-5: RAMP POSITIONS

Refer to **Table 3-5**. The status of the sensor light and interlock output occur over the entire range of each angle. Note that the interlock output has both a normal and an inverted output. This table applies to the normal output.

TABLE 3-5: SENSOR LIGHT AND INTERLOCK OUTPUT STATUS

ANGLE	DEPLOY LIGHT	STOW LIGHT	INTERLOCK OUTPUT
A	OFF	OFF	12VDC
B	ON	OFF	0VDC
C	ON	ON	0VDC
D	OFF	ON	0VDC
End of Table			

6. CIRCUIT BREAKERS AND FUSES

The bus builder installs a 25 or 50 amp circuit breaker to protect ramp control circuits.

Two fuses protect the controller, and are located inside its sealed enclosure. Please refer back to **Figure 3-2** for their locations. The fuses must be replaced by a Ricon authorized dealer or qualified service technician. The hydraulic pump assembly contains an 8 amp circuit breaker to protect components within the hydraulic pump assembly.

7. CONTACT SENSITIVE EDGE ON FRONT OF RAMP

This safety feature is located on the leading edge of the ramp. Inside the resilient rubber edge is an electrical contact switch that extends across the entire front edge. If the ramp contacts something during its deploy motion the controller is signaled and the Hold Valve is actuated in the hydraulic pump assembly. This action halts deployment of the ramp.

8. RAMP ARM ASSEMBLY

Please refer to **Figure 3-6** for the correct configuration of the arms and their hardware. Use a 4-Pin tool (Ricon P/N 36250) to fasten the sex bolt to the lifting arm and driven link arm actuator. Apply a small amount of threadlocker (Loctite blue) to sex bolt before assembling hardware. Apply 20-25 ft. lbs. torque to the sex bolt of Link Arms.

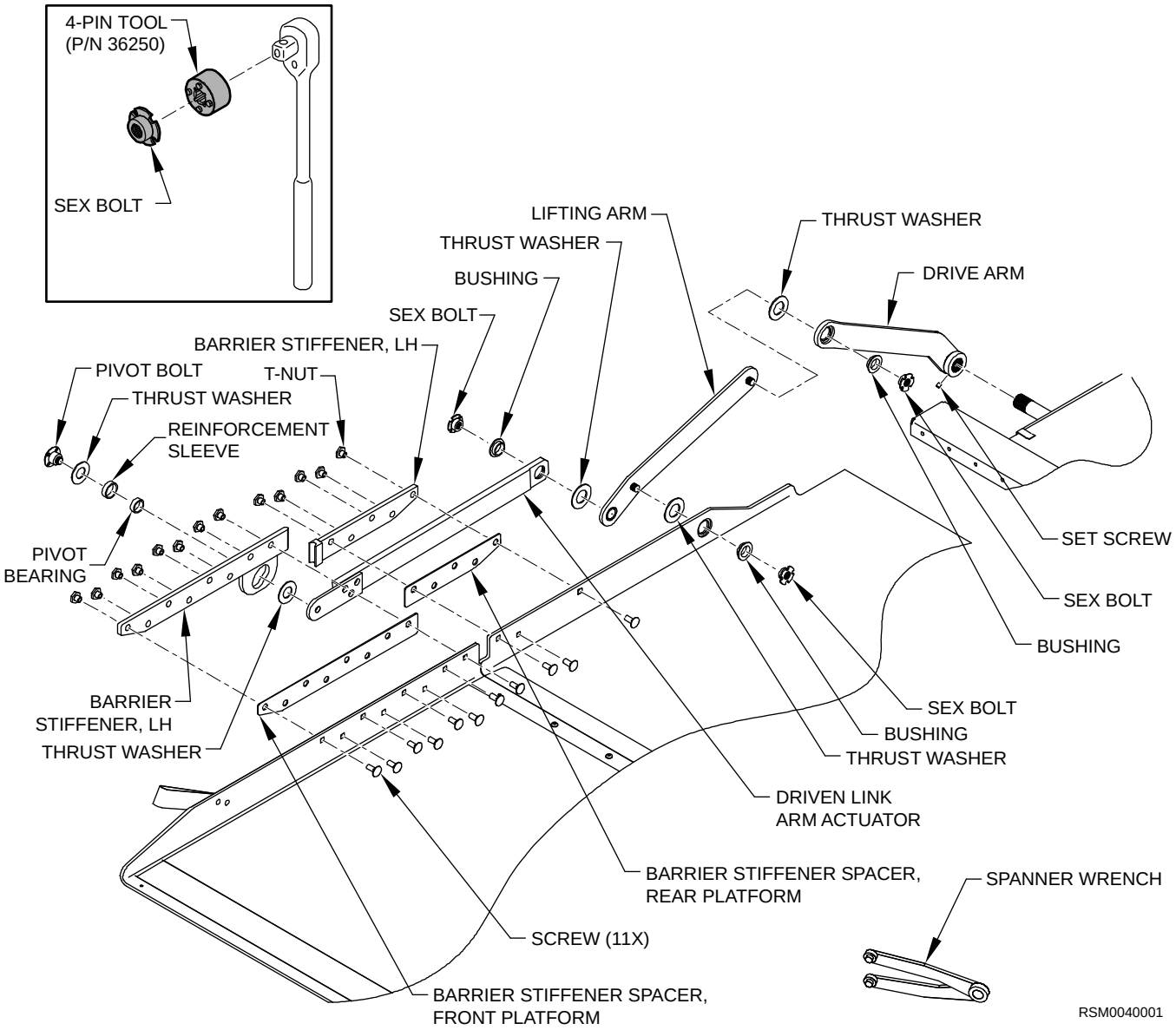


FIGURE 3-6: HARDWARE CONFIGURATION FOR LEFT SIDE RAMP ARM

E. ELECTRICAL AND HYDRAULIC DIAGRAMS

Refer to **Table 3-6** for wire color codes used on the electrical schematic. Refer to **Figure 3-7** for an illustration of the plug and receptacle designations used on the schematic. Refer to **Figure 3-8** for a list of symbols used on the schematic. Refer to **Table 3-7** for an explanation of labels used on the schematic. Refer to **Figures 3-9, 3-10**, and **3-11** for diagrams of the ramp hydraulic system in its inactive, deploy, and stow modes. The diagrams show the direction and path of fluid flow, and valve positions. The diagrams are located on the following pages.

Refer to **Figures 3-12, 3-13,**and **3-14** for an overall electrical schematic of the ramp system, including that portion supplied by the bus builder. The electrical schematic is located at the end of this chapter.

TABLE 3-6: WIRE COLOR CODES

CODE	COLOR	CODE	COLOR
BLK	BLACK	RED	RED
BLU	BLUE	TAN	TAN
BRN	BROWN	VIO	VIOLET
GRN	GREEN	WHT	WHITE
GRY	GRAY	YEL	YELLOW
ORG	ORANGE		

END OF TABLE

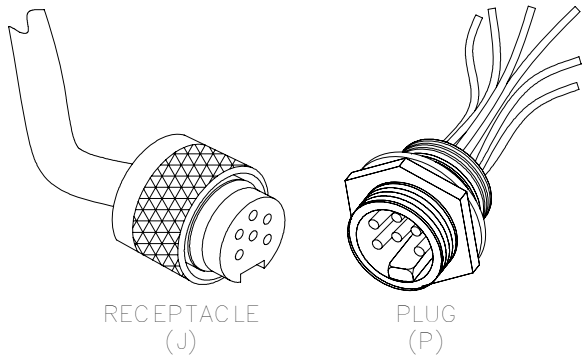


FIGURE 3-7: TYPICAL CONNECTOR CONFIGURATION

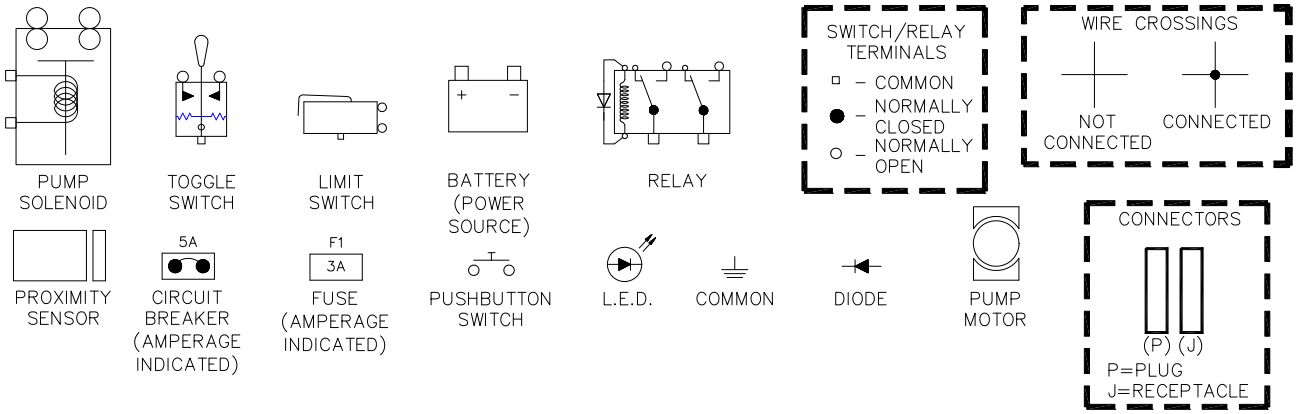


FIGURE 3-8: SCHEMATIC SYMBOLS

TABLE 3-7: WIRING DIAGRAM LABELS	
LABEL	**DESCRIPTION**
+24 VDC	System power for interlocks, hydraulic valves, controller, and sensors. **NOTE:** Some applications require +12 VDC system power.
COUNTER	Signal; pulse to auxiliary counter; generated by STOW function.
DEPLOY	Signal; to controller to request DEPLOY function.
DEPLOY VALVE INPUT	Signal; opens deploy valve.
COM, COMMON	System electrical common.
HEATER MAT	Power to ramp heater mat. **NOTE:** This feature is optional and may not be connected.
INTERLOCK	Signal; to vehicle interlock circuit when ramp is fully stowed; 24V when ramp is stowed; signal is generated by the electronic controller.
INTERLOCK NEG	Electrical ground (common) for vehicle interlock systems when ramp stowed; open when ramp is deployed.
PUMP SOLENOID INPUT	Signal; actuates pump solenoid.
SENSOR GROUND	Constant ground from controller.
STOW	Signal; to controller to request STOW function.
SENSOR OUTPUT	Signal; generated when either the STOWED or DEPLOYED sensor is triggered.
STOW VALVE INPUT	Signal; opens stow valve.
VEHICLE AUDIBLE ALERT	Signal to audible alarm. **NOTE:** This feature is optional and may not be connected.
END OF TABLE	

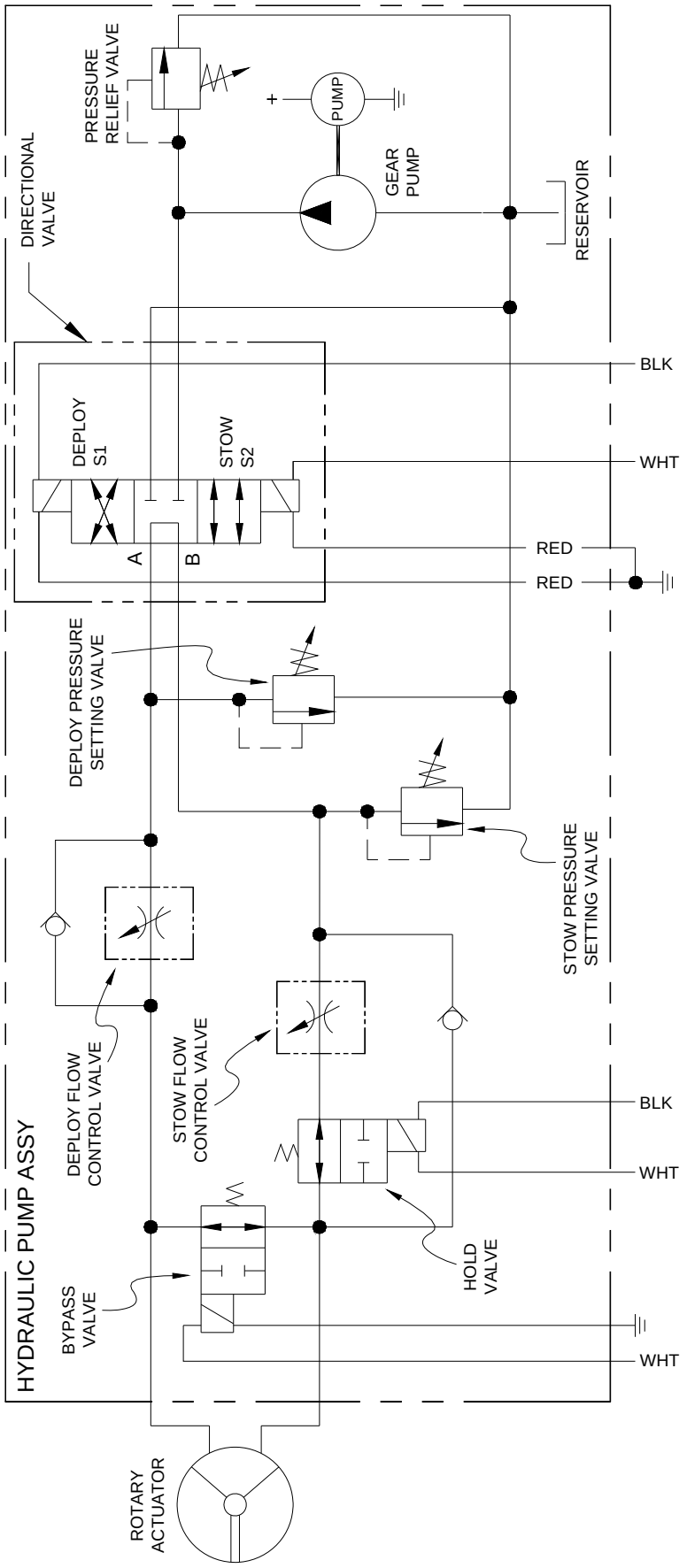


FIGURE 3-9: BR2C HYDRAULIC SYSTEM

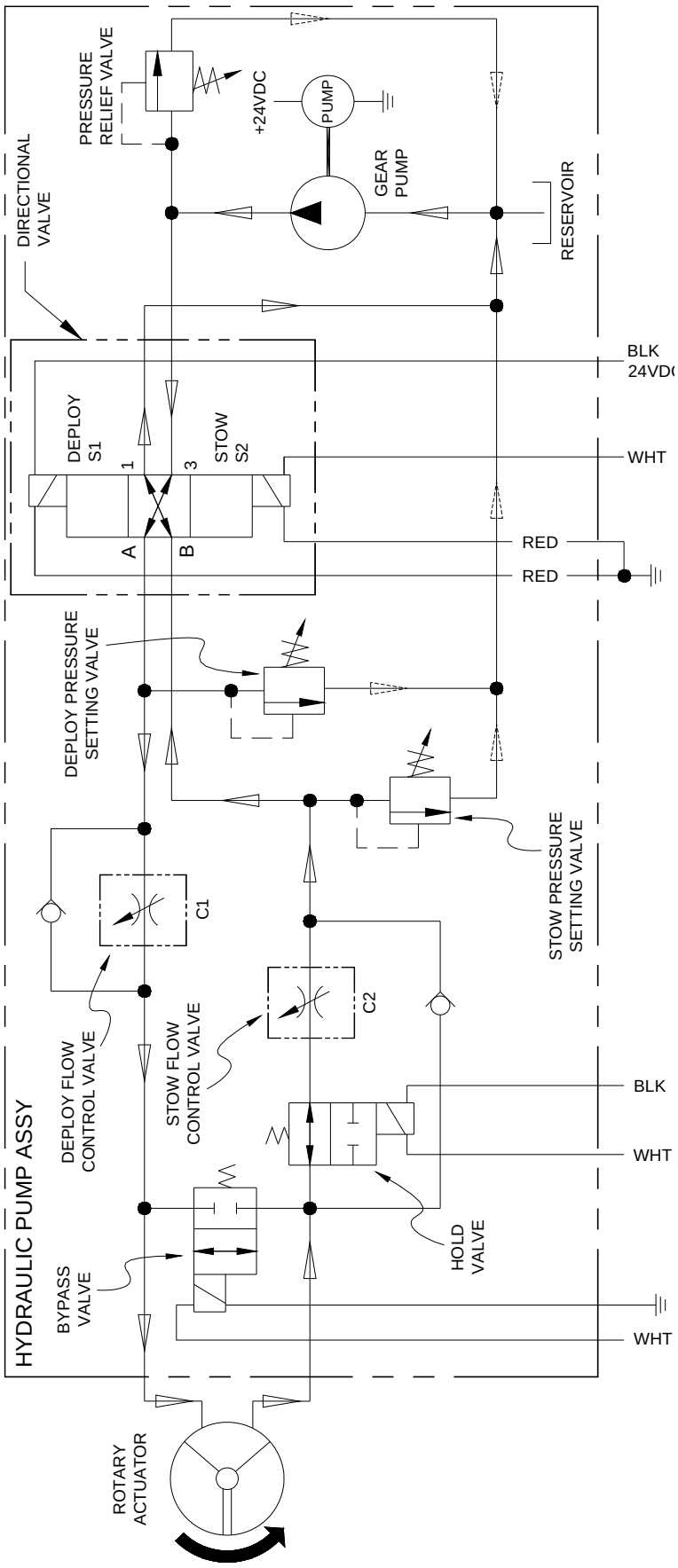


FIGURE 3-10: BR2C HYDRAULIC FLUID FLOW - DEPLOY

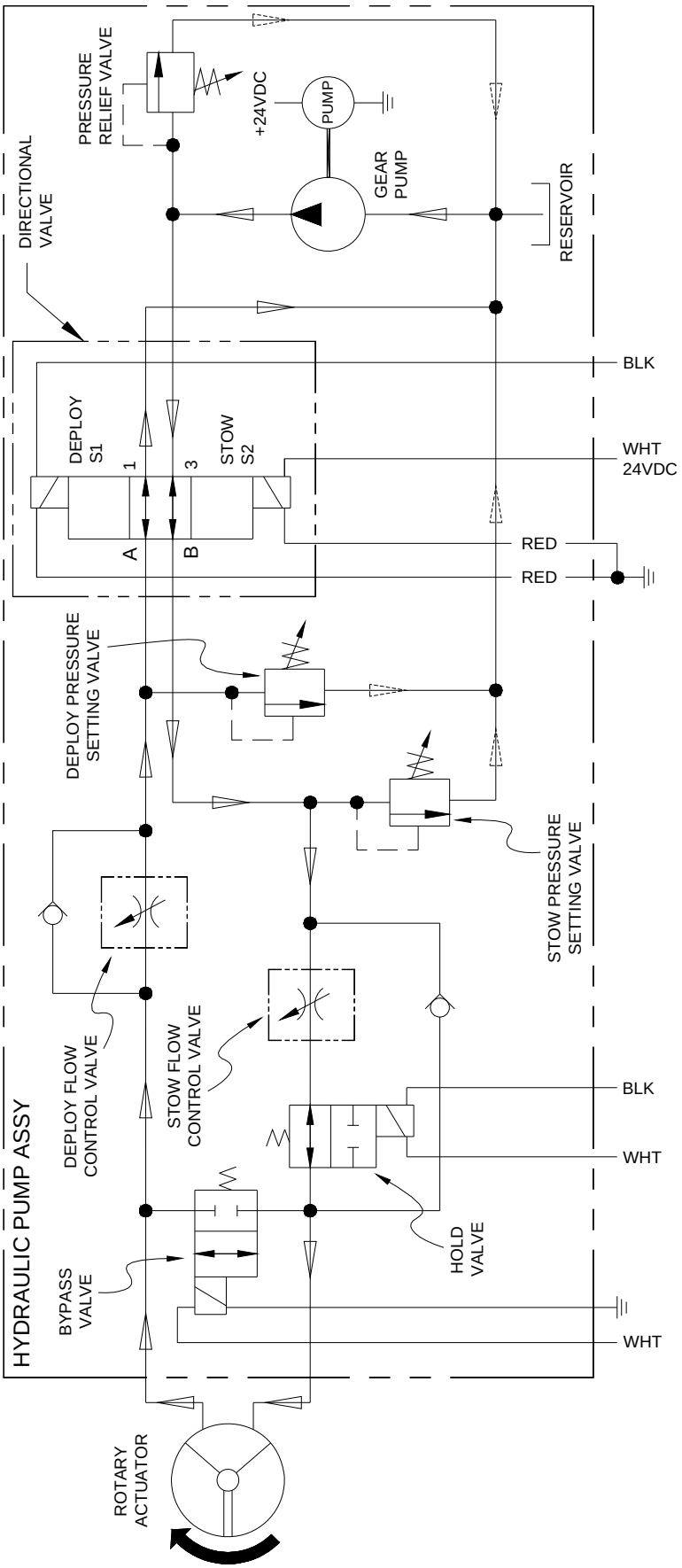
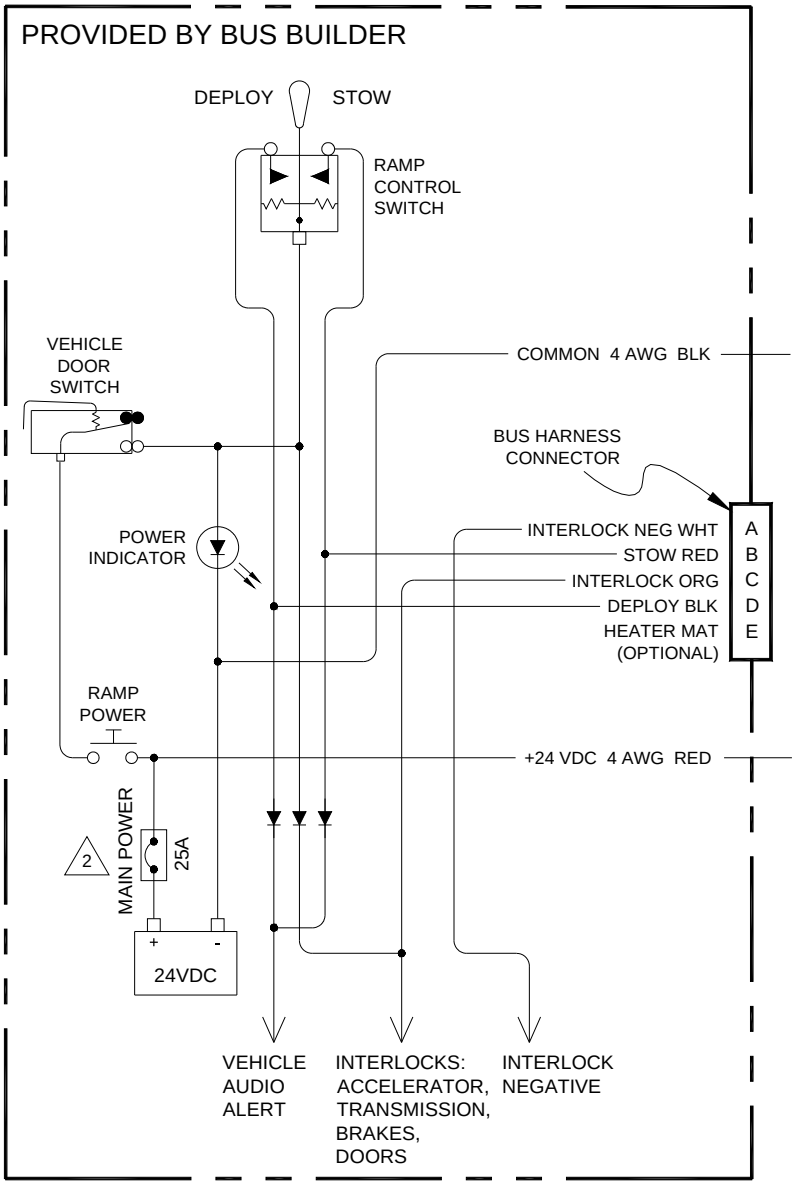


FIGURE 3-11: BR2C HYDRAULIC FLUID FLOW - STOW

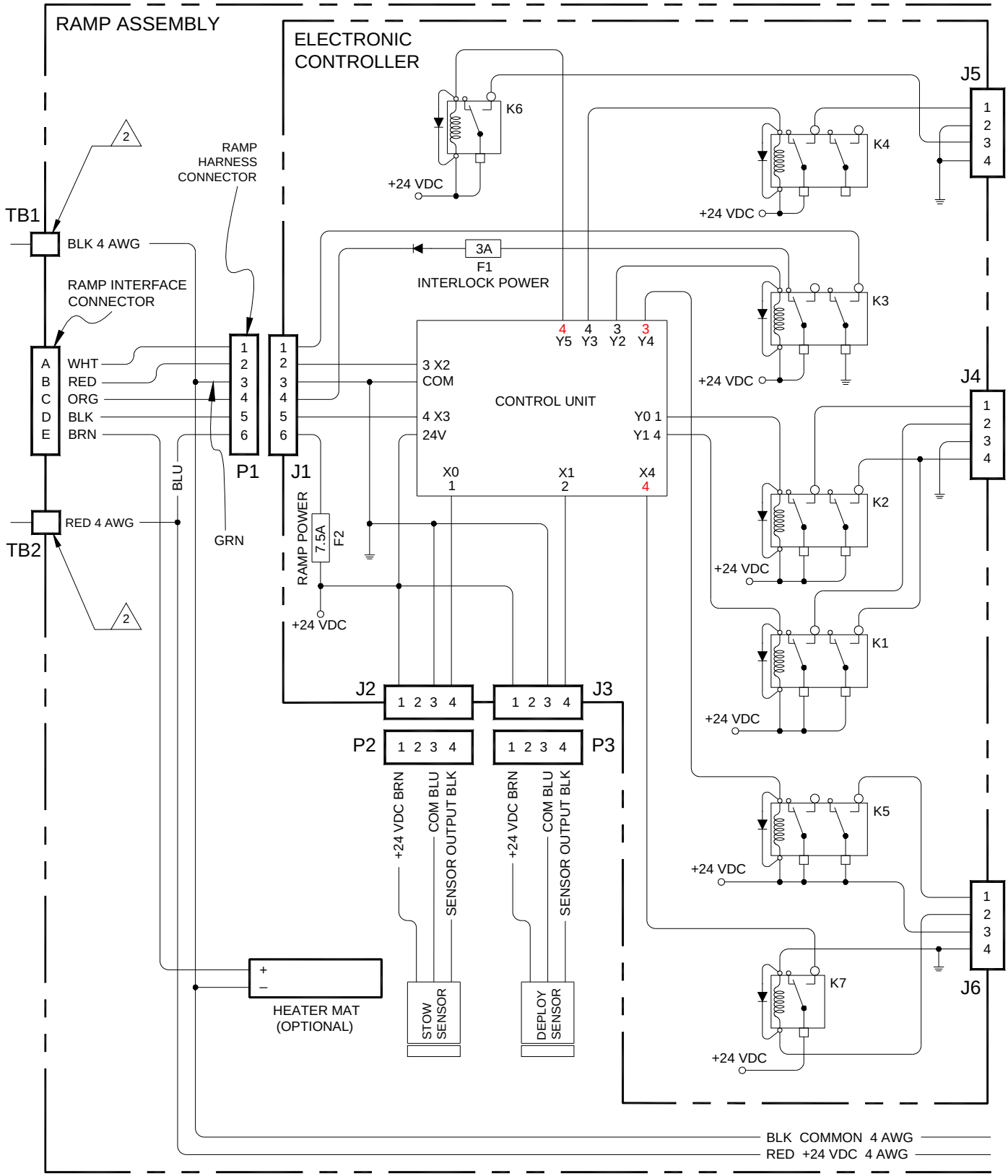


3. ALL SWITCHES AND RELAYS SHOWN WITH VEHICLE DOORS CLOSED AND RAMP FULLY STOWED.

2 50A CIRCUIT BREAKER USED FOR 12V APPLICATIONS.

1. ALL WIRES 18 AWG UNLESS OTHERWISE SPECIFIED.

FIGURE 3-12: RAMP ELECTRICAL SYSTEM DIAGRAM – SHEET 1

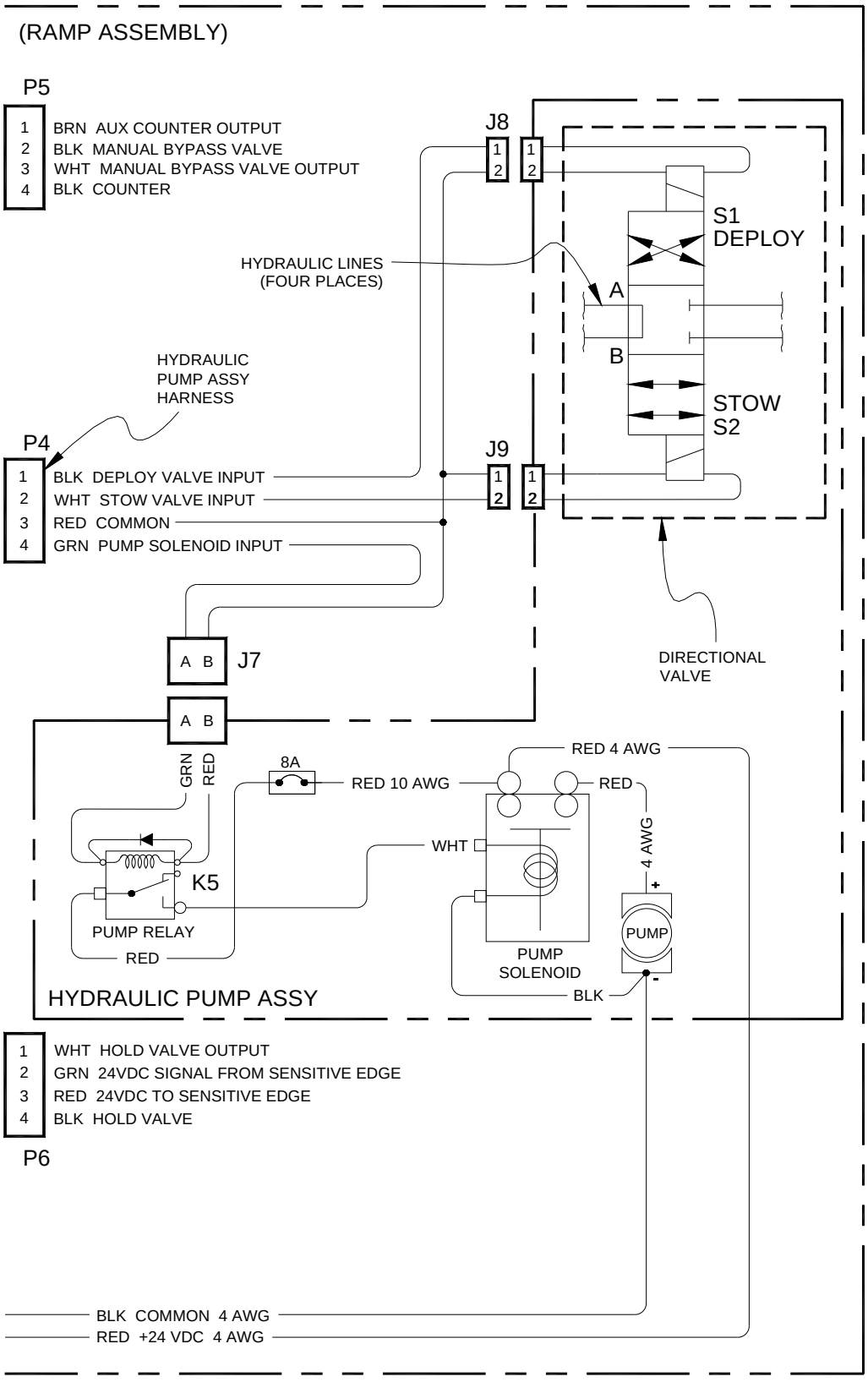


3. ALL SWITCHES AND RELAYS SHOWN WITH VEHICLE DOORS CLOSED AND RAMP FULLY STOWED.

2. THREADED TERMINAL POST.

1. ALL WIRES 18 AWG UNLESS OTHERWISE SPECIFIED.

FIGURE 3-13: RAMP ELECTRICAL SYSTEM DIAGRAM – SHEET 2



2. ALL SWITCHES AND RELAYS SHOWN WITH VEHICLE DOORS CLOSED AND RAMP FULLY STOWED.
1. ALL WIRES 18 AWG UNLESS OTHERWISE SPECIFIED.

FIGURE 3-14: RAMP ELECTRICAL SYSTEM DIAGRAM – SHEET 3

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IV. BIFOLD® RAMP TROUBLESHOOTING

The troubleshooting information in this chapter applies to the Ricon BiFold® BR2C-Series Low-Floor Vehicle Access ramp when installed in transit vehicles. The troubleshooting guide covers several possible failure modes, including complete lack of response, erratic behavior, and inability to stow. Use the hydraulic diagrams in Figures 3-7, 3-8, and 3-9 and the electrical wiring diagram in Figures 3-10, 3-11, and 3-12 of Chapter III to supplement this chapter.

The troubleshooting guide is intended to provide a logical starting point for general lift problems. However, not all possible problems or combinations of problems are listed. The guide assumes that the vehicle battery is fully charged and its connections are clean and tight.

⚠ WARNING

THE TROUBLESHOOTING GUIDE DOES NOT INCORPORATE ROUTINE SAFETY PRECAUTIONS OR PRELIMINARY PROCEDURES. TROUBLESHOOTING MUST BE PERFORMED BY A TRAINED, AUTHORIZED RICON DEALER OR QUALIFIED SERVICE TECHNICIAN DURING THE RICON WARRANTY PERIOD. IT IS RECOMMENDED THAT TROUBLESHOOTING ALSO BE PERFORMED BY AN AUTHORIZED RICON DEALER OR QUALIFIED SERVICE TECHNICIAN AFTER THE WARRANTY PERIOD.

A. TROUBLESHOOTING TABLE

TABLE 4-1: TROUBLESHOOTING GUIDE

Function	Symptom	Possible Cause	Remedy
DEPLOY function inoperative or erratic	Hydraulic pump does not operate; pump solenoid does not operate	Main circuit breaker tripped	Reset circuit breaker.
		Hydraulic pump circuit breaker tripped	Reset circuit breaker.
		Vehicle interlock conditions not met	Check that all interlock conditions are met before attempting to deploy ramp.
		No power to ramp harness connector P1, pin 6 (blue lead)	Check for ramp power at ramp harness connector pin P1-6. Repair wiring, as required.
		No signal from switch to ramp harness connector P1, pin 5 (black lead)	Check for DEPLOY REQ signal at ramp harness connector pin P1-5. Repair wiring, as required.
		Ramp control switch defective	Replace or repair STOW/DEPLOY switch.
		Door switch interlock circuit defective	Replace or repair door switch or associated wiring.
		Main ramp power switch defective	Replace or repair main ramp power switch.
		Pump solenoid defective	Replace pump solenoid.
		Pump relay defective	Replace pump relay.
		Electronic controller defective	Check for PUMP SOLENOID INPUT signal at controller connector pin J4-4. Replace controller, if necessary.
		Hydraulic pump assy wiring harness defective	Check for PUMP SOLENOID INPUT signal at hydraulic pump wiring harness connector pin J7-A (green lead). Repair wiring, as required.

TABLE 4-1: TROUBLESHOOTING GUIDE

Function	Symptom	Possible Cause	Remedy
		Deploy sensor is defective or out of adjustment	Adjust ramp sensor target; set proper sensor-to-target distance; refer to section B.6 in this chapter. Replace sensor, if necessary.
DEPLOY function inoperative or erratic (cont.)	Pump solenoid operates, but no ramp movement occurs	Flow control valves are closed	Adjust valves as shown in section C.5 in this chapter.
		Flow control valves are clogged	Clean the valves. Adjust valves as shown in section C.5 in this chapter.
		Air in hydraulic system	Cycle ramp to bleed system. Refill hydraulic fluid reservoir as required.
		Loose or faulty wiring at hydraulic pump	Check for DEPLOY VALVE INPUT signal at connector J8 (black lead). Repair harness, as required.
		Pump motor defective	Replace hydraulic pump assy.
		Directional valve defective	Replace hydraulic pump assy.
		Hydraulic rotary actuator defective	Replace hydraulic actuator.
		Electronic controller defective.	Check for DEPLOY VALVE INPUT signal at controller connector J4, pin 1. Replace controller, if necessary.
	Ramp deploys very slowly or stalls when DEPLOY switch is pressed	Sensor target requires adjustment	Adjust sensor target; refer to section B.6 in this chapter.
		Needle valve setting is too restrictive	Close both needle valves by turning them fully clockwise. Readjust valves as shown in section C.5 in this chapter.
		Hydraulic fluid level low	Check hydraulic fluid level; refill as required.
		Low hydraulic pressure	▪ Check that hydraulic pump pressure output is 1400 PSI. Adjust pump relief valve as necessary. ▪ Check pump and hydraulic lines for leaks or obstructions; repair, as required. ▪ Replace hydraulic pump assy.
		Hydraulic rotary actuator defective (binding or jammed)	Repair or replace hydraulic rotary actuator.
		Ramp hinge or ramp drive arms defective (binding or jammed)	Repair or replace defective parts.
		Wiring harness leading to pump is defective	Check wiring harness leading to pump. Repair wiring, as required.
	Ramp deploys normally but stalls at halfway point	Deploy sensor or sensor target is out of adjustment.	Adjust target as shown in section B.6 of this chapter.

TABLE 4-1: TROUBLESHOOTING GUIDE			
Function	**Symptom**	**Possible Cause**	**Remedy**
	Hydraulic pump does not shut off when ramp is fully deployed	Hydraulic pump solenoid defective	Replace solenoid.
		Hydraulic pump relay defective	Replace relay.
		Electronic controller defective	Check for 0 VDC at controller connector pin J4-4. Replace controller, if necessary.

TABLE 4-1: TROUBLESHOOTING GUIDE

Function	Symptom	Possible Cause	Remedy
STOW function inoperative or erratic	Hydraulic pump does not operate; pump solenoid does not operate	Main circuit breaker tripped	Reset main circuit breaker.
		Hydraulic pump circuit breaker tripped	Reset circuit breaker.
		No input power to ramp harness connector J1, pin 6 (blue lead)	Check for input power at ramp harness connector pin J1-6. Repair wiring, as required.
		No signal from STOW/DEPLOY switch to ramp harness connector J1, pin 2 (red lead)	Check for STOW REQ signal at ramp interface connector pin J1-2. Repair wiring, as required.
		STOW/DEPLOY switch defective	Replace or repair STOW/DEPLOY switch.
		Main ramp power switch defective.	Replace or repair main ramp power switch.
		Pump solenoid defective	Replace pump solenoid.
		Pump relay defective	Replace pump relay.
		Electronic controller defective	Check for PUMP SOLENOID INPUT signal at controller connector pin J4-4. Replace controller, if necessary.
		Pump wiring harness defective	Check pump-wiring harness. Repair wiring, as required.
	Pump solenoid operates, but no ramp movement occurs	Needle valves closed	Adjust valves as shown in section C.5 in this chapter.
		Needle valves clogged	Clean needle valves. Adjust valves as shown in section C.5 in this chapter.
		Hydraulic pump wiring harness defective	Check for STOW VALVE INPUT signal at hydraulic pump assy harness connector J9 (white lead). Repair wiring, as required.
		Electronic controller defective	Check for STOW VALVE INPUT signal at controller connector pin J4-2. Replace controller if required.
		Directional valve defective	Replace hydraulic pump assy.
		Hydraulic rotary actuator defective	Replace hydraulic rotary actuator.
		Hydraulic pump defective	Replace hydraulic pump.

TABLE 4-1: TROUBLESHOOTING GUIDE			
Function	**Symptom**	**Possible Cause**	**Remedy**
STOW function inoperative or erratic (cont.)	Ramp stows very slowly or stalls when STOW/DEPLOY switch is set to STOW	Sensor target requires adjustment	Adjust sensor target; refer to section B.6 in this chapter.
		Hydraulic fluid level low	Check hydraulic fluid level; refill as required.
		Needle valve setting is too restrictive	Close both needle valves by turning them fully clockwise. Readjust valves as shown in section C.5 in this chapter.
		Low hydraulic pressure	▪ Check that hydraulic pump pressure output is 1400 PSI. Adjust pump relief valve as necessary. ▪ Check hydraulic lines for leaks or obstructions; Repair, as required. ▪ Replace hydraulic pump.
		Hydraulic pump wiring harness defective	Repair or replace harness from electronic controller to hydraulic pump.
		Pump directional valve defective	Replace hydraulic pump.
		Hydraulic rotary actuator defective (binding or jammed)	Replace hydraulic rotary actuator.
		Ramp hinge or ramp drive arms defective (binding or jammed)	Repair or replace binding parts.
		Hydraulic pump pressure regulator defective	Replace hydraulic pump.
	Hydraulic pump does not shut off when ramp is stowed	Hydraulic pump solenoid defective	Replace solenoid.
		Hydraulic pump relay defective	Replace relay.
		Electronic controller defective	Replace controller.

TABLE 4-1: TROUBLESHOOTING GUIDE

Function	Symptom	Possible Cause	Remedy
Reversed operation	Ramp stows when STOW/DEPLOY switch is set to DEPLOY; ramp deploys when STOW/DEPLOY switch is set to STOW; unit will only deploy about 10 inches and will only stow when past the vertical mark	Hydraulic lines are not connected correctly	Verify that hydraulic lines to hydraulic pump, flow control valves and hydraulic actuator are connected correctly. Refer to **Figure 3-7** in Chapter 3.
		Leads not connected properly on directional valve solenoids	Verify that connector J8 (the connector with the black and red wires) is connected to solenoid S1, and that connector J9 (the connector with the white and red wires) is connected to solenoid S2.
	Ramp will stow when DEPLOY switch is depressed/or deploy when STOW switch is depressed; ramp will operate normally otherwise	Bus harness to ramp interface connector is not wired correctly	Verify that red STOW lead on STOW/DEPLOY switch is connected to bus harness connector P6, pin B, and the black DEPLOY lead is connected to bus harness connector P6, pin D.
Ramp will function in one direction, but not the other	Ramp will stow, but not deploy	Hydraulic pump wiring harness defective.	Check for DEPLOY VALVE INPUT signal at directional valve solenoid S1. Repair wiring, if required.
		Deploy sensor defective or out of adjustment	Verify that proximity sensor is energized (LED on sensor indicates operation) and adjusted for correct gap. Refer to section B.6 in this chapter.
		Hydraulic pump directional valve defective	Replace hydraulic pump.
Interlocks will not disengage	Constant interlock signal on ramp interface connector J6, pin C (orange wire)	Ramp not fully stowed	Remove possible obstructions and verify that ramp is fully stowed.
		Misadjusted sensor target or stow sensor	Verify that proximity sensor is energized (LED on sensor indicates operation) and adjusted for correct gap. Refer to section B.6 in this chapter.
		Stow sensor defective	Replace stow sensor.
		Electronic controller defective	Replace controller.
Interlock does not prevent vehicle departure when ramp is not stowed	No interlock signal on ramp interface connector J6, pin C (orange wire)	Misadjusted deploy sensor or sensor target	Verify that proximity sensor is energized (LED on sensor indicates operation) and adjusted for correct gap. Refer to section B.6 in this chapter.
		Deploy sensor defective	Replace stow sensor.
		Electronic controller defective	Replace controller.
		Ramp harness wiring defective	Check for interlock signal at ramp interface connector J6, pin C (orange lead). Repair wiring, if required.
		Bus interlock circuit wiring defective	Check for interlock signal from ramp via bus harness connector pin C. Repair wiring, if required.

B. INSTALLATION GUIDELINE

Careful installation of the Ricon BiFold ramp contributes to correct and safe operation. Use the hydraulic diagrams in Figures 3-7, 3-8, and 3-9 and the electrical wiring diagram in Figures 3-10, 3-11, and 3-12 of Chapter III to supplement this chapter.

1. LOCATING MOUNTING BRACKETS ON BUS FRAME

Use a rigid fixture that substitutes for the ramp assembly when positioning ramp-mounting brackets on bus frame. If the ramp assembly is used to position mounting brackets, verify that it is correctly located relative to the vehicle floor, etc. Accurate positioning of brackets prevents twisting or warping of ramp frame when installing and tightening mounting hardware. A warped frame may cause the ramp motion to be erratic. Set height of ramp flooring surface flush to surrounding floor structure to prevent a tripping hazard.

2. INSTALLING RAMP IN FLOOR

Trim away floor material to allow ramp assembly to drop into floor opening. The ramp perimeter trim overlaps the floor surface, and is sealed to it with a bead of sealer or a gasket. The typical gap between the side mounting faces and the bus structure is 1/8 inch; use shims to fill gap. Mount ramp with six grade-5 screws (included in supplied hardware installation kit, Ricon P/N 27481). Use flat washers and locking-type nuts. Cover ramp pockets to protect ramp until bus assembly is complete.

3. INSTALLING VEHICLE WIRING HARNESS

Route wiring harness from vehicle ramp controls to rear of ramp. Use the supplied electrical installation kit (Ricon P/N 22985) to connect vehicle control wiring to the ramp interface connector. See **Table 4-2** for pin layout and signal descriptions.

Table 4-2: CONNECTOR PIN LAYOUT AND DESCRIPTION

Pin	Wire color	Description	Volts/amps
1	White	Interlock common	Ground for interlock circuits
2	Red	STOW request from ramp control switch	24 volts, 5mA max draw
3	Green	Ground	Ground for ramp circuits
4	Orange	Output signal to interlock circuit, ramp not stowed	24 volts, 5A max
5	Black	DEPLOY request from ramp control switch	24 volts, 5mA max draw
6	Blue	Main power to ramp	24 volts, 5A max

4. FLOW CONTROL VALVE ADJUSTMENT

NOTE: It is important to adjust both flow control valves (C1 and C2) **identically** during this procedure.

a. Loosen lock screws that secure the valve knobs.

b. Turn both valves fully CW. This completely closes the valves, stopping ramp operation.

c. Open both valves 1/2 turn CCW from fully closed. Verify that each valve is adjusted identically. Rotating valves CCW increases flow to the ramp actuator and increases speed/torque; rotating the valves CW decreases flow to the actuator and decreases speed/torque.

d. Tighten lock screws.

5. ADJUSTING SENSOR TARGET FOR POSITION AND GAP

a. Verify that the ramp is completely stowed. This establishes a reference position for ramp during target adjustment.

b. Refer to **Figure 4-1** to verify that target is correctly installed on actuator driveshaft; the small stow segment points at the actuator and the larger deploy segment is adjacent to the pillow block. The target must be laterally positioned (double-headed arrow in figure) on driveshaft so that its stow and deploy segments are aligned with sensors; each target segment must be directly in front of a sensor. Adjust as necessary.

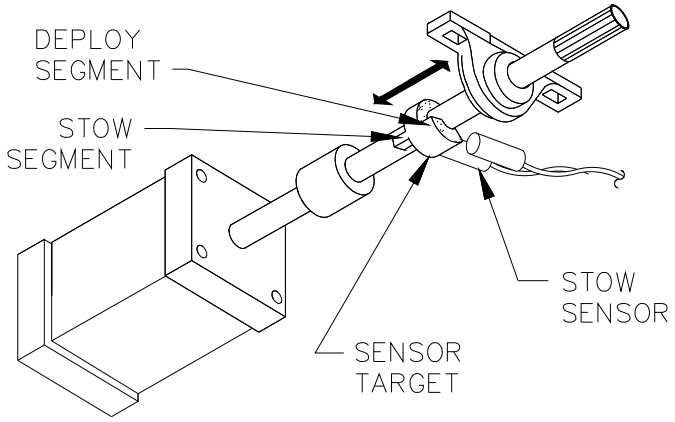


FIGURE 4-1: ORIENTATION OF SENSOR TARGET

c. Refer to **Figure 4-2.** Loosen jam nuts on sensor body. Adjust position of both nuts to achieve a gap between nose of sensor and outside diameter of target that is .060" ±.030" (gap can be set anywhere on outside diameter of target). Do not allow sensor to contact target. Tighten jam nuts and recheck gap. Repeat for other sensor.

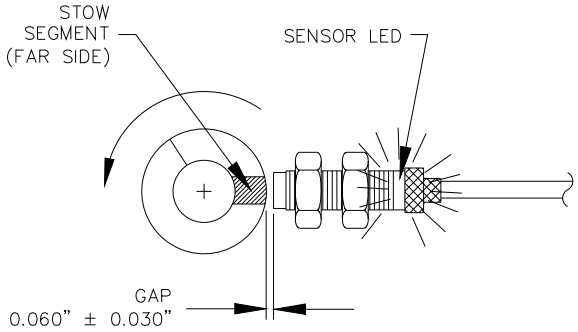


FIGURE 4-2: SENSOR GAP ADJUSTMENT
(VIEW IS FROM LEFT SIDE)

d. When front edge of ramp is within approximately 10 inches of the vehicle floor, the stow sensor will actuate and the LED on the sensor body will illuminate. **Figure 4-6** shows the position of the stow segment when the ramp is fully stowed.

6. FINAL INSPECTION

a. Visually inspect ramp for loose or missing hardware and fittings, and confirm that pockets are free of debris.

b. Verify that bottom cover is installed on ramp.

c. Verify that non-skid flooring is clean, functional, and securely fastened.

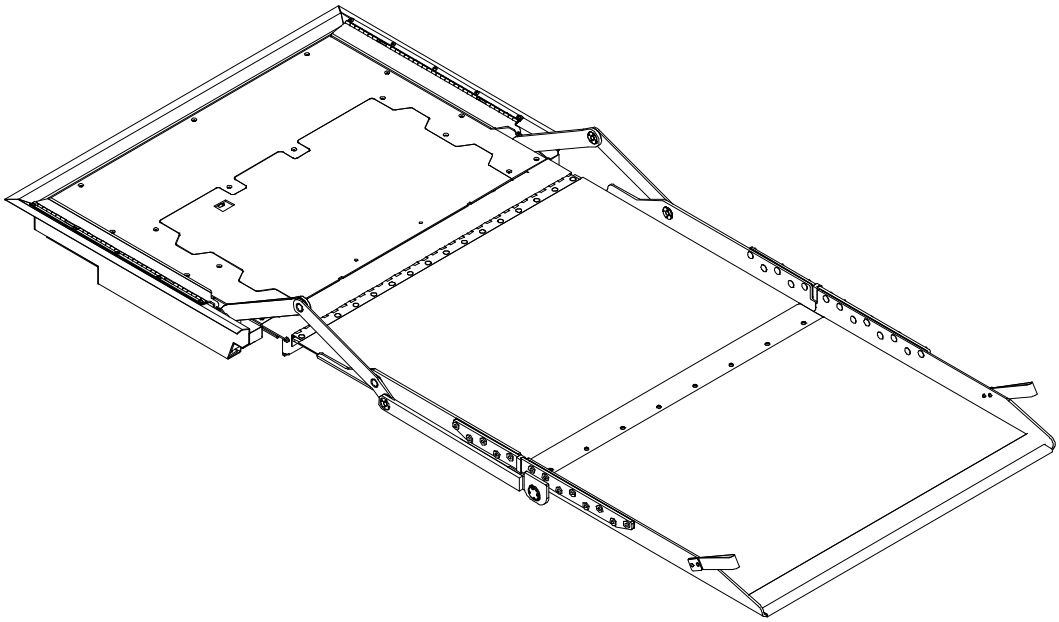
V. BIFOLD® RAMP SPARE PARTS

The parts layouts and lists in this chapter apply to the Ricon BiFold® BR2C-Series Low-Floor Vehicle Access ramp when installed in a transit vehicle. Replaceable ramp parts are illustrated in exploded views of major lift assemblies, which show smaller assemblies and components with reference numbers. Each associated parts list contains reference numbers, parts descriptions, and Ricon part numbers.

To order, locate the part in an exploded view, note its reference number, find this number on the associated parts list, and then order the part number in the far right column.

NOTE:

- Most items that are described as “kits” contain a single part (plus hardware). Therefore, you may need to order more than one kit if the part is used more than once on the assembly shown.
- Small, inexpensive hardware items are supplied in a minimum quantity of ten, and are packaged in a bag. A single bag may provide more parts than you need, or you may need multiple bags when working on a large assembly. The QTY column indicates how many individual parts are used on the assembly shown; you will need to determine the number of bags required for your task.
- The reference numbers for some parts have more than one part number listed. This occurs when variations of a part are used on different ramp models. These parts are followed by a model designation (e.g., BR2C00-02000110 or “BR2C00 Series Ramps”).



PARTS DIAGRAMS **PAGE**

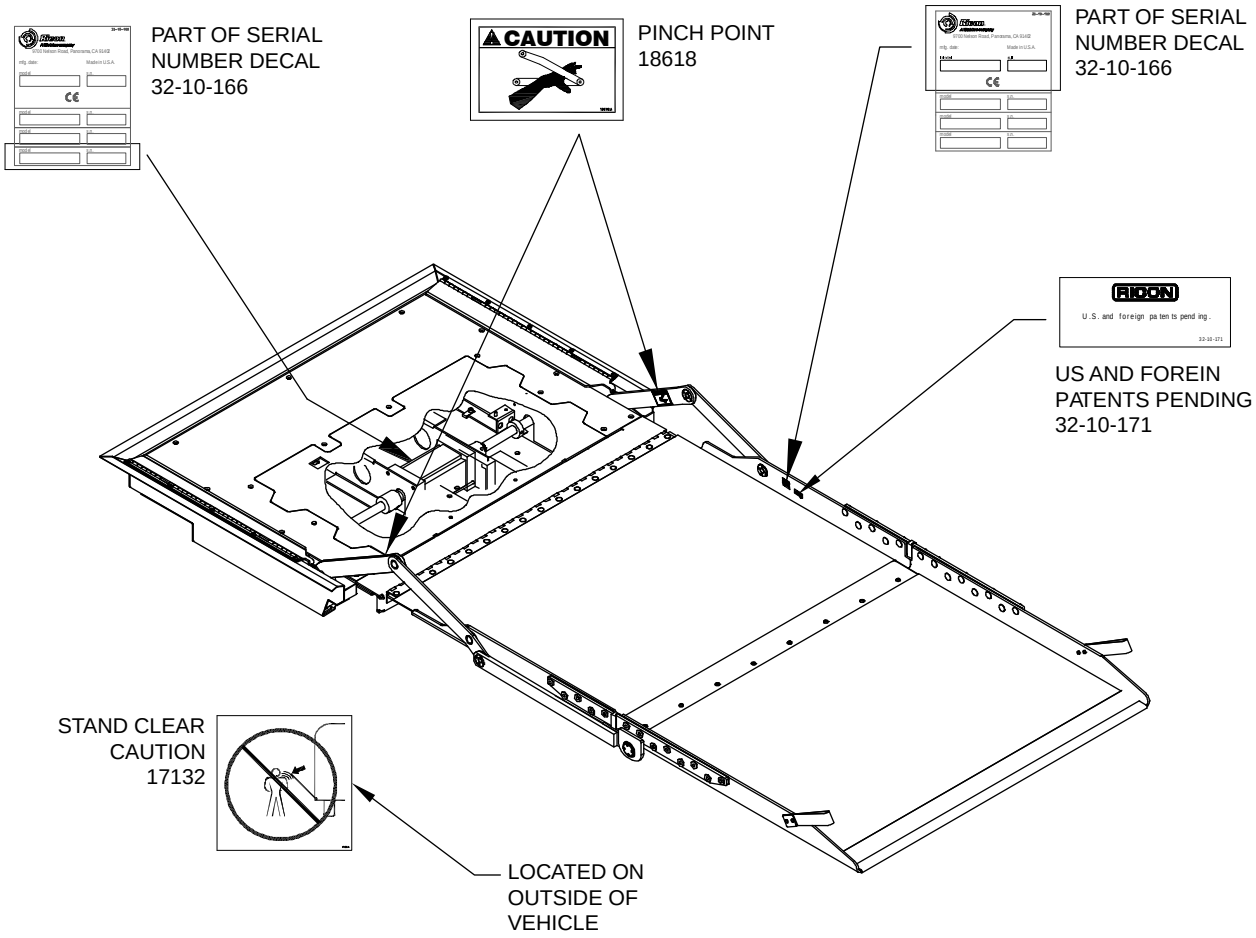


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FIGURE 5-1: BR2C DECAL LOCATIONS

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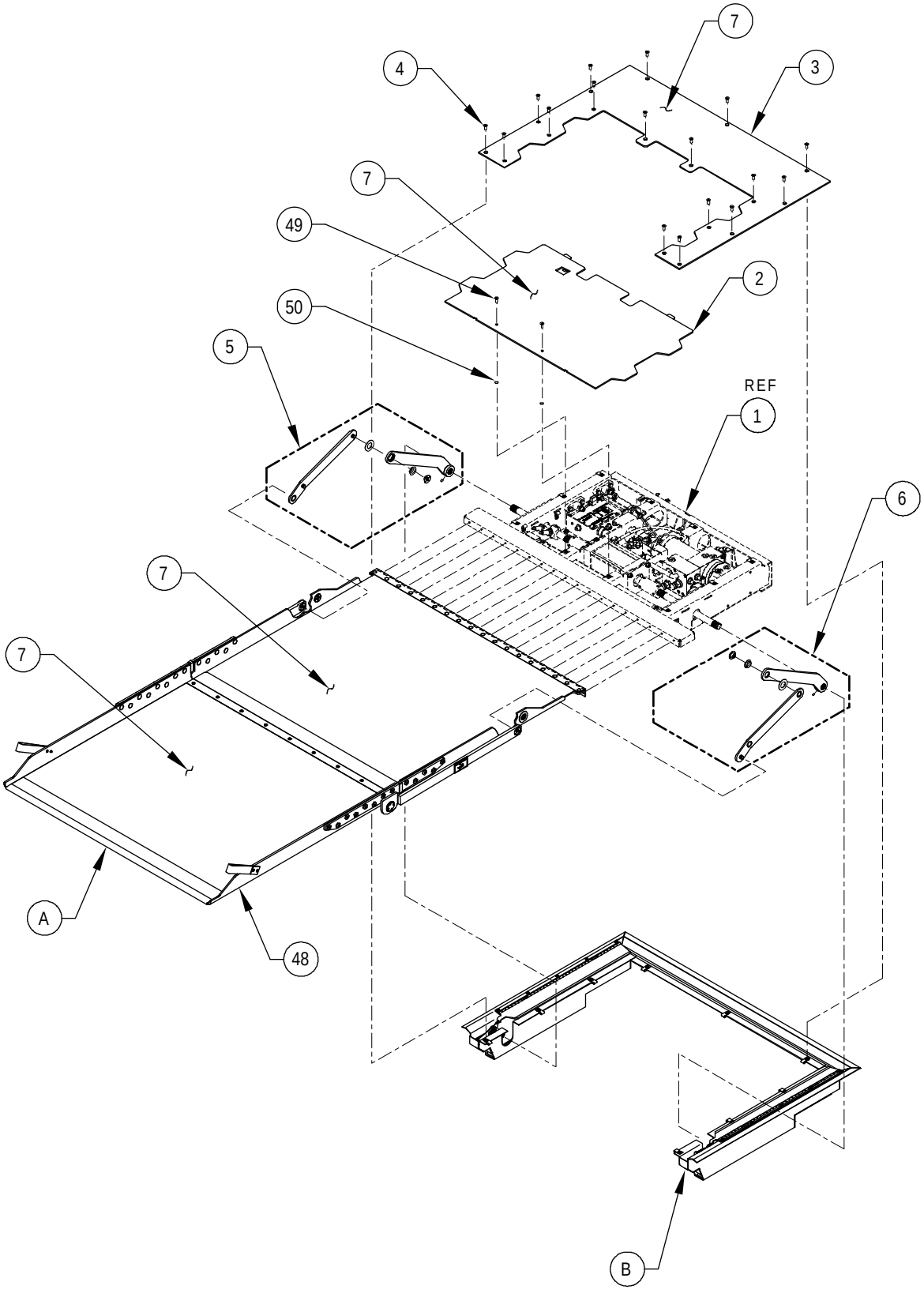

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FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY (SHEET 1 OF 3)

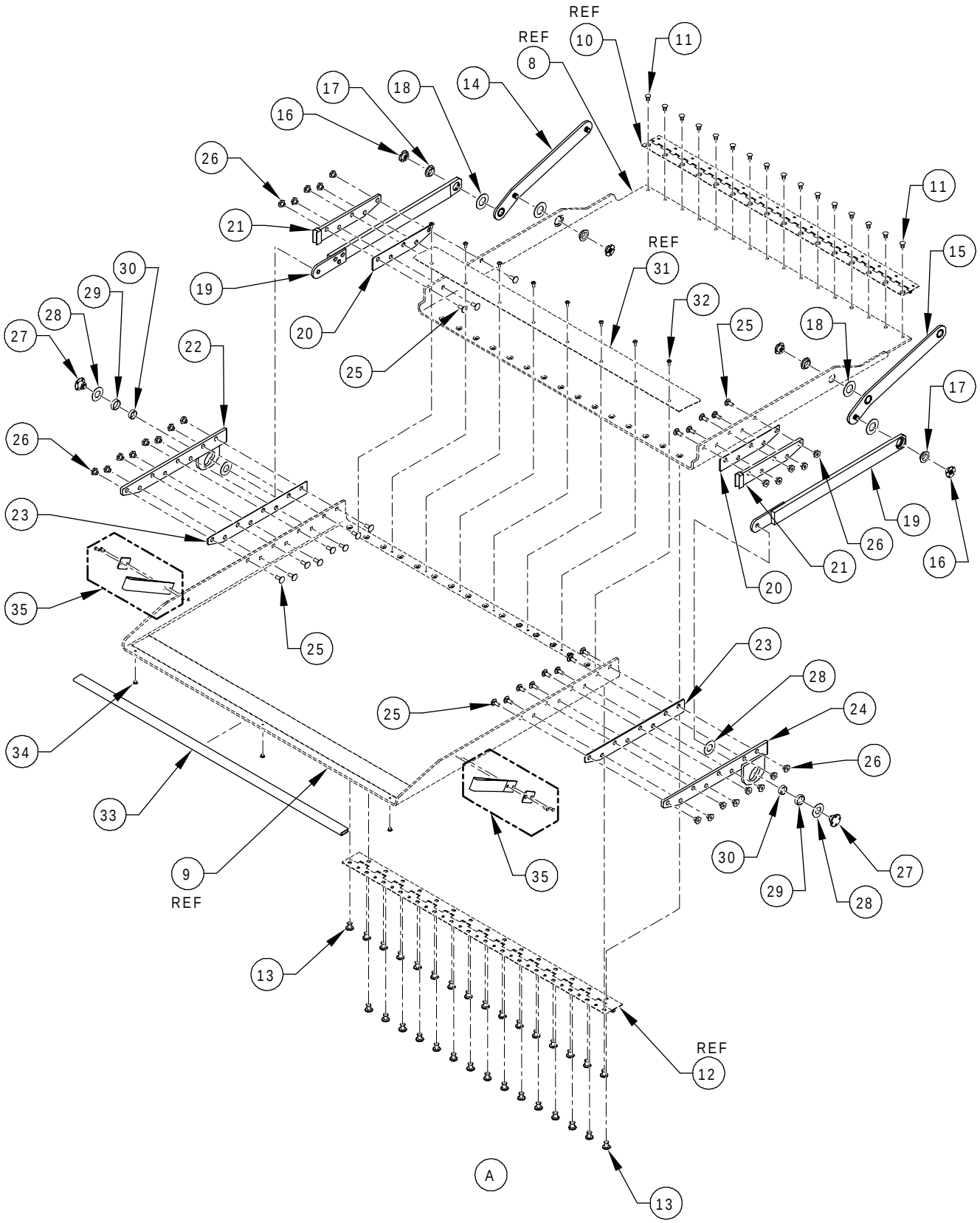

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FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY (SHEET 2 OF 3)

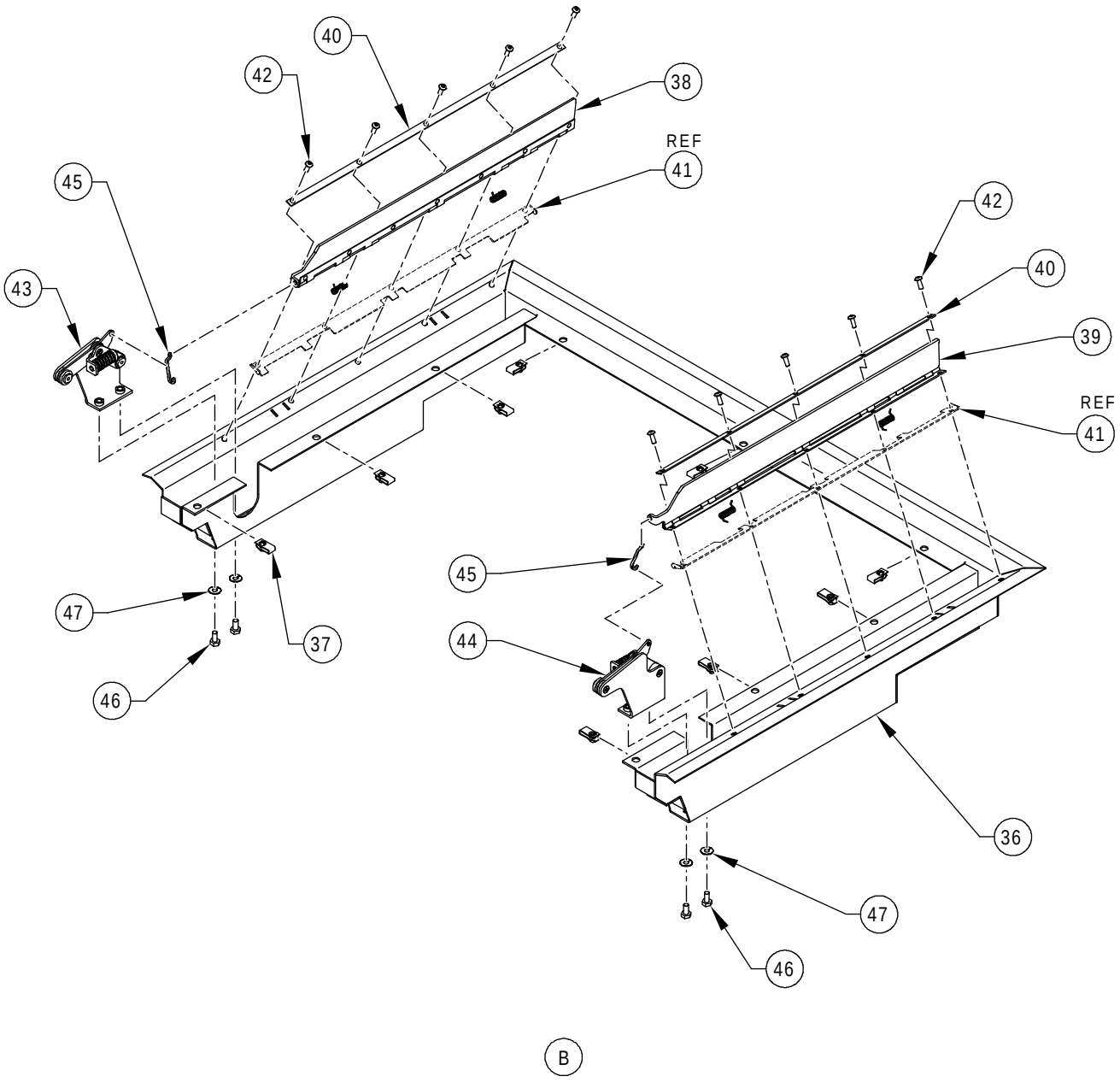

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FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY (SHEET 3 OF 3)

FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY

FIG. ITEM		DESCRIPTION	QTY	CONFIG.	PART NO.
1	*	FRAME WLDT, RAMP SUPPORT *(REFERENCE ONLY)*	REF	BR2C00-000000000	22935
1A	*	FRAME WLDT, RAMP SUPPORT *(REFERENCE ONLY)*	REF	BR2C02-000000000	44762
2	*	PANEL WLDT, ACCESS *(REFERENCE ONLY)*	REF	BR2C00-000000000	23996
2A	*	ACCESS COVER ASSY, W/WIRE ACCESS PLATE	1	BR2C02-000000000	29247
2B	*	ACCESS COVER ASSY, W/HEATER MAT,12V	1	BR2C02-000010000	46229
3	*	PLATE, FLOOR	1	BR2C00-000000000	43785
3A	*	FLOOR WLDT *(REFERENCE ONLY)*	REF	BR2C02-000000000	45410
3A	*	FLOOR WLDT *(REFERENCE ONLY)*	REF	BR2C02-000010000	45410
4		SCREW, FHH, M5-.8 X 20MM, SST (BAG OF 10)	19		29246
5		KIT, LINK ARM, LH	1		45809
6		KIT, LINK ARM, RH	1		45810
7	**	NONSKID, RAMP, BLACK	1		16730
8	*	PLATFORM, REAR SECTION, 32"W X 54"L *(REFERENCE ONLY)*	REF	BR2C00-000000000	45419
8A	*	PLATFORM, REAR SECTION, 34"W X 62"L *(REFERENCE ONLY)*	REF	BR2C02-000000000	57750
8A	*	PLATFORM, REAR SECTION, 34"W X 62"L *(REFERENCE ONLY)*	REF	BR2C02-000010000	57750
9	*	PLATFORM, FRONT SECTION, 32"W X 54"L *(REFERENCE ONLY)*	REF	BR2C00-000000000	45420
9A	*	PLATFORM, FRONT SECTION, 34"W X 62"L *(REFERENCE ONLY)*	REF	BR2C02-000000000	44785
9A	*	PLATFORM, FRONT SECTION, 34"W X 62"L *(REFERENCE ONLY)*	REF	BR2C02-000010000	44785
10	*	HINGE, RAMP *(REFERENCE ONLY)*	REF	BR2C00-000000000	23930
10A	*	HINGE, RAMP *(REFERENCE ONLY)*	REF	BR2C02-000000000	32596
10A	*	HINGE, RAMP *(REFERENCE ONLY)*	REF	BR2C02-000010000	32596
11		RIVET, .25 X .44L, 100 DEG CSK FLT HD, ALUM	16		22973
12		HINGE, PLATFORM, BI-FOLD, 32"W *(REFERENCE ONLY)*	REF		44965
13		RIVET, TINNERS 5/16 X 3/8" LONG	31		98150
14		LINK, INTERMEDIATE, LH	1		44161
15		LINK, INTERMEDIATE, RH	1		44162
16		BOLT, SEX, 3/8-16	4		19975
17		BUSHING, FLANGED, (BAG OF 2)	4		36285
18		WASHER, THRUST, (BAG OF 2)	4		36284
19	*	LINK WLDT, DRIVEN, SECOND PLATFORM ACTUATOR	REF	BR2C00-000000000	45415
19A	*	LINK WLDT, DRIVEN, SECOND PLATFORM ACTUATOR	2	BR2C02-000000000	44959
19A	*	LINK WLDT, DRIVEN, SECOND PLATFORM ACTUATOR	2	BR2C02-000010000	44959
20		SPACER, BARRIER STIFFENER, REAR PLATFORM	2		44961
21		BARRIER STIFFENER/PLATFORM STOP WLDT	2		44957
22		BARRIER STIFFENER/PLATFORM PIVOT WLDT, LH	1		44954
23		SPACER, BARRIER STIFFENER, FRONT PLATFORM	REF		44960
24		BARRIER STIFFENER/PLATFORM PIVOT WLDT, RH	1		44952
25		SCREW, CAR, 1/4-20 X 5/8” SST (BAG OF 10)	26		19707
26		NUT, TEE, 1/4-20 X 1/4” LNECK, SST (BAG OF 10)	26		14485
27		BOLT, PIVOT, BI-FOLD	2		44790

CONTINUED

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* Part number ONLY applies to corresponding configuration identified in CONFIG column. If no configuration is identified in CONFIG column then part number identified applies to ALL configurations.

** Some applications may require a separate flooring, additional material/adhesive and/or special tools when replacing the ramp and hinge assembly. Reference P/N 17792.

*** Not shown.

FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY

FIG. ITEM		DESCRIPTION	QTY	CONFIG.	PART NO.
28		WASHER, THRUST, 1.25OD X .625ID X .050 THK, ACET	4		44970
29		SLEEVE, REINFORCEMENT, ARM MECHANISM	2		44968
30		BEARING, PIVOT, ARM, BI-FOLD	2		44969
31	*	PLATE, TRANSITION, PLATFORM	REF	BR2C00-000000000	42429
31A	*	PLATE, TRANSITION, 34" W, Bi-Fold	REF	BR2C02-000000000	44931
31A	*	PLATE, TRANSITION, 34" W, Bi-Fold	REF	BR2C02-000010000	44931
32		SCREW, BHS, 10-24 X 3/8” SST (BAG OF 10)	8		14425
33	*	PLATE, SKID, 35" W, SST	REF	BR2C00-000000000	21846
33A	*	PLATE, SKID, 34" W RAMP	1	BR2C02-000000000	44933
33A	*	PLATE, SKID, 34" W RAMP	1	BR2C02-000010000	44933
34		SCREW, FHP, 10-24 X 1/4“ UNDERCUT (BAG OF 10)	3		13302
35		KIT, LIFTING STRAP	2		18625
36	**	TRIM POCKET ASSEMBLY	1	BR2C00-000000000	44158
36A	**	TRIM POCKET ASSEMBLY ***(SEE NOTE ****)***	1	BR2C02-000000000	44767
36A	**	TRIM POCKET ASSEMBLY ***(SEE NOTE ****)***	1	BR2C02-000010000	44767
37		NUT, SPRING, M5-.8, MULTI-THD (BAG OF 10)	9		19793
38	****	FLAPPER WLDT, LH *(SEE P/N 44158)*	REF	BR2C00-000000000	47882
38A	****	KIT, FLAPPER WLDT, LH ***(SEE NOTE ****)***	1	BR2C02-000000000	55688
38A	****	KIT, FLAPPER WLDT, LH ***(SEE NOTE ****)***	1	BR2C02-000010000	55688
39	****	FLAPPER WLDT, RH *(SEE P/N 44158)*	REF	BR2C00-000000000	47880
39A	****	KIT, FLAPPER WLDT, RH ***(SEE NOTE ****)***	1	BR2C02-000000000	55687
39A	****	KIT, FLAPPER WLDT, RH ***(SEE NOTE ****)***	1	BR2C02-000010000	55687
40	*	BAR, DOUBLER, HINGE	4	BR2C00-000000000	44165
40A	*	BAR, DOUBLER, HINGE	4	BR2C02-000000000	55686
40A	*	BAR, DOUBLER, HINGE	4	BR2C02-000010000	55686
41	****	PLATE, HINGE SUPPORT	REF	BR2C00-000000000	47879
41A	****	PLATE, HINGE SUPPORT *(SEE RETROFIT KIT P/N 47816 & 44767)*	REF	BR2C02-000000000	47810
41A	****	PLATE, HINGE SUPPORT *(SEE RETROFIT KIT P/N 47816 & 44767)*	REF	BR2C02-000010000	47810
42		SCREW, BHS, 10-32 X 1/2“ SST (BAG OF 10)	10		14408
43	****	FLAP ACTUATING MECHANISM, LH ***(SEE NOTE ****)***	1		55685
44	****	FLAP ACTUATING MECHANISM, RH ***(SEE NOTE ****)***	1		55684
45	****	LINK, SOLID ROD, FLAP ACTUATOR, LH ***(SEE NOTE ****)***	2		55660
46		SCREW, HEX, 1/4-20 X 1/2“ GR5, SST (BAG OF 10)	4		13307
47		WASHER, SPL, 1/4“ SST (BAG OF 10)	4		13399
48		KIT, REPLACE, RAMP PLATE ASSY, 32" WIDE	1	BR2C00-000000000	44928
48A	***	KIT, REPLACE, RAMP PLATE ASSY, 34” W/SF/TREAD/STRAP	1	BR2C02-000000000	46290
48A	***	KIT, REPLACE, RAMP PLATE ASSY, 34” W/SF/TREAD/STRAP	1	BR2C02-000010000	46290
49		STUD, 1/4-TURN, OVAL SLOT, SST (KIT OF 2)	2		35491

CONTINUED

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* Part number ONLY applies to corresponding configuration identified in CONFIG column. If no configuration is identified in CONFIG column then part number identified applies to ALL configurations.

** Some applications may require a separate flooring, additional material/adhesive and/or special tools when replacing the ramp and hinge assembly. Reference P/N 17792.

*** Not shown.

**** For ramps manufactured before 05-2011, Retrofit Kit P/N 47816 must be installed prior to installation of the latest kits identified in parts list above.

FIGURE 5-2: BR2C-SERIES RAMP ASSEMBLY				
FIG. ITEM	**DESCRIPTION**	**QTY**	**CONFIG.**	**PART NO.**
50	RETAINER, 1/4-TURN FASTENER, SST (KIT OF 10)	2		35490
	END			

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** Some applications may require a separate flooring, additional material/adhesive and/or special tools when replacing the ramp and hinge assembly. Reference P/N 17792.

*** Not shown.

**** For ramps manufactured before 05-2011, Retrofit Kit P/N 47816 must be installed prior to installation of the latest kits identified in parts list above.

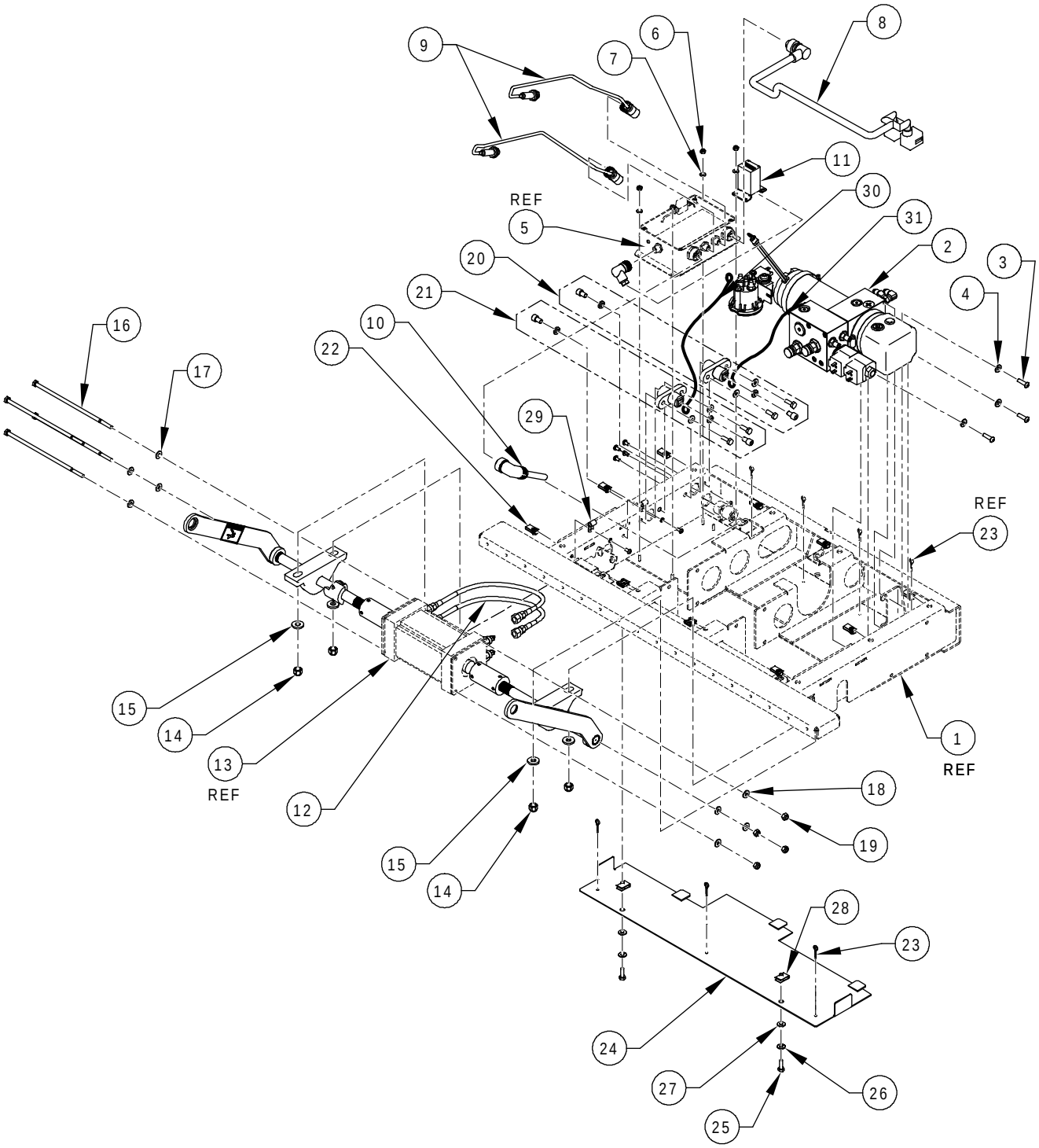

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FIGURE 5-3: BR2C-SERIES ENCLOSURE ASSEMBLY

FIGURE 5-3: BR2C-SERIES ENCLOSURE ASSEMBLY

FIG. ITEM		DESCRIPTION	QTY	CONFIG.	PART NO.
1	*	FRAME WLDT, RAMP SUPPORT *(REFERENCE ONLY)*	REF	BR2C00-000000000	22935
1A	*	FRAME WLDT, RAMP SUPPORT *(REFERENCE ONLY)*	REF	BR2C02-000000000	44762
1A	*	FRAME WLDT, RAMP SUPPORT *(REFERENCE ONLY)*	REF	BR2C02-000010000	44762
2		PUMP ASSY, 12V	1		32881
3		SCREW, BHS, 1/4-20 X 5/8” SST (BAG OF 10)	4		14423
4		WASHER, SPL, 1/4” SST (BAG OF 10)	4		13399
5		KIT, CONTROLLER, UNIVERSAL, W/PROGRAM INSTRUCT	1		20707
6		NUT, ESN, 8-32, SST	4		22984
7		WASHER, FLT, .188 X .438 X .049 SST	4		282694
8		HARNESS, J4, 20"L	1		18226
9		CABLE ASSY, SENSOR, UNIVERSAL *(REFERENCE ONLY)*	REF		98071
10		HARNESS, J1	1		28867
11		HARNESS, COUNTER	1		22978
12		HOSE ASSY, HYD, 17" X 1/4” JIC X 1/4” JIC	2		VS-SH-09
13		ACTUATOR/ARMS ASSY, YELLOW ARMS *(REFERENCE ONLY)*	REF		44765
14		NUT, ESN, 3/8-16 ,SST (BAG OF 10)	4		25605
15		WASHER, FLT, .88 X .38 X .125, CLR ZINC (BAG OF 10)	4		35437
16		BOLT, HEX, 1/4-20 X 8" SST *(SEE KIT P/N 18622)*	4		22971
17		WASHER, SPL, 1/4” SST (BAG OF 10)	4		13399
18		WASHER, FLT, .281 X .625 X .065 SST (BAG OF 10)	4		13398
19		NUT, ESN, 1/4-20 SST (BAG OF 10)	4		14414
20		KIT, TERM BLOCK, NEGATIVE, W/HARDWARE	1		29255
21		KIT, TERM BLOCK, POSITIVE, W/HARDWARE	1		29256
22		NUT, SPRING, M5-.8, MULTI-THD (BAG OF 10)	8		19793
23		PIN, COTTER, 1/8 X 1/2”, SST *(REFERENCE ONLY)*	REF		22785
24	*	BOTTOM COVER WLDT *(REFERENCE ONLY)*	REF	BR2C00-000000000	27252
24A	*	BOTTOM COVER WLDT	1	BR2C02-000000000	42456
24A	*	BOTTOM COVER WLDT	1	BR2C02-000010000	42456
25		SCREW, HEX, 1/4-20 X 1/2” GR5, SST (BAG OF 10)	6		13307
26		WASHER, SPL, 1/4” SST (BAG OF 10)	2		13399
27		WASHER, FLT, .281 X .625 X .065 SST (BAG OF 10)	4		13398
28		NUT, SPRING, 1/4-20 MULTI THD (BAG OF 10)	2		15952
29		CLAMP, CABLE, 3/8" (BAG OF 10)	2		32408
30		JUMPER, CABLE, 4 AWG, RED, 11"L	1		28869
31		JUMPER, CABLE, 4 AWG, BLK 21"	1		28540
32	**	KIT, INSTAL ,ELECTRICAL HARDWARE	1		22985
33		RESERVOIR, HYDRAULIC PUMP	1		37252

END

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** Not shown.

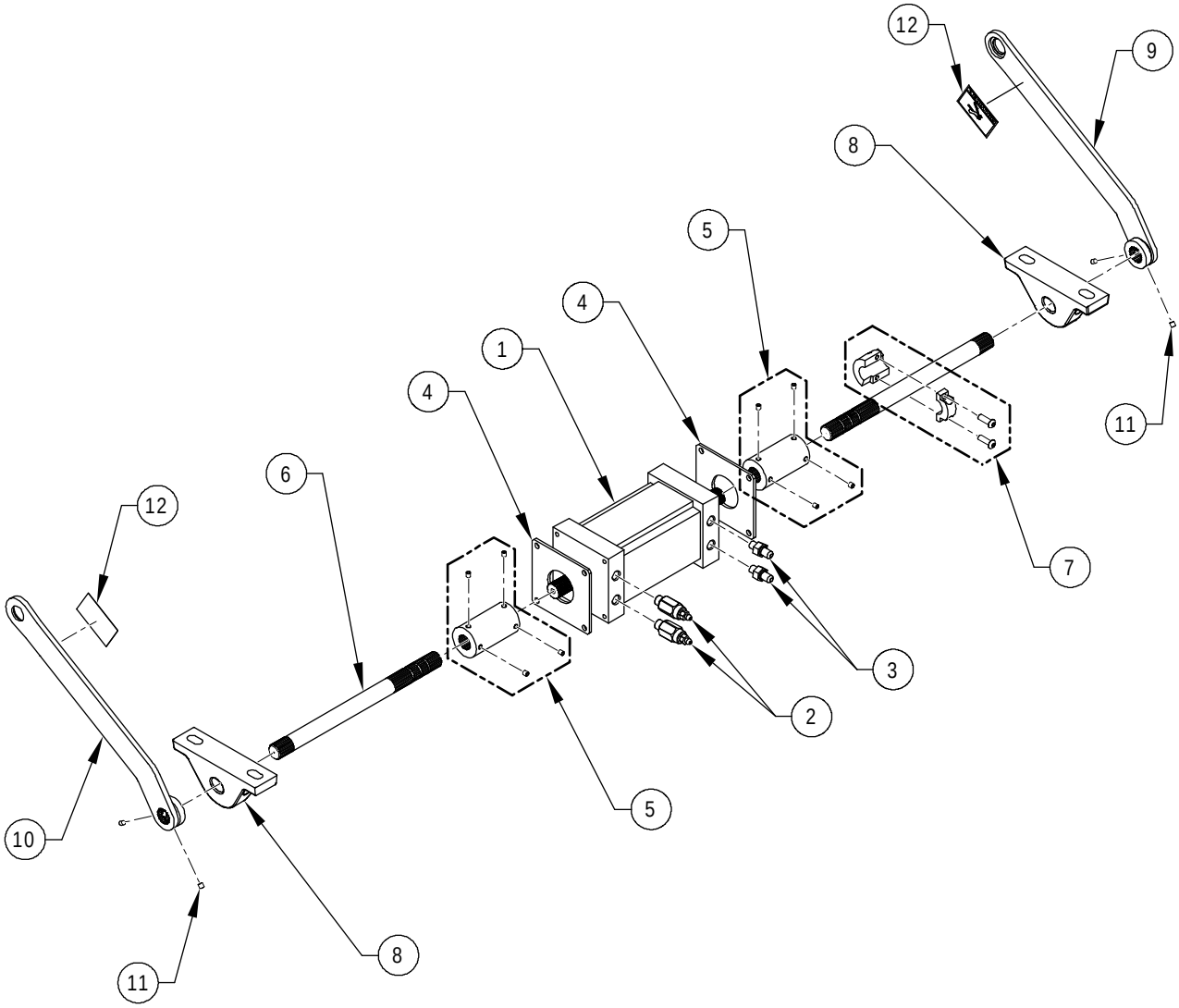

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FIGURE 5-4: BR2C-SERIES ROTARY ACTUATOR ASSEMBLY

FIGURE 5-4: BR2C-SERIES ROTARY ACTUATOR ASSEMBLY				
FIG. ITEM	**DESCRIPTION**	**QTY**	**CONFIG.**	**PART NO.**
1	ACTUATOR, ROTARY *(SEE KIT P/N 18619)*	1		98048
2	ADAPTER, ORB, 4 X JIC, 4 STL *(SEE KIT P/N 18619)*	2		17208
3	FITTING, -4SAE, BLEEDER *(SEE KIT P/N 18619)*	2		25710
4	PLATE, RETAINER, ACTUATOR	2		27456
5	KIT, COUPLER SHAFT W/HARDWARE	2		18614
6	SHAFT, FOLDOVER RAMP	2		18741
7	KIT, TARGET SENSOR W/ HARDWARE	1		29201
8	KIT, PILLOW BLOCK W/MATING HARDWARE	2		18611
9	ARM WLDT, DRIVE, LH, YELLOW *(SEE KIT P/N 45809)*	1		36641
10	ARM WLDT, DRIVE, RH, YELLOW *(SEE KIT P/N 45810)*	1		36640
11	SETSCREW, 1/4-20 X 3/8 W/NYLON INSERT	4		16754
12	DECAL, CAUTION, PINCH POINT	2		18618
END				

NOTE: (REF) in QTY column is for Referenced Parts Only and are not sold as spare parts.

* Part number ONLY applies to corresponding configuration identified in CONFIG column. If no configuration is identified in CONFIG column then part number identified applies to ALL configurations.

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