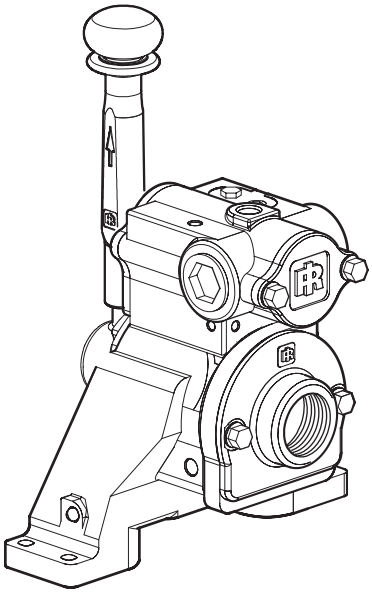
PARTS, OPERATION AND MAINTENANCE SUPPLEMENT

force 5™ AIR WINCHES

K5C2 AND K5C2-E CONTROL VALVE

REPLACEMENT FOR K5B AND K5C CONTROL VALVE



(Dwg. MHP2037)

READ THIS SUPPLEMENT BEFORE USING THIS PRODUCT. This supplement contains important information covering options and redesigned components not covered in original manual. Make this supplement available to all persons responsible for the installation, operation and maintenance of this product.

Use this supplement in conjunction with the appropriate Parts, Operation and Maintenance Manual.

Form MHD56213
Edition 7
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71365878

Ingersoll-Rand®

SAFETY INFORMATION

This manual provides important information for all personnel involved with the safe installation, operation and proper maintenance of this product. Even if you feel you are familiar with this or similar equipment, you should read this manual before operating the product.

Danger, Warning, Caution and Notice

Throughout this manual there are steps and procedures which, if not followed, may result in a hazard. The following signal words are used to identify the level of potential hazard.

⚠ DANGER — Danger is used to indicate the presence of a hazard which ***will*** cause ***severe*** injury, death, or substantial property damage if the warning is ignored.

⚠ WARNING — Warning is used to indicate the presence of a hazard which ***can*** cause ***severe*** injury, death, or substantial property damage if the warning is ignored.

⚠ CAUTION — Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause injury or property damage if the warning is ignored.

NOTICE — Notice is used to notify people of installation, operation, or maintenance information which is important but not hazard-related.

Safety Summary

This manual has been produced by **Ingersoll-Rand** to provide dealers, mechanics, operators and company personnel with information required to install, operate, maintain and repair the products described herein.

It is extremely important that mechanics and operators be familiar with servicing procedures of these products, or like or similar products, and are physically capable of conducting the procedures. These personnel shall have a general working knowledge that includes:

1. Proper and safe use and application of mechanics common hand tools as well as special **Ingersoll-Rand** or recommended tools.
2. Safety procedures, precautions and work habits established by accepted industry standards.

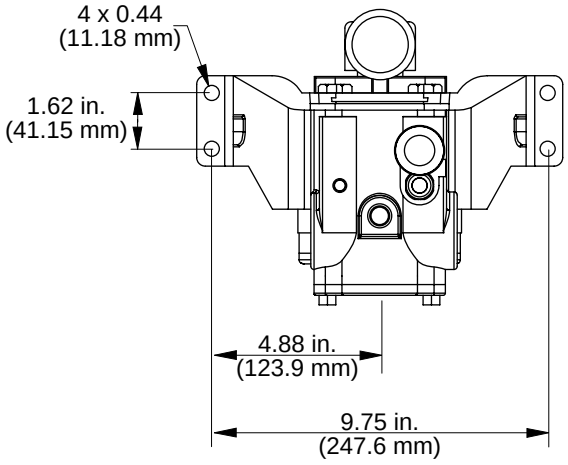
Ingersoll-Rand cannot know of, or provide all the procedures by which product operations or repairs may be conducted and the hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by the manufacturer are conducted, it must be ensured that product safety is not endangered by the actions taken. If unsure of an operation or maintenance procedure or step, personnel should place the product in a safe condition and contact supervisors and/or the factory for technical assistance.

INSTALLATION

Control Valve Replacement

Refer to Dwg. MHP2274 on page 16.
Replacement of K5B control valve with K5C2 control valve.

1. Remove capscrews (102) and (255), and washers (196) from exhaust flange cap (254). Discard gasket (317).
2. Remove capscrews (951) and washers (949) from control valve.
3. Remove control valve from rotary housing and discard gasket (317).
4. Install gaskets (946) and control valve assembly (900).
5. Install gasket (970) and exhaust cap (971) to rotary housing on motor.
6. Install fittings (957), (958) and muffler (959) on control valve. These are optional parts.

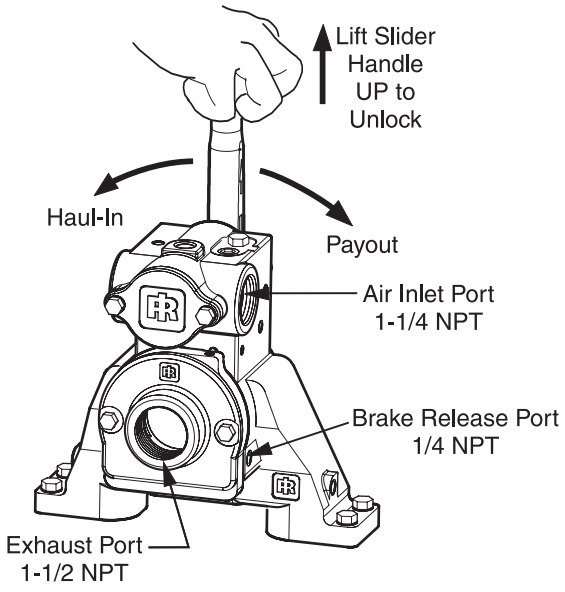


(Dwg. MHP2232)

OPERATION

Winch Mounted Control Valve

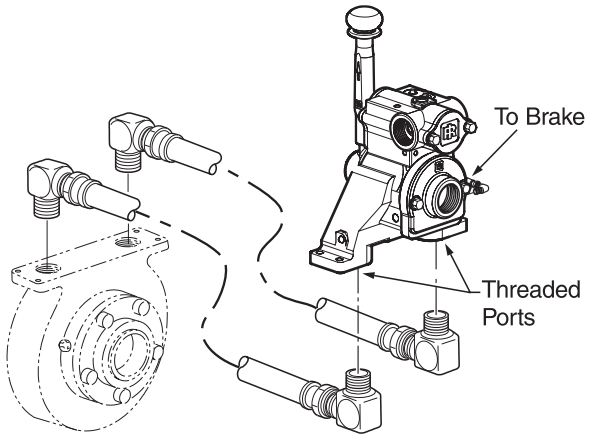
Refer to Dwg. MHP1809 on page 3.
The spring loaded, live air, manual control valve mounts to rotary housing.
To operate control valve, place palm of hand on control knob and wrap fingers around flange of sliding handle. Squeeze fingers, lifting sliding handle up to unlock control lever. Shift control lever in desired direction to payout or haul-in wire rope.
As viewed from air motor end, move control throttle handle to the right (clockwise) to payout wire rope and to the left (counterclockwise) to haul-in wire rope. Avoid sudden movements of control valve to ensure smooth operation of winch.
When released, handle will return to neutral or center position. The sliding handle will drop down to engage and lock control handle in place.



(Dwg. MHP1809)

Remote Mounted Control Valve (optional feature)

Refer to Dwg. MHP2043 on page 3.
Control valve may also be remote mounted. Base ports in control valve are threaded to accept fittings for air line connections. Control valve is secured using four mounting holes.



(Dwg. MHP2043)

Underwound Operation (optional feature)

Underwound operation is where wire rope haul-in or payout is off the bottom of drum. This is a special operation and requires a winch specifically designed for this usage.

Underwound operation requires a reverse bias valve installed in the control valve.

Control valve operation will be opposite as shown in Dwg. MHP1809 on page 3. As viewed from air motor end, lift slider handle up to unlock control lever. Move control throttle handle to the left (counterclockwise) to payout, and to the right (clockwise) to haul-in.

Emergency Stop and Overload System

Refer to Dwg. MHP2180 on page 12.
Air supply line is connected to air control valve. When emergency stop or overload valve is activated, all winch movement will stop.

⚠ CAUTION

• If winch continues to move (payout load) after emergency stop activates, brake(s) are not holding load and may require adjustment or repair.

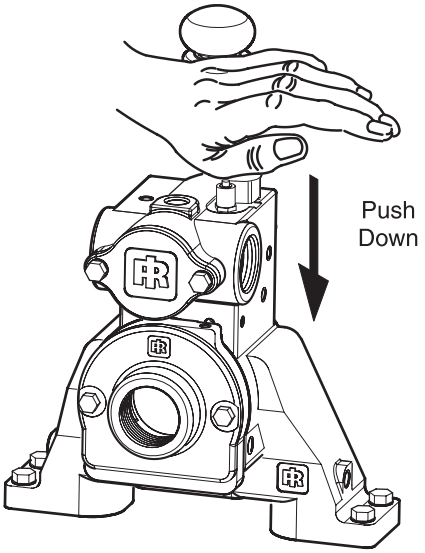
When control valve senses a preset pressure difference between ports, a pilot signal is sent to stop flow of air, all winch movement will stop.

Emergency Stop (optional feature)

Refer to Dwg. MHP2047 on page 4.
Emergency stop device is located on the control valve. When activated, winch drum rotation will immediately cease. To activate emergency stop, conduct the following:

1. Depress (push down) red palm valve, located on top of control valve.

Emergency Stop Operation



(Dwg. MHP2047)

NOTICE

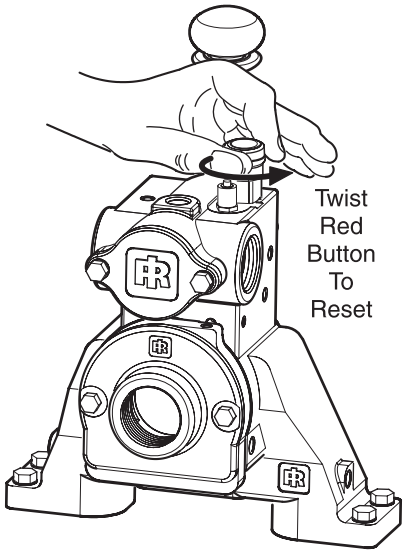
• If winch overload occurs, overload device, if equipped, also stops winch. To operate winch after an overload, reduce load and reset overload.
• Cannot be added to old style control valve. Refer to Dwg. MHP2036 on page 10.

Emergency Stop Reset

Refer to Dwg. MHP2048 on page 4.

1. Rotate red stop button, in counterclockwise direction until red stop button ‘pops’ up.
2. Winch is ready to resume operation.

Emergency Stop Reset



(Dwg. MHP2048)

Overload Device

An overload device is available on winches with the emergency shutoff option. Overload device operation is based on differential pressure between air motor inlet and exhaust. The overload device is factory preset to actuate at 150% (± 25%) of winch rated capacity. When an overload condition is sensed, the valve poppet closes, to cut off supply air to winch, stopping winch operation. If an overload shutoff occurs, winch load must be reduced. Reset the overload valve and operate winch in payout direction to lower load. Refer to ‘Emergency Stop Reset’ section on page 4.

Overload Valve Adjustment

Refer to Dwg. MHP2216 on page 5.
5/16 in. or 8 mm open ended wrench required.

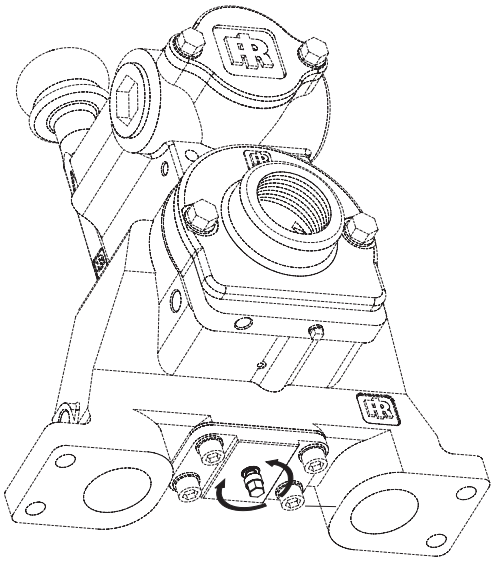
1. Adjust overload valve by turning adjustment screw located at bottom of control valve.
2. Rotating adjustment screw **clockwise will increase** pressure required to activate overload valve.

⚠ WARNING

• This adjustment can cause overload device to NOT activate before winch’s safety limit is exceeded. This procedure should only be done by personnel trained in testing and servicing this winch.

3. Rotating adjustment screw **counterclockwise will decrease** pressure required to activate overload valve.

Overload Valve Adjustment



(Dwg. MHP2216)

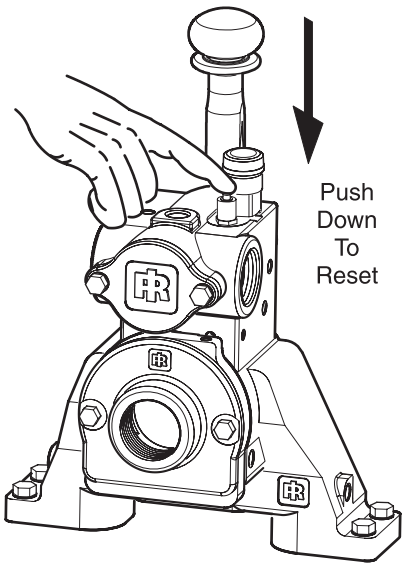
Checking Overload Valve Setting

1. Attach load line to a load that is calibrated to maximum load for which winch is rated.
2. Move control lever to haul-in position. If winch does not lift load, adjust the adjustment screw. Refer to 'Overload Valve Adjustment' section on page 4.

Setting the Overload

1. Attach load line to a load that is calibrated to 150% of winch rated capacity. Shift control lever to haul-in position.
   a. If overload valve activates, reset overload valve. Winch is ready for normal operation.
   b. If winch lifts load, lower load. Turn adjustment screw counterclockwise in 1/4 turn increments until overload valve activates when control lever is shifted to haul-in position. After each 1/4 turn, retest winch.

Overload Valve Reset



(Dwg. MHP2049)

Brake Connections

Refer to Dwg. MHP2182 on page 14 and Dwg. MHP2198 on page 15.

WARNING

• Failure to use a 45° fitting with orifice on brake port could cause load to fall. Fitting is item number (956), part number 27973 on parts page and can be identified as fitting with orifice in one end.

NOTICE

FA2B Disc Brake winches use a 45° fitting with an orifice in the brake port on control valve.

Refer to "Table 1 Brake Line Connection' on page 8 for proper installation configurations.

K5C2 Control Valve Disassembly

Refer to Dwg. MHP2036 on page 10.

Handle Removal

If handle is not damaged it is not necessary to disassemble completely.

1. Carefully pry off plug (935).
2. Remove capscrew (901) and tab lock washer (909).

NOTICE

• Observe spring (937) connection during disassembly. This spring is under tension and is required to return handle to neutral position.

3. Carefully pull handle assembly (930) from reverse valve (943). Remove spring (937).

Reverse Valve Removal

1. Remove capscrews (938), (925) and washers (924) from seal bracket (939). Remove seal bracket from housing. Remove and discard 'O' rings (941) and (942).
2. Remove capscrews (901) and washers (902) from exhaust flange (955). Remove flange from housing. Remove and discard 'O' ring (942).
3. Move reverse valve (943) out exhaust flange side of housing until ball (916) is visible on reverse valve. Allow ball (916) to drop out of bushing (944) and remove ball (916).
4. Remove bushing (944) out exhaust flange side of housing.

NOTICE

• Dowel pin (945) allows the bushing to be removed only from the exhaust flange side of housing. Ball (916) retains reverse valve (943) in bushing (944).
• Do not remove reverse valve (943), bushing (944) and ball (916) at the same time, damage may occur to bushing.
• Take care to not allow ball (916) to drop in motor. If this occurs it may be necessary to disassemble motor to retrieve ball (916).

Piston Removal

1. Remove capscrews (901) and washers (902) from piston cover (919). Remove cover and discard gasket (918).
2. Remove capscrews (901) and washers (902) from poppet cover (903). Remove cover and discard gasket (904).
3. Remove the following items from housing poppet bore: spring (905), poppet cap (906) and poppet seal (907).
4. From poppet side, push piston (922) out of housing. Remove 'O' rings (921) and (923) and discard.

Pilot Valve Removal

NOTICE

• For easier removal it is recommended to use IR pilot seat tool (920). This must be purchased separately.

If pilot valve is not damaged it is not necessary to disassemble completely.

1. Remove plug (912).
2. Remove pilot valve assembly (910) as an assembly.
3. Discard and replace pilot valve assembly (910) if necessary.

K5C2-E Control Valve Disassembly

Refer to Dwg. MHP2180 on page 12.

Handle Removal

Follow disassembly instructions for K5C2 Control Valve.

Reverse Valve Removal

1. Remove capscrews (938), (925) and washers (924) from seal bracket (939). Remove seal bracket from housing. Remove and discard 'O' rings (941) and (942).
2. Remove capscrews (721) and washers (902) from exhaust flange (955) and exhaust adapter (723). Remove and discard 'O' rings (942) and (722).
3. Move reverse valve (943) out exhaust flange side of housing until ball (916) is visible on reverse valve. Allow ball (916) to drop out of bushing (944) and remove ball (916).
4. Remove bushing (944) out exhaust flange side of housing.

NOTICE

• Dowel pin (945) allows the bushing to be removed only from the exhaust flange side of housing. Ball (916) retains reverse valve (943) in bushing (944).
• Do not remove reverse valve (943), bushing (944) and ball (916) at the same time, damage may occur to bushing.

Piston Removal

Follow disassembly instructions for K5C2 Control Valve.

Pilot Valve Removal

Follow disassembly instructions for K5C2 Control Valve.

Emergency Stop Removal

1. Remove adapter (706) and E-Stop button (705).
2. Remove plunger (707). Remove and discard 'O' rings (703).
3. Pull spring (711) out of valve housing and discard.

Overload Valve Removal

1. Remove cap (700). Remove and discard grommet (701).
2. Pull out plunger (702), remove and discard 'O' rings (703).
3. Remove capscrews (901) and washers (902) from cover (719) underneath valve housing.

NOTICE

• Cover (719) retains spring (718). To remove capscrews (901) and washer (902) unscrew in a crisscross pattern.

4. Remove adjusting screw (720).

5. Remove and discard ‘O’ ring (716), gasket (714) and ‘O’ ring (713) from piston.
6. Do not remove seal from piston, if piston appears damaged or worn replace.

K5C2 Control Valve Assembly

Refer to Dwg. MHP2036 on page 10.

Reverse Valve Assembly

1. Insert reverse valve (943) into bushing (944) with ball slot oriented UP, approximately 2-1/2 in. (64 mm).
2. Insert bushing (944) and reverse valve (943) into valve housing (917) from exhaust flange side, ensuring that groove in bushing is aligned with pin (945).
3. Insert ball (916) onto reverse valve platform. With finger, push ball (916) in housing until ball hits end of reverse valve.
4. Holding ball (916) in position on reverse valve platform, rotate reverse valve from neutral position to approximately 45 degrees in either direction. Ball will ‘walk’ up side of reverse valve platform and move in ball hole in bushing.

NOTICE

• Do not rotate reverse valve past a 90 degree position, it may result in the ball (916) falling in motor.

5. Slowly push reverse valve, while still in the 45 degree position, the rest of the way in housing until flush with surface. From other side of valve rotate reverse valve back to neutral position, ball should be seated in ball slot at that time.
6. Lubricate ‘O’ ring (942) and place it in groove in exhaust flange (955).
7. Secure exhaust flange (955) to valve housing with capscrews (901) and washers (902).
8. Insert ‘O’ ring (941) into seal bracket (939). Lubricate ‘O’ ring (942) and place into groove in seal bracket.
9. Place seal bracket over end of reverse valve. Using finger pressure, press until seal is seated on reverse valve and seal bracket is seated on valve housing. Secure with washers (924) and capscrews (925) and (938).

Pilot Valve Assembly

NOTICE

• For easier installation it is recommended to use IR pilot seat tool (920). This must be purchased separately.

1. Install pilot valve assembly (910).
2. Apply thread sealant Loctite 567® to pilot seat (914), place pilot valve assembly into valve housing. Use a large flat tipped screw driver to engage slots in pilot seat and tighten until pilot assembly is 1/8 in. (3.175 mm) from housing bore.
3. Insert plug (912) and tighten.

Piston Assembly

1. Lubricate and install ‘O’ rings (921) and (923) on piston (922).
2. Insert assembled piston into valve housing (917) from handle side.
3. Secure with gasket (918), piston cover (919), washers (902) and capscrews (901).
4. Place poppet seal (907) into poppet cap (906). Place this assembly into valve housing and seat on piston (922).
5. Place spring (905) over this assembly.
6. Secure with gasket (904), poppet cover (903), washers (902) and capscrews (901).

Handle Assembly

1. Place spring (937) over reverse valve handle end in seal bracket.

NOTICE

• Spring (937) will have to be ‘Cocked’ over stud in seal bracket. This will ensure handle returns to neutral.

2. Place handle assembly over reverse valve end. Slide handle will have to be lifted slightly to allow pin to fit into slot in seal bracket.
3. Secure handle assembly (930) to reverse valve with tab lock washer (909) and capscrew (901), torque to 15 ft. lbs. (21 Nm). Washer (909) has small tab on side, engage with small hole in handle.
4. Bend tabs of washer (909) over flats of capscrew.
5. Press plug (935) into handle assembly to cover capscrew. Check control handle movement. Correct any discrepancies.

K5C2-E Control Valve Assembly

Refer to Dwg. MHP2180 on page 12.

Reverse Valve Assembly

1. Insert reverse valve (943) into bushing (944) with ball slot oriented UP. Apply grease to ball (916) and insert into ball slot of reverse valve (943) through bushing (944).
2. Insert bushing (944), reverse valve (943) and ball (916) into valve housing (917) from exhaust flange side, ensuring that groove in bushing is aligned with pin (945).
3. Lubricate ‘O’ rings (942) and (722), and place in grooves in exhaust adapter (723).
4. Lubricate ‘O’ rings (942) and place in grooves in exhaust flange (955).
5. Secure exhaust adapter with exhaust flange to valve housing with capscrews (721) and washers (902).
6. Insert ‘O’ ring (941) into seal bracket (939). Lubricate ‘O’ ring (942) and place into groove in seal bracket.
7. Place seal bracket over end of reverse valve. Using finger pressure, press until seal is seated on reverse valve and seal bracket is seated on valve housing. Secure with washers (924) and capscrews (925) and (938).

Pilot Valve Assembly

Follow assembly instructions for K5C2 Control Valve.

Piston Assembly

Follow assembly instructions for K5C2 Control Valve.

Handle Assembly

Follow assembly instructions for K5C2 Control Valve.

Emergency Stop Assembly

1. Insert spring (711) into valve housing (917).
2. Place 'O' rings (703) on plunger (707).
3. Insert plunger into valve housing.
4. Screw adapter (706) and E-Stop button (705) into valve housing.
5. Tighten adapter until snug, do not over tighten.

Overload Valve Assembly

1. Replace 'O' rings (703) on plunger (702).
2. Insert plunger (702) with 'O' rings in valve housing (917).
3. Replace grommet (701) in cap (700).
4. Install and tighten cap (700) flush to valve housing.
5. Replace piston (712) if appears damaged or worn.
6. Insert 'O' ring (713) on piston (712).
7. Replace gasket (714).

NOTICE

• Cover (719) retains springs (718), adjustment nut (717) and plate (715). Insert capscrews (902) and washers (901) in a crisscross patter until tightened evenly.

8. Insert adjusting screw (720), refer to 'OPERATION' section for overload valve adjustment.

Mounting Control Valve

1. Secure Control Valve Assembly to intake manifold using capscrews (951) and washers (949). Use new gaskets (946) between control valve and manifold.
2. Test control valve for proper operation. Lift slide handle and move handle all the way in one direction and release hand. Control handle should return and lock in the neutral position. Repeat for other direction.
3. Connect brake line.
4. Connect air supply line.

Brake Connections

WARNING

• Failure to use a 45° fitting with orifice on brake port could cause load to fall. Fitting is item number (956), part number 27973 on parts page and can be identified as fitting with orifice in one end.

NOTICE

• FA2B Disc Brake winches use a 45° fitting with an orifice in the brake port on control valve.

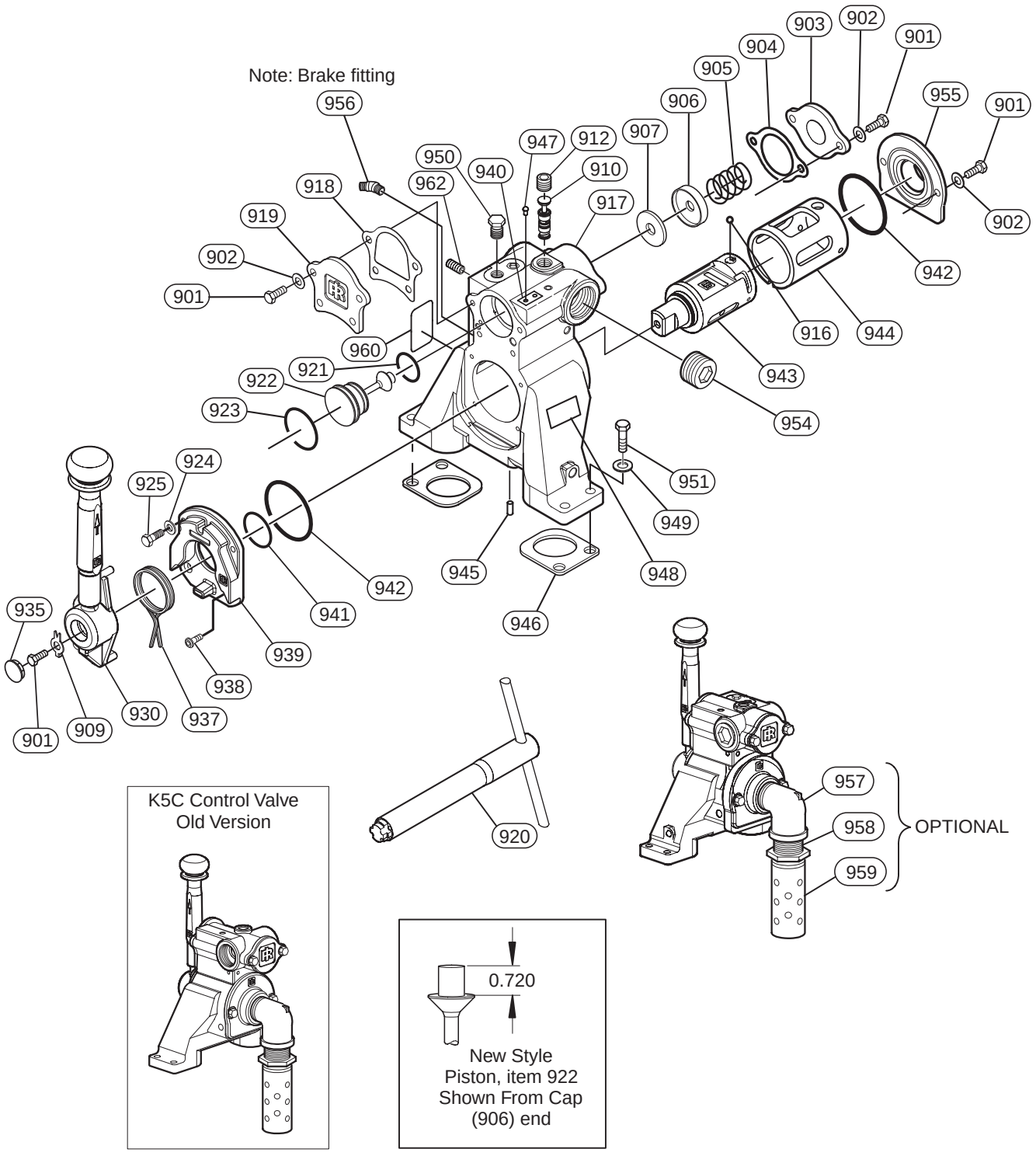
Table 1 Brake Line Connection

Winch Models	Brake Configuration (Refer to Dwg. MHP2182 on page 14 and MHP2198 on page 15)				
	Disc Brake Only	Automatic Drum Brake	Disc and Automatic Drum Brake	Manual Drum Brake Only	Disc and Manual Drum Brake
FA2B and FA2B-E	Configuration 2	Configuration 3	Configuration 1	Use as is	Configuration 2
FA2.5A, FA5A, FA2.5A-E and FA5A-E					
FA2.5, FA5, FA7 and FA10	Configuration 3		Configuration 3*		Configuration 3
FA5-E and FA10-E	Configuration 4*				Configuration 4
FA2.5-E and FA7-E	Contact Factory				

* Requires tee at disc brake port part number 52181, contact factory for replacement.

SERVICE NOTES

K5C2 CONTROL VALVE ASSEMBLY DRAWING



(Dwg. MHP2036)

Note: Item numbers (957-959) will be different depending upon Parts, Operation and Maintenance Manual.

* Item 920 is not sold with any valve parts. Must be purchased separately.

K5C2 CONTROL VALVE ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
900	Control Valve Assembly	1	Refer to Config. Kits on page 18	940	Tag, No FA2B	1	71392757
				941	'O' Ring	1	71357198
				942	'O' Ring	2	51651
901	Capscrew	9	71342034	943	Reverse Valve Kit (Normal)** (Note 1)	1	27925-S
902	Washer	9	71303408				27925-SX
903	Cover, Poppet	1	26997		Reverse Valve (Reverse Bias)**		28002
904	Gasket, Poppet	1	27064		Reverse Valve (Unbiased)		****
905	Spring, Poppet	1	71351068	944	Bushing (Normal)***	1	26686
906	Cap, Poppet	1	28734		Bushing (Reverse Bias)***		27450
907	Seal, Poppet	1	26991		Bushing (Unbiased)		****
909	Washer, Tab Lock	1	71398091	945	Pin	1	71146674
910	Pilot Valve Assembly	1	28696	946	Gasket	Set	27115
912	Plug	1	71267561	947	Rivet	2	71028849
916	Ball	1	D10-280	948	Label, Throttle Direction	1	71352777
917	Valve Housing	1	*	949	Washer (FA2B only)	4	54843
918	Gasket, Cover	1	26999		Washer (all other winches)		71376370
919	Cover, Piston	1	26998	950	Plug	1	71366348
920	IR Pilot Valve Tool	1	28690	951	Capscrew (FA2B only)	4	71351944
921	'O' Ring	1	52537		Capscrew (all other winches)		71369276
922	Piston (Note 3)	1	28735-S	954	Plug	1	71263297
923	'O' Ring	1	71355796	955	Exhaust Flange	1	26691
924	Washer	2	71271985	956	Fitting (with orifice) (FA2B only)	1	27973
925	Capscrew	2	71348338		Fitting (all other winches)		71367932
930	Handle Assembly	1	27239-1	957	Fitting, Elbow	1	71273676
935	Plug	1	71348965	958	Fitting, Nipple	1	71057483
937	Spring	1	26966	959	Muffler	1	52472
938	Buttonhead Screw	2	71394407	960	Label, Warning	1	71373229
939	Seal Bracket (Note 4)	1	28733-S	962	Breather	1	51559
940	Tag, FA2B Only	1	71392740	941	'O' Ring	1	71357198

* Item 917 not sold separately, order item 900.

** Reverse Valve (Normal) for Standard Overwound operation. Reverse Valve (Reverse Bias) for Optional Underwound operation.

*** Ensure Bushing matches Reverse Valve (Reverse Valve (Normal) and Bushing (Normal)). Mixing these components can result in erratic winch operation.

**** Reverse Valve (Unbiased) and Bushing (Unbiased) contact factory for application.

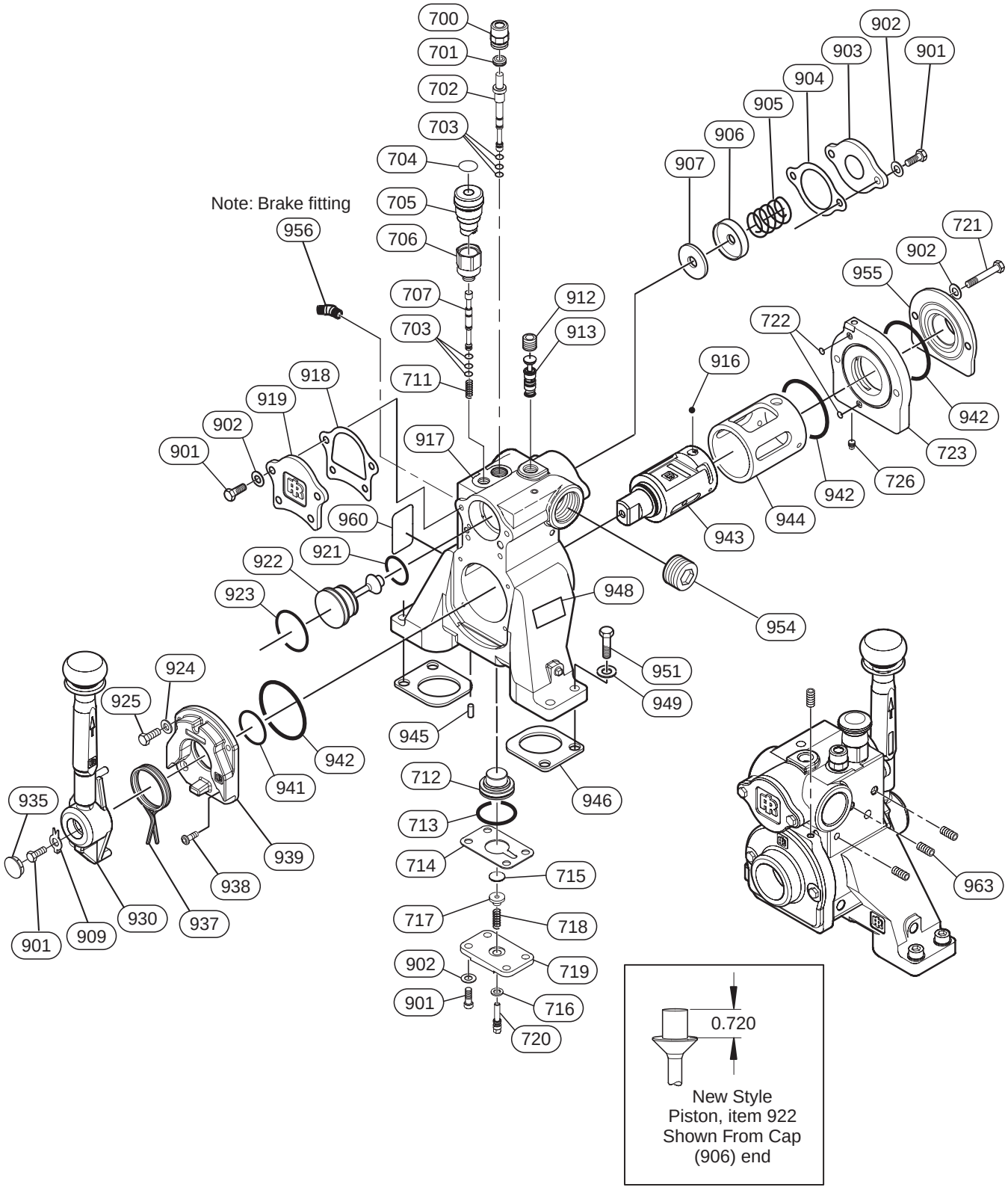
Note 1: Item 943 part number 27925-S used on FA2B and FA2B-E winches only. Part number 27925-SX used on all other winch models.

Note 2: For service kit descriptions and additional information on related publication(s) refer to Tables on page 18.

Note 3: Item 922 not sold separately, includes items (6) each of 901 and 902, items 904-907, 918, 921 and 923.

Note 4: Item 939 not sold separately, includes items (1) each of 901 and 902, items 924, 925, 935, 937, 938 and 940.

EMERGENCY STOP AND OVERLOAD K5C2-E VALVE ASSEMBLY DRAWING



(Dwg. MHP2180)

EMERGENCY STOP AND OVERLOAD K5C2-E VALVE PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
908	Control Valve Assembly	1	Refer to Config. Kits on page 18	921	'O' Ring	1	52537
				922	Piston (Note 3)	1	28735-S
				923	'O' Ring	1	71355796
				924	Washer	2	71271985
700	Cap	1	27491	925	Capscrew	2	71348338
701	Grommet	1	71365779	930	Handle Assembly	1	27239-1
702	Plunger	1	27490	935	Plug	1	71348965
703	'O' Ring	6	71127039	937	Spring	1	26966
704	Label, Stop	1	95790099	938	Buttonhead Screw	2	71394407
705	Button, E-Stop	1	71372601	939	Seal Bracket (Note 4)	1	28733-S
706	Adapter	1	27488	940	Tag, FA2B Only	1	71392740
707	Plunger	1	27489		Tag, No FA2B		71392757
711	Spring	1	71365787	941	'O' Ring	1	71357198
712	Piston	1	27964	942	'O' Ring	3	51651
713	'O' Ring	1	51768	943	Reverse Valve Kit (Normal)** (Note 1)	1	27925-S
714	Gasket	1	27493				27925-SX
715	Plate	1	27624		Reverse Valve (Reverse Bias)**		28002
716	'O' Ring	1	71365795		Reverse Valve (Unbiased)		****
717	Adjustment Nut	1	24374	944	Bushing (Normal)***	1	26686
718	Spring	1	71053730		Bushing (Reverse Bias)***		27450
719	Cover	1	27494		Bushing (Unbiased)		****
720	Screw, Adjusting	1	27571	945	Pin	1	71146674
721	Capscrew	2	71365811	946	Gasket	Set	27115
722	'O' Ring	2	71138135	947	Rivet	2	71028849
723	Adapter, Exhaust	1	27540	948	Label, Throttle Direction	1	71352777
726	Plug	1	27945	949	Washer (FA2B only)	4	54843
901	Capscrew	11	71342034		Washer (all other winches)		71376370
902	Washer	13	71303408	951	Capscrew (FA2B only)	4	71351944
903	Cover, Poppet	1	26997		Capscrew (all other winches)		71369276
904	Gasket, Poppet	1	27064	954	Plug	1	71263297
905	Spring, Poppet	1	71351068	955	Exhaust Flange	1	26691
906	Cap, Poppet	1	28734	956	Fitting (with orifice) (FA2B only)	1	27973
907	Seal, Poppet	1	26991		Fitting (all other winches)		71367932
909	Washer, Tab Lock	1	71398091	957	Fitting, Elbow (refer to Dwg. MHP2036)	1	71273676
910	Pilot Valve Assembly	1	28696				
911	'O' Ring	2	71126825	958	Fitting, Nipple (refer to Dwg. MHP2036)	1	71057483
912	Plug	1	71267561				
916	Ball	1	D10-280	959	Muffler (refer to Dwg. MHP2036)	1	52472
917	Valve Housing	1	*				
918	Gasket, Cover	1	26999	960	Label, Warning	1	71373229
919	Cover, Piston	1	26998	963	Plug	3	28628

* Item 917 not sold separately, order item 908.

** Reverse Valve (Normal) for Standard Overwound operation. Reverse Valve (Reverse Bias) for Optional Underwound operation.

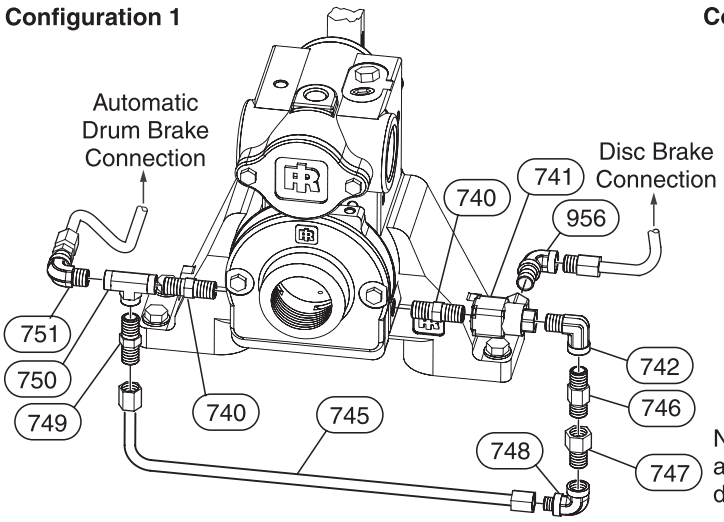
*** Ensure Bushing matches Reverse Valve (Reverse Valve (Normal) and Bushing (Normal)). Mixing these components can result in erratic winch operation.

**** Reverse Valve (Unbiased) and Bushing (Unbiased) contact factory for application.

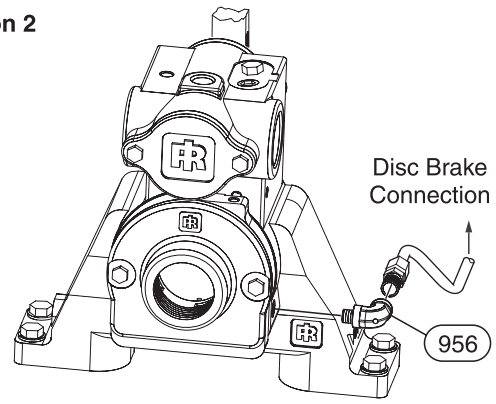
Note 1: Item 943 part number 27925-S used on FA2B and FA2B-E winches only. Part number 27925-SX used on all other winch models.
Note 2: For service kit descriptions and additional information on related publication(s) refer to Tables on page 18.
Note 3: Item 922 not sold separately, includes items (6) each of 901 and 902, items 904-907, 918, 921 and 923.
Note 4: Item 939 not sold separately, includes items (1) each of 901 and 902, items 924, 925, 935, 937, 938 and 940.

BRAKE LINE CONNECTION FOR K5C2 PARTS DRAWING AND LIST

Configuration 1

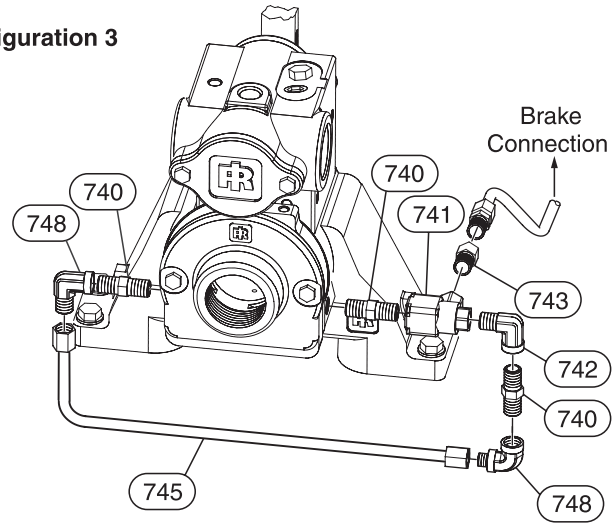


Configuration 2



Note: Item #746 installed with arrow flow symbol pointing up direction.

Configuration 3



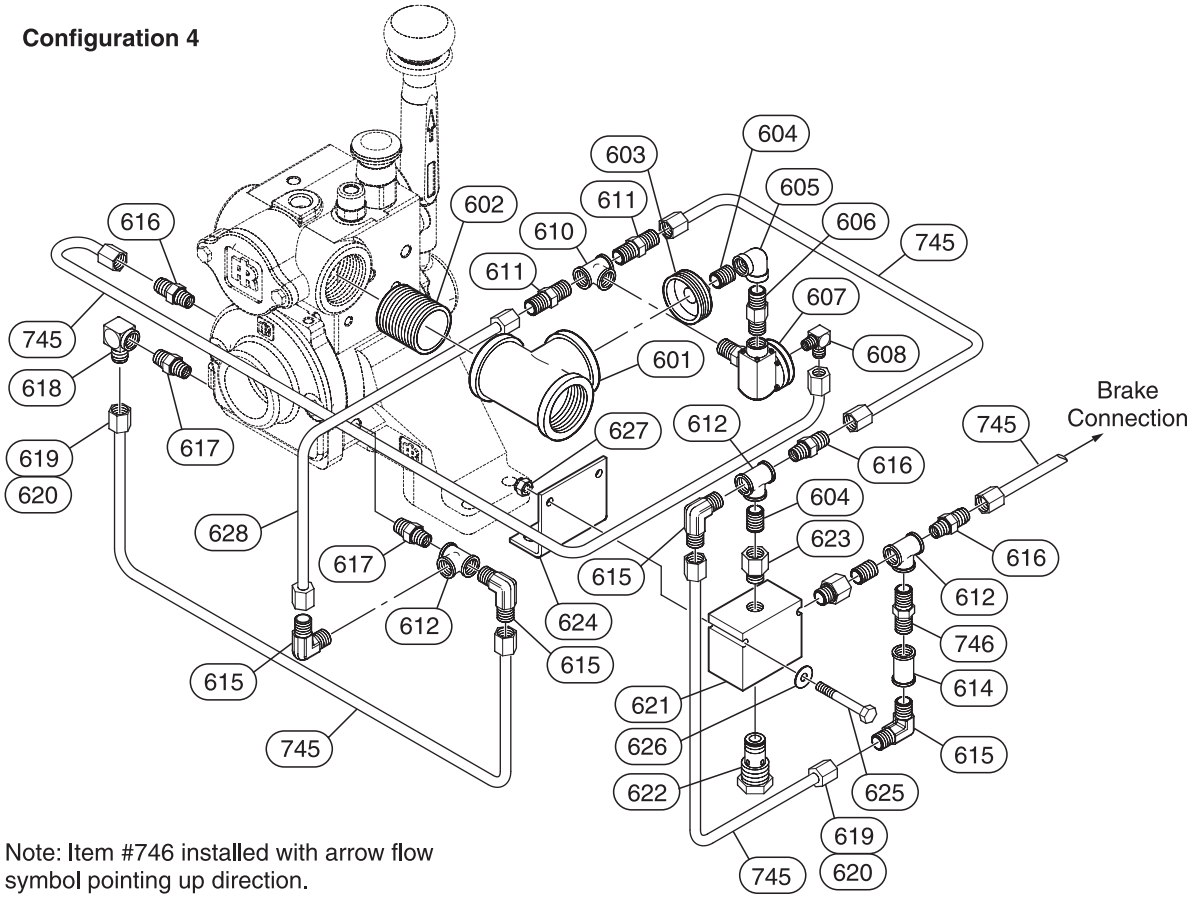
(Dwg. MHP2182)

Item No.	Description of Part	Total Qty	Part Number
740	Fitting, Connector	2 (3)	71367908
741	Shuttle Valve	1	50277
742	Fitting, Elbow	1	71372650
743	Fitting, Reducer	1	53939
745	Tubing, Assembly	*	52520
746	Check Valve	1	71368609
747	Fitting, Reducer	1	71370605

Item No.	Description of Part	Total Qty	Part Number
748	Fitting, Elbow	1 (2)	71367767
749	Fitting, Connector	1	71367759
750	Fitting, Tee	1	71367916
751	Fitting, Elbow	1	71367924
956	Fitting (w/ orifice) (FA2B only)	1	27973
	Fitting (all other winches)		71367932

* Tubing supplied at factory and may vary in length.

BRAKE LINE CONNECTIONS PARTS DRAWING AND LIST

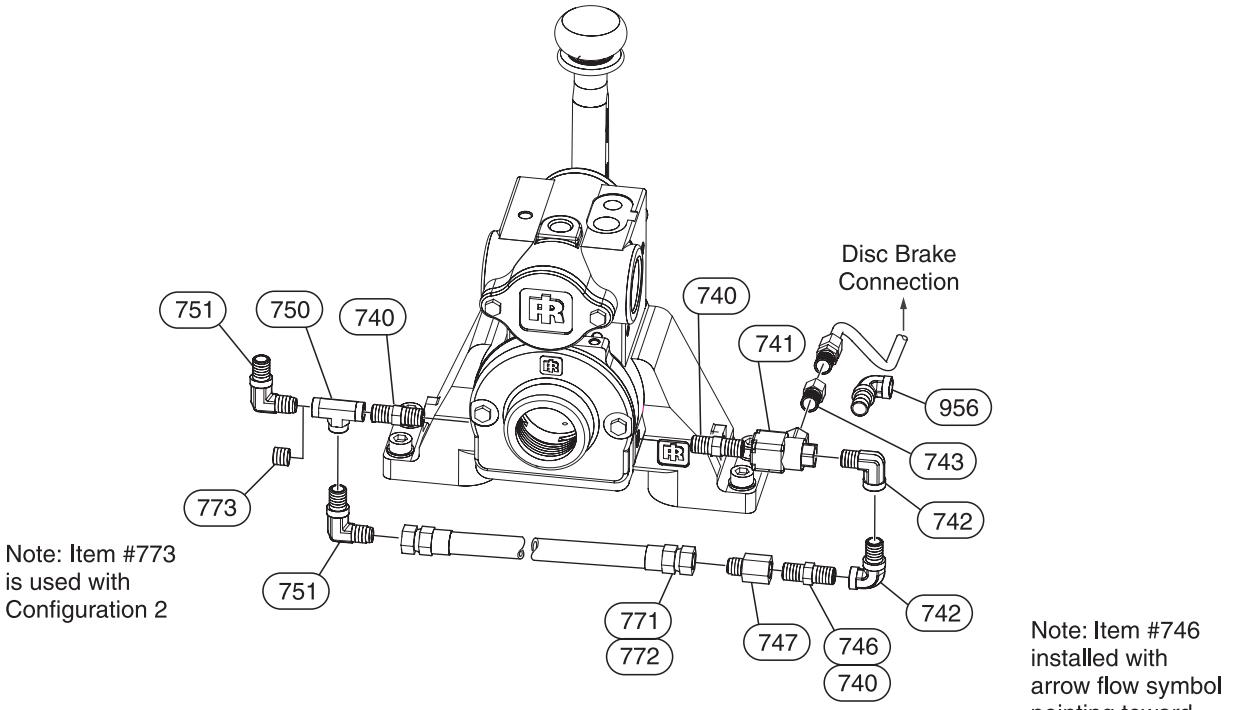


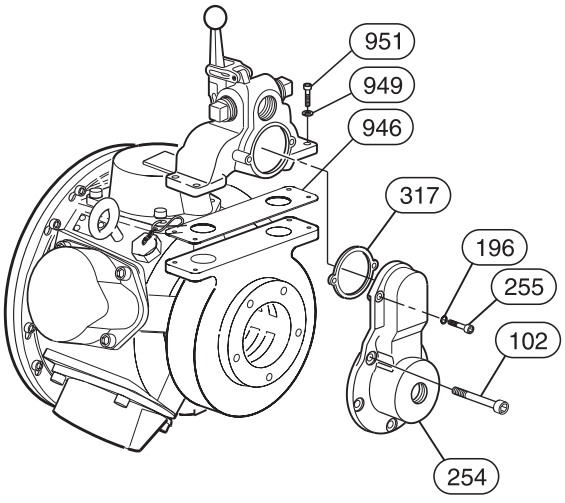
(Dwg. MHP2198)

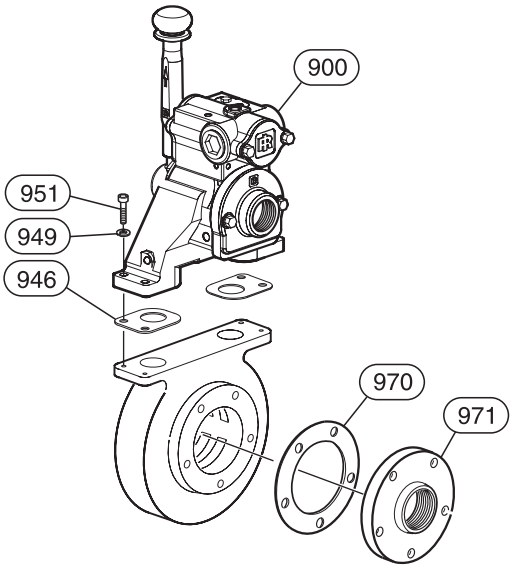
Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
601	Fitting, Tee	1	51707	617	Fitting, Connector	2	54274
602	Fitting, Pipe	1	51704	618	Fitting, Elbow	1	71375349
603	Bushing	1	71039416	619	Fitting	12	55014
604	Fitting, Nipple	3	51034	620	Locknut	12	55013
605	Fitting, Elbow	1	51031	621	Valve	1	71375380
606	Fitting, Connector	1	54679	622	Check Valve	1	71375398
607	Valve	1	54672	623	Fitting, Reducer	2	71375406
608	Fitting, Elbow	1	51281	624	Bracket, Support	1	28051
610	Fitting, Tee	1	71375372	625	Screw	2	54277
611	Fitting, Connector	2	52092	626	Washer	2	51831
612	Fitting, Tee	3	51812	627	Locknut	2	53541
614	Fitting, Pipe	1	50861	745	Tubing (Bulk)	As Needed	52520
615	Fitting, Elbow	4	52182				
616	Fitting, Connector	3	51814	746	Valve, Check	1	71368609

K5C2-SKB CONTROL VALVE KIT PARTS DRAWING

Note: Refer to 'Table 1 Brake Line Connection' on page 8 and Dwg. MHP2182 on page 14 for applicable brake configuration. All fittings and plugs may not be needed. Discard any unused parts.







(Dwg. MHP2274)

K5C2-SBK CONTROL VALVE KIT PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
980	Control Valve Kit*	1	K5C2-SBK	750	Fitting, Tee	1	71367916
102	Capscrew	5	51471	751	Fitting, Elbow	1	71367924
196	Lockwasher	2	50200	771	Hose	1 ft.	50923
254	Exhaust Flange	1	K5B-276	772	Fitting, Hose End	2	51029
255	Capscrew	2	54610	773	Plug	1	51897
317	Gasket	1	K5B-275	900	Control Valve Assembly	1	K5C2
740	Fitting, Connector	3	71367908	946	Gasket	Set	27115
741	Shuttle Valve	1	50277	956	Fitting (w/ orifice)(FA2B only)	1	27973
742	Fitting, Elbow	2	71372650		Fitting (all other winches)		71367932
743	Fitting, Reducer	1	53939	970	Gasket	1	K5B-928
746	Check Valve**	1	71368609	971	Exhaust Flange	1	KK5B-276M
747	Fitting, Hose	1	71383996	972	Loctite 567® †	1	71384077

* Kit includes item numbers 740-743, 746, 747, 750, 751, 771-773, 900, 970-972.

** Item number 746 is used on winch models FA2B, FA2B-E, FA2.5A, FA5A, FA2.5A-E and FA5A-E in these disc and automatic brake configurations only. In other applications use item number 740.

† Item 972 not illustrated.

REFERENCE MANUALS AND SERVICE KITS

Item No.	Kit Description	Total Qty	Part Number
• 780	Control Valve Service Kit Standard (includes items 901, 902, 904, 905, 907, 918, 921, 923-925, 935, 937, 938, 941, 942, 946, 949 and 951)	1	27240
930	Handle Assembly Kit (includes items 901, 909, 930 and 935)	1	27239-1
784	Reverse Valve Kit (includes items 940, 943, 947 and 956) (FA2B and FA2B-E only)	1	27925-S
	Reverse Valve Kit (includes items 940, 943 and 947) (All other winch models)		27925-SX
• 786	Overload Valve Service Kit (includes items 701, 703, 712 through 714, 716, 722 and 942)	1	27995
• 788	Emergency Stop Service Kit (includes items 703 and 711)	1	27994
789	Emergency Stop Kit (Optional Feature)*	1	28026

• Recommended spare for one winch, two years of normal service.

* Kits can be installed to new style control valve. Refer to Dwg. MHP2036 page 10.

Control Valve Configuration Kit with Brake Applications

Model	Application Type				
	Disc Brake Only	Automatic Drum Brake Only	Disc and Automatic Drum Brake	Manual Drum Brake Only	Disc and Manual Drum Brake
Without Emergency Stop and Overload					
FA2B	K5C2-SBK**				
FA2.5A and FA5A	K5C2-SBK-X				
FA2.5, FA5, FA7 and FA10					
With Emergency Stop and Overload					
FA2B-E	K5C2-ES	K5C2-ES2	K5C2-ES1	K5C2-E	K5C2-ES
FA2.5A-E and FA5A-E	K5C2-EXS	K5C2-EXS2	K5C2-EXS1	K5C2-EX	K5C2-EXS
FA2.5-E, FA7-E, FA5 and FA10	K5C2-EXS3	K5C2-EXS3	K5C2-EXS3	K5C2-EX	K5C2-EXS3

** Discard any unused parts.

Publication	Part / Document Number
FA2 and FA2.5 Air Winch Parts, Operation and Maintenance Manual	MHD56040
FA5 and 5T Air Winch Parts, Operation and Maintenance Manual	MHD56037
FA7 and 7T Air Winch Parts, Operation and Maintenance Manual	MHD56076
FA10 Air Winch Parts, Operation and Maintenance Manual	MHD56116
FA2.5A Air Winch Parts, Operation and Maintenance Manual	MHD56114
FA5A Air Winch Parts, Operation and Maintenance Manual	MHD56087
FA2B Air Winch Parts, Operation and Maintenance Manual	MHD56177
Reverse Valve Kits Instruction Sheet	MHD56242

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