

Force 5i Air Winch

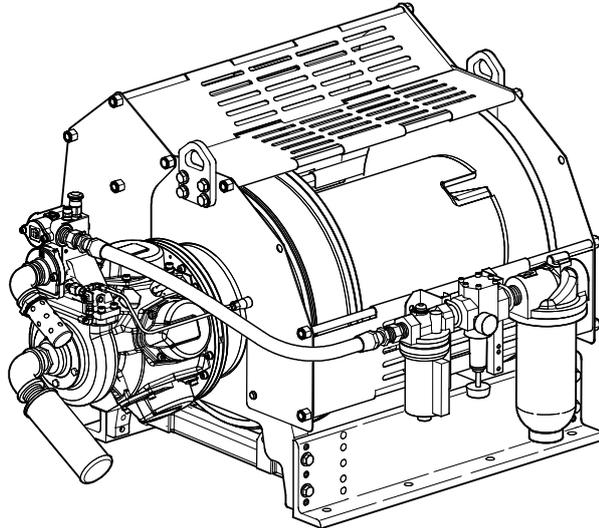


FA2.5i and FA2.5i-CE

FA5i and FA5i-CE

FA5Ti and FA5Ti-CE

(-CE compliant with European Directives)



Product Information



Save These Instructions



Form MHD56434
Edition H
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CCN 45899762

Only allow **Ingersoll Rand** trained technicians to perform maintenance on this product. For additional information contact **Ingersoll Rand** factory or nearest Distributor.

For additional supporting documentation, refer to **Table 1, p. 2**.

Manuals can be downloaded from www.irmhdocs.skysite.com

The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and will invalidate all warranties.

Original instructions are in English. Other languages are a translation of the original instructions.

Refer all communications to the nearest **Ingersoll Rand** Office.

Table 1. Product Information Manual

Publication Name	Document Number (CCN)
Product Safety Information Manual (Non-Man Rider)	MHD56250 (71402598)
Product Parts Information Manual	MHD56287

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Product Description

Infinity series winches are air powered, planetary geared units designed for and intended for use as utility winches, with a Mechanism Classification of M5. They shall not be used for lifting or moving personnel. They may be used to pull or lift loads at various wire rope take-off angles. Winches can be equipped, with either an internal automatic disc brake, a manual or automatic band brake, or a combination of both disc and band brake.

The output from an externally mounted piston air motor is transmitted through a coupling and shaft to the planetary reduction gear assembly. Output from the planetary reduction gear assembly is connected to the wire rope drum through the output shaft.

The disc brake assembly consisting of friction plates splined to a hub which in turn is connected to the drive shaft from the air motor. Brake friction plates are clamped to the drum shaft through a spring applied piston. The brake remains applied until the winch control valve is operated and winch pay out or haul-in occurs. Air is introduced into a chamber, which is formed between brake piston and brake housing, causing the brake piston to react, compressing brake springs and releasing friction plates allowing motor shaft to rotate. A power failure or sudden loss of air will immediately cause the spring applied brake to engage. The band brake operates by applying a friction force between brake band and winch drum. The manual brake requires an operator to engage and disengage brake using a handle located on top of brake band. The automatic band brake operation is similar to disc brake operation; they are both fully disengaged in the haul-in and payout direction.

The design life of the winch is based on the application and its maintenance. Refer to [Table 9, p. 20](#).

CE winches in addition to the above have drum guard, upper and lower limit switches, overload protection and emergency stop as standard features, and are compliant with CE directives.

Specifications

Model Code Explanation

Example: FA5i-24MK1P

FA5i - 24 M K 1 P

Series (Capacity):

- FA2.5i = 5,000 lbs (2.5 metric ton)
- FA5i = 11,000 lbs (5 metric ton)**
- FA5Ti = 8,400 lbs (4 metric ton)

Drum Flange Height:

- = **Standard flange**
- T = Tall flange

Drum Length (Distance between drum flanges):

- 24 = Standard (Refer to Table 4 'Available Drum Lengths' on page 4 for drum lengths)**

Drum Brake:

- A = Automatic Drum Brake
- M = Manual Drum Brake**
- X = None

Disc Brake:

- K = Automatic Disc Brake**
- X = None

Control:

- 1 = Winch mounted lever throttle (Standard)**
- * 2XX = Remote full flow [XX = Specify hose length (feet). Maximum 20 ft (6 metres)]
- * 3XX = Remote pilot pendant throttle [XX = Specify hose length (feet). Maximum 66 ft (20 metres)]***
- * 4XX = Remote pilot lever throttle [XX = Specify length (feet). Maximum 66 ft. (20 metres)]***
- * 5XX = Remote electric over air throttle *** †

Options: **

- 7 = Drum Grooving (Number = wire rope size in sixteenths, e.g. 7/16 inch) †
- B = Extended Warranty
- ** CM = Low Temperature Components; C1M3 = -20° ABS, C2M3 = -20° DNV
- D = Drum Divider Flange and additional wire rope anchor †
- E = Construction Cage †
- G = Drum Guard
- J = Air Line Accessories (not mounted to winch)
- L = Drum Locking Pin
- ** M1 = Material Traceability (typical material results) ††
- ** M2 = Material Traceability (actual material results) ††
- ** M3 = Material Traceability (actual material results for these parts in finished, as-delivered condition) ††
- N4 = Manufactured under American Bureau of Shipping (ABS) Survey
- N5 = Manufactured under Det Norske Veritas (DNV) Survey
- P = Marine 812 Grade Corrosion Preventative Finish**
- P1 = Marine 812-X Grade Corrosion Preventative Finish
- Q = Adjustable Accu-Spool™ †
- R = Slack Wire Rope Detector
- S = Limit Switch (upper and lower)
- U = Underwound
- V = Press Roller (not available with drum divider)
- CE = Compliance with European Machinery Directive and EN 14492-1
- W1 = ABS witness test
- W2 = DNV witness test
- W3 = LRS witness test
- W4 = Client witness test
- Y = Overload protection with emergency stop on lever throttle valve

Notes:

- * Remote throttles are provided with 6 feet (2 metres) of hose. Specify hose lengths greater than 6 feet. For lengths greater than 20 feet (6 metres) with the Remote Full Flow Throttle, or 66 feet (20 metres) with the Remote Pilot Lever and Remote Pilot Pendant Throttles contact your **Ingersoll Rand** distributor for control acceptability. Metric lengths are provided for reference only, order lengths in feet. (Used with Disc and Auto Band Brake only.)
- ** Documentation, witness testing and material traceability available; must be requested at time of order. Specify options or contact the factory or your nearest **Ingersoll Rand** distributor for information.
- *** Not available with -CE option, or units equipped with limit switches.
- † Not covered in this manual.
- †† Refer to 'Traceability' on page 4 for a description of the differences between M1, M2 and M3.

All -E models are manufactured to previous European Machinery directives. Refer to Data (Name) Plate on winch to determine model. If winch is a custom build also refer to the Declaration of Conformity for serial number break.

Table 2. Specifications

Models	Air System		Rated Performance (at rated pressure/volume)													
	Rated Operating Pressure	Air Consumption (at rated pressure and load)		Full Drum Line Pull		Full Drum Line Speed		Mid Drum Line Speed		Max Stall Pull 1st Layer		Force Limit Factor	Maximum Freeboard		Net Weight ^(a)	
		scfm	cu. m/min	lbs	kgs	fpm	m/min	fpm	m/min	lbs	kgs		inch	mm	lbs	kgs
FA2.5i	90 psig (630 kPs/ 6.3 bar)	700	20	5000	2273	132	40	145	44	10500	4763	N/A	0.5	13	1190	540
FA2.5i-CE	70 psig (480 kPs/ 6.3 bar)					98	30					1.6	1.3	32	1265	574
FA5i	90 psig (630 kPs/ 6.3 bar)			11000	5000	54	16	65	20	29000	13154	N/A	0.5	13	1895	860
FASTi	90 psig (630 kPs/ 6.3 bar)			8400	3818	98	30	80	24			2170			984	
FA5i-CE	80 psig (550 kPs/ 5.5 bar)			11000	5000	52	16	65	20	25900	11748	1.6	1.6	40	1985	900
FASTi-CE	80 psig (550 kPs/ 5.5 bar)			8400	3818	98	30	80	24						2300	1043

^(a) Weight of standard winch without wire rope.

Table 3. Specifications

Models	Air Motor Pipe Inlet Size		Minimum Air System Hose Size (inside diameter)		Drum Barrel Diameter		Drum Flange Diameter		Recommended Wire Rope Size (standard)		Sound Pressure Level	Sound Power Level	Maximum Foundation Anchor Shear Force at one Capscrew	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	dBA	dBA	lbs	N
FA2.5i/FA2.5i-CE	1.25	32	1.5	38	10.75	273	19	483	5/8	16	97	109	2210	9830
FA5i/FA5i-CE					15	381	27	686	3/4	20			4850	21570
FASTi/FASTi-CE					35	889	35	889					4114	18300

Sound measurements have been made in accordance with ISO 11201, ISO 3744-3746 and ISO 4871 test specifications for sound from pneumatic equipment. Readings shown are based on the average noise level of each winch configuration, proportionate to the utilized time in a regular cycle.

Lpc (Peak Sound Pressure) does not exceed 130 dB. Performance based on 90 psig (6.3 bar/630 kPa) operating pressure.

Table 4. Available Drum Lengths

Models	Drum Lengths																			
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
FA2.5i/FA2.5i-CE	8	203																		
FA5i/FA5i-CE			12	305	16	406	20	508	24 ^(a)	610 ^(a)	30	762	36	915	40 ^(b)	1016 ^(b)	42 ^(b)	1067 ^(b)	50 ^(b)	1270 ^(b)
FASTi/FASTi-CE	—	—																		

^(a) Standard Length

^(b) Special, contact factory

Refer to sales literature for winch drum wire rope storage capacities.

NOTICE

!

All -E winch models are manufactured to previous European Machinery directives. Refer to Data (Name) Plate on winch to determine model. If winch is a custom build also refer to the Declaration of Conformity for serial number break.

Traceability

Load bearing parts are documented to provide traceability. Documentation includes chemical and physical properties of raw material, heat treating, hardening, tensile and charpy tests as required for the part.

Units with **M1**, **M2** or **M3** in the model code have traceable load bearing components.

M1 – Material Traceability certificates according to EN 10204 (Ex DIN 50049) 2.2 on load bearing parts. Conformity documents affirm (by the manufacturer) that parts are in compliance with requirements of the order, based on non-specific inspection and testing (i.e. results are typical material properties for these parts).

M2 – Material Traceability certificates according to EN 10204 (Ex DIN 50049) 3.1b on load bearing parts. Conformity documents affirm (by a department independent of the manufacturing department) that actual parts are in compliance with requirements of the order, based on specific inspection and testing (i.e. results are actual material properties for these parts).

M3 – Material Traceability certificates according to EN 10204 (Ex DIN 50049) 3.1b on load bearing parts. Conformity documents affirm (by a department independent of the manufacturing department) that the actual parts used in the product are in compliance with the order, based on specific inspection and testing (i.e. results are actual material properties for these parts in a finished, as delivered condition).

Components with part numbers ending in CH are charpy parts for use under extreme cold conditions. Traceability requirements must be stated when reordering these parts for continued certification.

Installation

Prior to installing the product, carefully inspect it for possible shipping damage. Products are supplied fully lubricated from the factory. Check oil levels and adjust as necessary before operating product. Refer to "Lubrication," p. 24 for recommended oils and lubrication intervals.

⚠ WARNING

!

Product not installed properly may fall or cause a load to fall resulting in sever injury or death. Before installation refer to Product Safety Manual and all safety warnings pertaining to this product.

⚠ CAUTION

!

Always install, operate, inspect, and maintain this product in accordance with all applicable standards and regulations (state, country, and federal, etc.). For example In the USA, the applicable standards are American Society of Mechanical Engineers (ASME) and National Fire Protection Agency (NFPA).

Mounting

Care must be taken when moving, positioning or mounting the winch. In most cases, lifting lugs have been provided to assist in handling the winch. If lug locations are improper for your specific installation, great care should be taken to ensure that winch, when lifted, will be properly balanced. Determine weight of your winch by referring to "Specifications," p. 6. Add weight of wire rope and other installed options as necessary. Lift winch 3 to 4 inches (75 to 100 mm) off ground. Verify winch is balanced and secure before continuing lift. Mount winch so axis of drum is horizontal and that motor vent cap is not more than 15° off top vertical center. If winch is to be mounted in an inverted position, motor case must be rotated to position vent cap to the top.

1. The winch mounting surface must be flat and of sufficient strength to handle rated load plus weight of winch and attached equipment. An inadequate foundation may cause distortion or twisting of winch uprights and siderails resulting in winch damage.
2. Make sure mounting surface is flat to within 0.005 inch (0.127 mm) per inch of drum length. Shim if necessary. Refer to Table 5, p. 9.
3. Mounting bolts must be Grade 8 or better. Use self-locking nuts or nuts with lockwashers. Refer to Table 6, p. 10.
4. Tighten mounting bolts evenly and torque to specification in torque chart. Refer to 'TORQUE CHART' in Product Maintenance Manual.
5. Maintain a fleet angle between sheave and winch of no more than 1-1/2°. The lead sheave must be on a center line with drum and, for every inch (25 mm) of drum length, be at least 1.6 feet (0.5 metre) from the drum. Refer to Product Safety Information Manual.
6. Do not weld to any part of winch.

Refer to Figure 1, p. 10.

Table 5. Mounting Surface Tolerance

Drum Length	Mounting Surface Minimum Flatness	
	inch	mm
8	0.04	1.02
12	0.06	1.52
16	0.08	2.03
20	0.10	2.54
24	0.12	3.05
30	0.15	3.81
36	0.18	4.57

Installation

Table 6. Mounting Bolts

Models	Mounting Bolts	
	inch	mm
FA2.5i/FA2.5i-CE	5/8	16
FA5i/FA5i-CE	3/4	18
FA5Ti/FA5Ti-CE		

Refer to Figure 1, p. 10.

Table 7. Winch Bolt Hole Mounting Dimensions

Models	Dimension		Drum Lengths (inches)										
			8	12	16	20	24	30	36	40	42	50	
FA2.5i (a)	"A"	inch	30								(b)		
		mm	508										
	"B" (c)	inch	7	9	7.5	9	10	12					
		mm	178	229	190	229	254	305					
	"B" (d)	inch	6	8	7	8	9	11					
		mm	152	203	178	203	229	279					
	"C"	inch	0.6875										
		mm	17.5										
	Bolt Hole Qty each siderail		3		4			4					
	FA5i	"A"	inch	31.25									
mm			794										
FA2.5i-CE	"A"	inch	34.25										
		mm	870										
FASTi/FASTi-CE (e)	"B" (c)	inch	7.5	9	10	10.5	10	11					
		mm	190	229	254	267	254	279					
	"B" (d)	inch	6	6.25	8.5	9	12	14					
		mm	152	159	216	229	305	356					
	"C"	inch	0.8125										
		mm	20										
	Bolt Hole Qty each siderail		4				(4) 5						

(a) 30 and 36 inch Drum with Band Brake will require 5 bolts, without Band Brake 4 bolts.

(b) Contact Factory

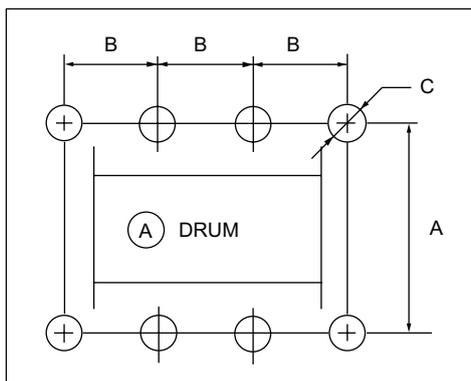
(c) Drum with Manual or Automatic Drum Brake

(d) Drum without Manual or Automatic Drum Brake

(e) 20 inch Drum with Band Brake will require 5 bolts, without Band Brake 4 bolts.

36 inch Drum with Band Brake will require 6 bolts, without Band Brake 5 bolts.

Figure 1. MHP0133



Wire Rope

⚠ CAUTION

!

- **Maintain at least 5 tight wraps of wire rope on the drum at all times.**
- **Do not use wire rope as a ground (earth) for welding.**
- **Do not attach a welding electrode to winch or wire rope.**
- **Install wire rope to come off drum for overwind operation (normal application).**

NOTICE

!

For horizontal applications order the "H" option or contact factory prior to operation.

Wire Rope Selection

Consult a reputable wire rope manufacturer or distributor for assistance in selecting the appropriate type and size of wire rope and, where necessary, a protective coating. Use a wire rope which provides an adequate safety factor to handle the actual working load and meets all applicable industry, trade association, federal, state and local regulations.

When considering wire rope requirements the actual working load must include not only the static or dead load but also loads resulting from acceleration, retardation and shock load. Consideration must also be given to the size of the winch wire rope drum, sheaves and method of reeving. Maximum wire rope diameter is limited by the wire rope anchor. It is recommended that wire rope construction be 6 X 19 or 6 X 37 IWRC right lay. Refer to [Table 8, below](#) for recommended sizes.

Table 8. Minimum and Maximum Wire Rope Size

Models	Minimum		Maximum	
	inch	mm	inch	mm
FA2.5i/FA2.5i-CE	5/8	16	5/8	16
FA5i/FA5i-CE			7/8	22
FA5Ti/FA5Ti-CE	3/4	20		

Notes:

1. *Maximum wire rope diameter is limited by size of wire rope anchor hole. Refer to Product Parts Information Manual for correct wire rope anchor part numbers.*
2. *Wire rope diameter is fixed if grooved drum option is used.*

Installing Wire Rope

NOTICE

!

When installing wire rope, pressurize disc brake with a minimum of 45 psi (3.1 bar) air from an auxiliary source. If winch is equipped with an auto brake cylinder, pressurize with a minimum of 80 psi (5.5 bar) air from an auxiliary source.

Refer to [Figure 5, p. 27](#).

1. Cut wire rope to length in accordance with wire rope manufacturer's instructions.
2. Feed end of wire rope through drum anchor pocket hole.
3. Forming a loop, wrap loop around anchor, approximately 22 inches (559 mm) of wire rope.
4. Pull wire rope anchor into position in drum anchor pocket. Ensure no extra (open end) of wire rope is extending out of drum anchor pocket.

⚠ CAUTION

!

Make sure first wrap of wire rope is tight and lays flush against drum flange.

Installation

Safe Wire Rope Handling Procedure

- Always use gloves when handling wire rope.
- Never use wire rope that is frayed or kinked.
- Never use wire rope as a sling.
- Always make sure wire rope is correctly spooled and the first layer is tight against drum.
- Always follow wire rope manufacturer's recommendation on use, lubrication, and maintenance of wire rope.

Wire Rope Spooling

To compensate for uneven spooling and the decrease in line pull capacity as the drum fills up, use as short a wire rope as practical. When rewinding apply tension to the end of the wire rope to eliminate line slack. This helps achieve level winding and tight spooling.

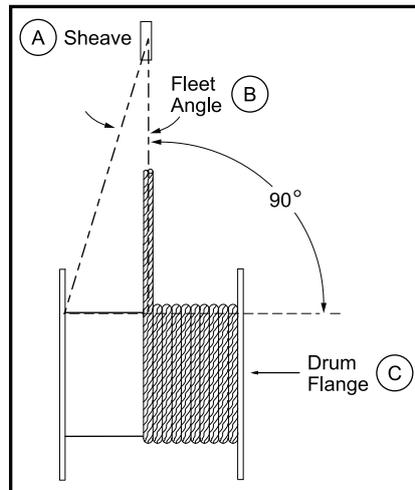
Rigging

Make sure all wire rope blocks, tackle and fasteners have a sufficient safety margin to handle required load under all conditions. Do not allow wire rope to contact sharp edges or make sharp bends which will cause damage to wire rope, use a sheave. Refer to wire rope manufacturer's instructions for proper sizing, use and care of wire rope.

Safe Installation Procedures

1. Do not use wire rope as a ground (earth) for welding.
2. Do not attach a welding electrode to winch or wire rope.
3. Never run wire rope over a sharp edge. Use a correctly sized sheave.
4. When a lead sheave is used, it must be aligned with center of drum. The diameter of lead sheave must be at least 18 times the diameter of wire rope. Refer to [Figure 2, p. 12](#).
5. Always maintain at least five full, tight wraps of wire rope on drum.

Figure 2. MHP2449



Drum Guard

Use of a drum guard is recommended on all winches, and is standard on -CE winches. Refer to the Product Parts Information Manual.

Drum guard panels must be adjusted to suit wire rope departure angle. To reposition drum guard panels remove nuts and slide out crossbar or remove the screws on current design guard. Position panels to avoid wire rope contact and install crossbar and nuts or the screws.

⚠ WARNING

!

Do not allow wire rope to come in contact with drum guard panels during winch operation. Wire rope will be damaged. Adjust drum guard panels to clear wire rope travel angle.

Air Supply

The air supply must be clean, free from moisture and lubricated to ensure optimum motor performance. Foreign particles, moisture and lack of lubrication are the primary causes of premature motor wear and breakdown. Using an air filter, lubricator and moisture separator will improve overall product performance and reduce unscheduled downtime. Install an emergency shut-off valve in the control valve inlet line.

Refer to [Figure 4, p. 27](#).

Refer to [Table 2, p. 7](#) for motor air consumption and rated operating pressure. If air supply varies from what is recommended, product performance will change.

Install air line lubricator, filter and regulator as close as possible to air inlet on motor. Lubricator must be located no more than 10 ft (3 m) from motor. Air line accessories package can also be mounted to the winch guard panel on the operator's side or opposite.

Air Lines

Inside diameter of air supply lines must not be less than size specified in [Table 2, p. 7](#). Before making final connections, all air supply lines should be purged with clean, moisture free air or nitrogen before connecting to main air inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to restrictions and surface friction in lines.

Air Line Lubricator

Always use an air line lubricator with these motors. The lubricator must have an inlet and outlet at least as large as inlet on motor.

⚠ CAUTION

!

- **Lubricator must be located no more than 10 ft (3 m) from motor.**
- **Shut off air supply before filling air line lubricator.**

The air line lubricator should be replenished daily and set to provide 2 to 3 drops per minute of ISO VG 32 (SAE 10W) oil. A fine mist will be exhausted from control valve when air line lubricator is functioning properly.

Air Line Filter

It is recommended that an air line strainer/filter be installed before the lubricator to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter periodically to maintain its operating efficiency.

NOTICE

!

When air filter is used ensure it allows air to pass through at products rated scfm. Refer to [Specifications, p. 7](#).

Air Pressure Regulator

If an air pressure regulator is used, install between lubricator and filter.

NOTICE

!

- **Do not adjust regulator for a CE marked product, these are preset at factory and pressure gauges are not provided. Adjustment of regulator will effect overload settings and product will no longer conform to CE regulations.**
- **Not all products are CE approved, refer to products data (name) plate to see if this applies.**

Moisture in Air Lines

Moisture that reaches the air motor through air supply lines is a primary factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches motor, or an aftercooler at compressor that cools air to condense and collect moisture prior to distribution through supply lines, are also helpful.

Installation

Mufflers

Ensure mufflers are installed in winch motor exhaust manifold and control valve exhaust port. An additional muffler is used on winches equipped with an emergency stop and overload device. Check mufflers periodically to ensure they are functioning correctly.

Motor

For optimum performance and maximum durability of parts, provide recommended air supply as measured at motor inlet. Refer to [Table 2, p. 7](#). Winch should be installed as near as possible to compressor or air receiver.

Tensioning System (optional feature)

Refer to [Figure 11, p. 28](#).

The air supply line is connected to one of the two top ports on the control valve. This will allow air to supply either the normal control valve or the auxiliary valve.

⚠ WARNING

!

Use only one control valve to operate winch at any time. Attempting to OVERRIDE one control valve with the other will result in total loss of winch control.

Limit Switches

Limit switches are standard on **-CE** winches.

Pre-set limit switch settings prevent winch wire rope payout and haul-in by stopping air flow to the winch motor when a defined set point has been reached. It is the owner's and operator's responsibility to adjust winch operating limits prior to using winch.

NOTICE

!

Settings for limit switch are for an overwound operation only.

To adjust set points:

Follow instructions in the order they appear for limit switch adjustment (**use two people to make adjustments**). Refer to [Figure 13, p. 28](#).

1. Remove cap from limit switch cover.
2. Partially unscrew center nut.
3. **PAYOUT**: Rotate (#1) screw (counterclockwise) while slowly paying out until winch shuts off.
4. **HAUL-IN**: Rotate (#2) screw (clockwise) while slowly hauling in until winch shuts
5. Tighten center nut.
6. Reinstall cap on limit switch cover and tighten.

⚠ WARNING

!

Ensure limit switch set points are established and operating properly before putting winch into service.

Press Roller

Ensure wire rope is positioned between press roller and drum barrel and springs keep press roller in tight contact with wire rope.

Initial Winch Operating Checks

Winches are tested for proper operation prior to leaving the factory. Before the winch is placed into service the following initial operating checks should be performed.

1. When first running the motor inject a small amount of light oil into the inlet connection to provide initial lubrication.
2. Check oil level in motor, reduction gear assembly and disc brake are correct. Top off levels as required before

operation as described in the [“Lubrication,” p. 24.](#)

3. Operate winch in both directions with no load.
4. Check operation of brakes.
5. Check operation of limit switches, locking mechanisms and all safety devices when equipped.
6. Check foundation mounting fasteners are secure.
7. Install drum guard when provided.

For winches that have been in storage, the following start-up procedures are required.

1. Give the winch an inspection conforming to requirements of [“Winches Not in Regular Use,” p. 22.](#)
2. Pour a small amount of ISO VG 32 (SAE 10W) oil in motor inlet port.
3. Operate motor in both directions to flush out any impurities.
4. The winch is now ready for normal use.

Operation

Winch Controls

The spring loaded, motor mounted, live air manual throttle control valve is supplied as a standard feature on this winch. Optional remote throttle controls are available. Reference model code on the winch data (name) plate and compare it to "Specifications," p. 6, to determine your configuration. The throttle controls provide operator control of motor speed and direction of drum rotation.

Winch Mounted Air Throttle

Refer to [Figure 6, p. 27](#).

The winch control throttle valve is spring loaded, full flow air and mounts to the motor 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 handle. Shift control handle 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 handle to ensure smooth operation of winch. When released, handle will return to neutral or center position, sliding handle will drop down to engage and lock control handle in place.

Remote Full Flow Air Throttle

Refer to [Figure 12, p. 28](#).

Provides for remote mounting of winch control at a fixed location at up to 20 feet (6 metres) away from winch motor. Air hoses connect throttle to winch motor to provide winch operation.

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.

Remote Pilot Pendant Throttle

Refer to [Figure 14, p. 29](#).

Provides for remote winch control at distances of up to 66* feet (20 metres) away from winch. The pilot pendant control throttle is a two function movable control station for winch operation. Pilot pressure from pendant control activates winch control valve. The winch control valve, located on winch motor, controls motor speed and direction of drum rotation. Direction of drum rotation is determined by the pendant lever/button depressed.

Remote Pilot Lever Throttle

Provides for remote winch control at distances of up to 66* feet (20 metres) away from winch. The lever pilot control throttle is a fixed mounted lever control station for winch operation. Pilot pressure from lever pilot control throttle activates winch control valve. The winch control valve, located on winch motor, controls motor speed and direction of drum rotation. Direction of drum rotation is determined by the direction in which lever is shifted.

* For distances greater than 50 feet (15 metres) contact **Ingersoll Rand** Technical Sales for control suitability.

Underwound Operation (optional feature)

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

Emergency Stop and Overload System

Emergency Stop and Overload System are standard on **-CE** winches.

Refer to [Figure 7, p. 27](#).

When emergency stop or overload valve is activated, winch drum rotation will immediately cease.

⚠ CAUTION

!

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

When control valve senses a preset pressure difference between ports, a pilot signal is sent to stop flow of air, winch drum rotation will immediately cease.

Emergency Stop

Emergency stop device is located on the control valve. When activated, winch drum rotation will immediately cease. To activate emergency stop, depress (push down) red palm valve, located on top of control valve.

NOTICE

!

If winch overload occurs, overload device, if equipped, also stops winch. To operate winch after an overload, reduce load and reset overload.

Emergency Stop Reset:

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

Pendant Control:

Refer to "Emergency Stop" section and [Figure 15, p. 29](#).

Overload System (CE Models only)

The winch utilizes a direct acting load limiter to limit the maximum line pull to 160% of the rated line pull. The limiter is a pressure regulator that limits the supply air to a pressure that will not allow the winch to pull beyond 160% of the rated line pull.

Checking Overload Valve Setting:

Proper test and adjustment of overload should only be performed by an **Ingersoll Rand** trained technician. The winch shall not be able to lift a load greater than 160% of the rated utility load. If this is possible, adjustment is required.

Tensioning System (optional feature)

Refer to [Figure 16, p. 29](#).

With auxiliary valve in the NORMAL position, winch provides normal operation. Placing valve selector in TENSIONING position allows winch to automatically operate to haul-in slack wire rope to maintain tension.

Auxiliary valve provides preset air pressure to air motor and disc brake. This allows brake to be released and winch to overhaul during TENSIONING operations. In this position, winch will maintain constant tension on wire rope.

Auxiliary valve is pre-set at zero from the factory. Specific adjustments must be made in the field. Adjustments can be modified at any time to accommodate the load conditions. Refer to 'Regulator Adjustment' in the Product Maintenance Information Manual.

Tensioning System (operation)

1. Place auxiliary valve in NORMAL position.
2. Operate winch normally to position end of load line.
3. Connect load line to load.

⚠ WARNING

!

Ensure slack load line is taken up by operating winch control valve with selector in NORMAL position. If selector lever is placed in TENSION position the winch will immediately attempt to establish line tension causing line to 'snap' resulting in injury or damage to property.

4. Operate winch normally to remove slack from load line.
5. Actuate valve to TENSION position to set winch to automatically haul-in load line and maintain line tension.

Winch Brakes

Manual Drum Band Brake

The manual drum band brake is applied by pushing down on handle and released by pulling up. If handle is pushed down fully, it should lock in that position and prevent drum rotation, until released by operator. The brake must be kept properly adjusted to hold rated load.

Operation

Automatic Drum Band Brake

The automatic drum band brake is a spring applied, air released brake which utilizes an air actuated, spring loaded cylinder, that automatically disengages brake when motor is operated. Air pressure in cylinder overcomes spring pressure to release brake. When control valve is placed in neutral position, air in cylinder is vented and spring automatically engages brake to prevent drum rotation.

The brake must be kept properly adjusted to hold rated load.

NOTICE

!

Extended exposure to corrosive atmospheres can cause the band brake lining to adhere to the drum. It is recommended when winch is not in operation and in a no load condition that the band brake be left in a released position.

Automatic Disc Brake

The automatic disc brake is a spring applied, air released brake. Using an air actuated, spring loaded piston, the brake automatically disengages when motor is operated and engages when throttle is returned to neutral position. Air pressure ported through brake housing overcomes spring pressure and moves piston which releases brake. When control valve is placed in neutral position, air is vented, spring pressure overcomes air pressure and spring pressure moves piston, engages brake and prevents drum rotation.

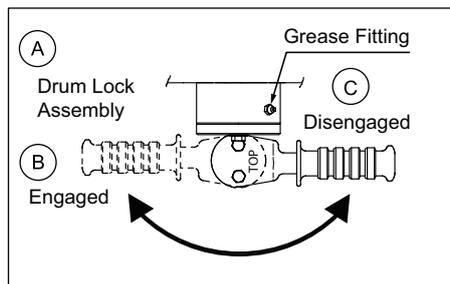
NOTICE

!

A minimum of 45 psig is required to release the brake.

Drum Locking Pin (optional feature)

Figure 3. MHP2772



The drum locking pin assembly is mounted on the outboard upright, opposite motor. Handle movement must be parallel to the winch base. It should be engaged if a load is left suspended. The word 'TOP' is stamped into the handle for correct orientation and must be visible from above.

To engage Drum Locking Pin:

When facing the handle, pull handle away from the outboard upright and pivot it to the left. Handle pivot capscrew will be in closest position to drum flange. Operate winch very slowly until locking pin engages one of the drum flange holes.

⚠ WARNING

!

- **Ensure that all braking mechanisms are engaged and all personnel are clear of winch load and rigging before disengaging locking pin.**
- **Extremely difficult locking pin release is an indication that load is held by locking pin and braking mechanisms are not functioning properly. Do not release locking pin until load control is established.**

To disengage Drum Locking Pin:

When facing the handle, pull handle away from the outboard upright and pivot it to the right. Handle pivot capscrew will be in furthest position from drum flange.

Limit Switches

Limit switches are standard on **-CE** winches.

Pre-set limit switch settings prevent winch wire rope payout and haul-in by stopping air flow to the winch motor when a set point has been reached. It is the owner's and operator's responsibility to adjust winch operating limits prior to using the winch. To adjust the limit switch set points, refer to "[Limit Switches](#)," p. 14.

Inspection

Inspection information is based in part on American Society of Mechanical Engineers Safety Codes (ASME B30.7).

⚠ WARNING

!

- **All new or repaired equipment should be inspected and tested by Ingersoll Rand Trained Service Technicians to ensure safe operation at rated specifications before placing equipment in service.**
- **Never use a winch that inspection indicates is damaged.**

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or **Ingersoll Rand** Trained Inspectors and include observations made during routine equipment operation. Periodic inspections are thorough inspections conducted by **Ingersoll Rand** Trained Service Technicians or Qualified personnel. ASME B30.7 states inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage. Refer to 'Inspection Classifications' chart and 'Maintenance Intervals' chart for recommended maintenance intervals.

Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel to ensure corrective action is taken.

A determination as to whether a condition constitutes a safety hazard(s) must be decided, and the correction of noted safety hazard(s) accomplished and documented by written report before placing the equipment in service.

Wire Rope Reports

Records should be maintained as part of a long-term wire rope inspection program. Records should include the condition of wire rope removed from service. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of wire rope as determined by periodic inspections.

Maintenance Intervals

NOTICE

!

Perform an annual winch load test for all applications.

Table 9. Maintenance Intervals

The following work can be completed by owner maintenance personnel						
System Air Filter	Inspect system air filter every 30 days.					
Grease Fittings	Lubricate grease fittings every 90 days.					
Auto Band Brake	Check band brake adjustment every 90 days.					
It is recommended that the following work be completed by an Ingersoll Rand service technician or a Qualified Person						
Standard Components	1 year	2 years	3 years	4 years	5 years	10 years
Inspect Motor					X	X
Inspect Disc Brake					X	X
Inspect Gearbox					X	X
Replace Winch Anchor Bolts					X	X
Inspect Control Valve	X	X	X	X	X	X
Inspect Drum, Housings and Main Frames					X	X
Emergency Shut-Off Valve	X	X	X	X	X	X
Drum Shaft					X	X
Brake Shaft					X	X
Drive Shaft					X	X

Table 9. Maintenance Intervals (continued)

Limit Switches	X	X	X	X	X	X
Automatic/Manual Band Brake ^(a)	X	X	X	X	X	X

^(a) Do not disassemble Auto Band Brake Air Cylinder.

NOTICE



- **Annual Inspection and Load Test shall be performed by an Ingersoll Rand Trained Technicians unless directed otherwise by a * Qualified Person.**
- **Overhaul and Certification shall be done every Five years by an Ingersoll Rand Trained Technicians.**

* Qualified Person: A person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

Frequent or Daily Inspection

On equipment in regular service, daily inspections should be made by operators at the beginning of each shift. In addition, visual and audible inspections should be conducted during regular operation for indications of damage or evidence of malfunction (such as abnormal noises).

1. **Lubricator:** Adjust air line lubricator drops [ISO VG 46 (SAE 10W)] per minute to 3 to 9 during winch operation.
2. **Motor Oil Level:** Check motor oil level. Drain condensate and top off oil level.
3. **Surrounding Area:** Visually check for winch oil leaks. Do not operate winch if leaking oil is found. Ensure surrounding area has no slippery surfaces and is obstruction free.
4. **Mounting:** Visually inspect winch mounting bolts. Check bolts are tight, undamaged and free of corrosion.
5. **Hoses and Fittings:** Visually inspect for damage, air leaks and loose connections. Repair all leaks or damage and tighten loose connections prior to starting daily tasks.
6. **Muffler:** Visually check for restrictions or external damage. Clear restrictions or replace if damaged.
7. **Manual Shut-Off Valve:** Test shut-off valve to ensure proper operation and free movement.
8. **Guards:** Verify wire rope does not contact guard during winch operation and that guards are secure and undamaged.
9. **Winch:** Visually inspect winch housings, control(s), external brake, siderails and drum for damage. Check that all external bolts are in place and secure. Report damage to supervisor and request additional inspection by an Ingersoll Rand trained Service Technician.
10. **Winch Operation:** Power winch in both directions. Winch must operate smoothly without sticking, binding or abnormal noises and have minimal vibration.
11. **Pendant (optional feature):** Ensure operation of pendant levers is smooth and winch is responsive to pendant control. Pendant levers must spring return to the neutral position when released.
12. **Manual Throttle Lever:** Ensure operation of manual throttle lever is smooth and winch is responsive to lever movement. Lever must return to neutral and lock in place when released. If winch responds slowly or controls stick, do not operate winch until all problems have been corrected.
13. **Wire Rope:** Visually inspect all wire rope expected to be in use during the day's operations. Inspect for wear and damage indicated by distortion of wire rope such as kinking, "birdcaging," core protrusion, main strand displacement, corrosion, broken or cut strands. If damage is evident, do not operate winch until the discrepancies have been reviewed and inspected further by personnel knowledgeable on wire rope safety and maintenance procedures.

NOTICE



The full extent of wire rope wear cannot be determined by visual inspection. At any indication of wear, consult with local wire rope provider.

14. **Wire Rope Spooling:** Visually check reeving and ensure wire rope feeds on and off the drum smoothly. Verify spooling direction (overwind or underwind) is correct for winch and application.
15. **Brake(s):** Lift and lower the load a short distance to test brake(s). Brake(s) must hold load without slipping. Automatic brake must release when winch control throttle is operated. If brake(s) do not hold load or do not release properly, they must be adjusted or repaired.

⚠ WARNING



Worn or improperly functioning brakes may cause excessive heat buildup and sparks.

16. **Emergency Stop:** Standard on all CE winch models. Run winch and activate emergency stop. Winch operation must stop quickly. Ensure valve resets properly.
17. **Labels and Tags:** Check for presence and legibility of labels. Refer to Product Parts Information Manual for correct labels and placement. Replace if damaged or missing.

Periodic Inspection

Complete a 'Periodic Inspection' on a recurring basis to provide regular winch monitoring. In addition to the requirements of 'Daily Inspection' also inspect the following:

1. **Power Supply:**
 - a. Inlet air pressure to the winch is 90 psi (6.3 bar) at full throttle with nominal system usage.
 - b. Filter, regulator and lubricator are installed and functioning.
 - c. Air filter is clean, drain if necessary.
 - d. Air supply regulator is set to 90 psi (6.3 bar).
2. **Rigging:**
 - a. Correct size wire rope is being used.
 - b. Wire rope take-off angle is within design limits.
3. **Visual Integrity:**
 - a. All Components - Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates damage, contact **Ingersoll Rand** Service Technician to disassemble as required to conduct a detailed inspection.
 - b. No part of the winch has been welded onto.
 - c. Fasteners - Check external retainer rings, split pins, capscrews, nuts and other fasteners on winch, including mounting bolts.
 - d. Drum and Sheaves - Check for cracks, wear or damage.
 - e. Press Roller - Inspect rollers for wear and grooves. Ensure rollers freely rotate. Replace rollers if worn or grooved. Replace bearings if rotation is rough or stiff.
 - f. Slack Line Detector - Inspect rollers for wear and grooves. Ensure rollers freely rotate.
 - g. Ensure drum guard is capable of adequately guarding personnel.
 - h. No modifications have been performed on the winch.
 - i. Check motor, gearbox and disc brake for oil leakage.
4. **Labeling / Marking:**
 - a. Data (name) plate is attached and legible.
 - b. Warning tags and labels are attached, legible and in correct places on winch.
5. **Wire Rope Spooling:**
 - a. A minimum of 5 dead wraps remain on drum in fully paid-out position.
 - b. Proper freeboard is maintained at full haul-in position (minimum 1 inch (26 mm)).
 - c. Wire rope is properly lubricated.
6. **Operational Checks:**
 - a. Limit Switches - Operate winch in the haul-in direction until limit switch engages. Ensure winch stops running in haul-in direction, and operate in payout. Operate winch in payout direction until limit switch engages. Ensure winch stops operating in payout direction, and will operate in haul-in direction.

Winches Not in Regular Use

1. Equipment which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming to the requirements of "[Frequent or Daily Inspection](#)," p. 21 before being placed in service.
2. Equipment which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "[Periodic Inspection](#)," p. 22 before being placed in service.
3. Standby equipment shall be inspected at least semi-annually in accordance with the requirements of "[Periodic](#)

[Inspection,](#)” p. 22.

4. All oils must be drained and replaced with new, and all grease cavities shall be packed to the prescribed limit. Refer to [“Lubrication,”](#) p. 24. Product must be operated in both directions with well lubricated, dry air.

Storing the Winch

1. Always store the winch in a no load condition.
2. Wipe off all dirt and water.
3. To prevent rust buildup from internal condensation, open lubricator to allow more oil into winch and operate with no load. If winch is being stored from air source place small amount of 20 weight oil at air inlet port.
4. Oil the wire rope.
5. Place in a dry location.
6. **Mufflers and Breathers:** All mufflers and breathers must be removed and replaced with threaded plugs to prevent dust and moisture from entering motor and valve assemblies.
7. **Rotary Limit Switch:** Product equipped with a rotary limit switch must be stored with the limit switch not activated.
8. **Drum Brake:** Product equipped with a manual band brake must be stored with the brake in its disengaged position.
9. **Drum Lock:** Product equipped with a drum lock must be stored with drum locking pin in its disengaged position (ie, not inserted into outboard drum flange).
10. Before returning winch to service, follow instructions for [“Winches Not in Regular Use,”](#) p. 22.

Lubrication

To ensure continued satisfactory operation of winch, all points requiring lubrication must be serviced with correct lubricant at proper time interval as indicated for each assembly.

Refer to chart below for recommended lubrication intervals. Use only those lubricants recommended. Other lubricants may affect product performance. Approval for use of other lubricants must be obtained from **Ingersoll Rand** distributor. Failure to observe this precaution may result in damage to winch and/ or its associated components.

Table 10. Lubrication Intervals

Interval	Lubrication checks
Start of each shift	Check flow and level of air line lubricator (approximately 3 to 9 drops per minute required at maximum motor speed).
	Check oil levels in motor.
Every 30 Days	Inspect and clean or replace air line filter.
	Lubricate all grease fittings.
	Check oil level in disc brake/reducer.
Every 90 Days	Drain and replace oil in motor/disc brake.
Yearly	Drain and refill oil in reducer.

General Lubrication

Correct lubrication is one of the most important factors in maintaining efficient winch operation.

1. The recommended grade of oil must be used at all times. Use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to lubricated components. Refer to ["Recommended Lubricants,"](#) below.
2. The first oil change to be done after approximately 50 hours of initial operation. Always inspect removed oil for evidence of internal damage (metal shavings, dirt, water, etc.). Thereafter, drain and replace oil according to [Table 10, p. 24.](#)
3. Always inspect removed oil for evidence of internal damage or contamination (metal shavings, dirt, water, etc.). If indications of damage are noted, investigate and correct before returning winch to service.
4. After winch operation, allow oil to settle before topping off.
5. Always collect lubricants in suitable containers and dispose of in an environmentally safe manner.

⚠ WARNING

!

Pneumatic Winches use oil to prevent excessive heat build up and to prevent wear that could cause sparks. Oil levels must be properly maintained.

Recommended Lubricants

Table 11. Synthetic Lubricants for the Reduction Gear and Disc Brake

Ambient Temperature	0° C/ +20° C	+20° C +40° C
SHELL	TIVELA S150	TIVELA S220
AGIP	BLASIA S150	BLASIA S220
ESSO	GLYCOLUBE 150	GLYCOLUBE 220
IP	PONTIAX HDS	PONTIAX HDS
KLUBER	SYNTHESO D150 EP	SYNTHESO D220 EP
MOBIL	SHC 629	SHC 630
BP-MACH	—	ERNESYN HTX 220

Table 12. Air Motor Recommended Lubricants

Temperature	Type Oil
Below 32° F (0° C)	ISO VG 32 (SAE 10W)
32° to 80° F (0° to 27° C)	ISO VG 68 (SAE 20W) ^(a)
Above 80° F (27° C)	ISO VG 100 (SAE 30W)

^(a) Units are shipped from factory with ISO VG 68 (SAE 20W) lubricant.

Table 13. Recommended Grease

Temperature	Type Oil
-20° to 50° F (-30° to 10° C)	EP 1 multipurpose lithium based grease
30° to 120° F (-1° to 49° C)	EP 2 multipurpose lithium based grease

Motor

Refer to [Figure 9, p. 28](#).

⚠ CAUTION

!

Do not use synthetic or detergent lubricants in air motor. Synthetic lubricants will result in oil blowing by piston rings.

The oil level in the motor should be checked daily or at the start of each shift after accumulated water has been drained off.

Correct lubrication is one of the most important factors in maintaining efficient winch operation. The motor is splash lubricated by the oil in the motor housing and has no other means of lubrication. It is therefore important to use only high quality, Extreme Pressure (EP) rust and oxidation inhibiting gear oils or non-detergent motor oils to ensure maximum performance and minimum downtime for repairs.

Add oil through filler opening until oil flows from level plug hole. Add oil slowly to prevent spilling. Refer to [Table 14, p. 25](#). Allow oil to settle before topping off.

When motors are operated in temperatures below freezing, wait long enough at end of shift for water to separate from oil but not long enough for it to freeze. Failure to drain the water when the winch is to remain idle for a protracted period at low temperatures may result in the oil splasher freezing fast. Drain the water then refill to the level plug. If desired, all the oil may be drained at the end of the shift and the motor refilled with new oil.

Table 14. Motor Oil Capacity

Quartz	Litres
2.4	2.3

Reduction Gear and Disc Brake Lubrication

⚠ CAUTION

!

- **Do not over fill. Excess oil will reduce operating efficiency and increase oil temperature.**
- **Only use synthetic oil in reduction gear and disc brake.**

The reduction gear and disc brake are filled with oil from the factory. Check oil level before initial winch operation. Reduction gear and disc brake components are splash lubricated by oil in the housings and have no other means of lubrication. It is therefore important to use high quality, Extreme Pressure (EP) rust and oxidation inhibited gear oils to ensure maximum performance and minimum downtime for repairs.

Table 15. Reduction Gear and Disc Brake capacities

Models	Reducer		Disc Brake	
	qt	litres	oz	ml
FA2.5i	1.6	1.5	4	118
FA5i	4.4	4.2	4	118

Disc Brake

⚠ CAUTION

!

Do not lubricate disc brake with grease. The breather plug on top of the brake housing must not be used as a grease fitting.

Refer to [Figure 10, p. 28](#). The friction plates and drive plates are in a self contained oil bath and have no other means lubrication. After an oil change or winch overhaul remove the breather plug and pour a small amount of oil [4 to 6 ounces (0.2 litres)] through breather hole in brake housing. Allow oil to fully settle between fillings.

NOTICE

!

If too much oil is added excess oil will be discharged through breather plug when control valve is actuated.

Drum Locking Pin

Lubricate at least once every month, depending on environment and duty cycle, through grease fitting located in housing with 2 or 3 pumps of a grease gun. Refer to ["Recommended Lubricants," p. 24](#). Use sufficient grease to provide a good protective coat.

Lubrication will help to prevent rust and allow easier locking pin operation.

Wire Rope

Follow the wire rope manufacturers' instructions. At a minimum, observe the following guidelines.

1. Clean with a brush or steam to remove dirt, rock dust or other foreign material on the surface of the wire rope.

⚠ CAUTION

!

Do not use an acid-based solvent. Only use cleaning fluids specified by the wire rope manufacturer.

2. Apply a wire rope lubricant.
3. Brush, drip or spray lubricant weekly, or more frequently, depending on severity of service.

Product Information Graphics

Figure 4. MHP0191

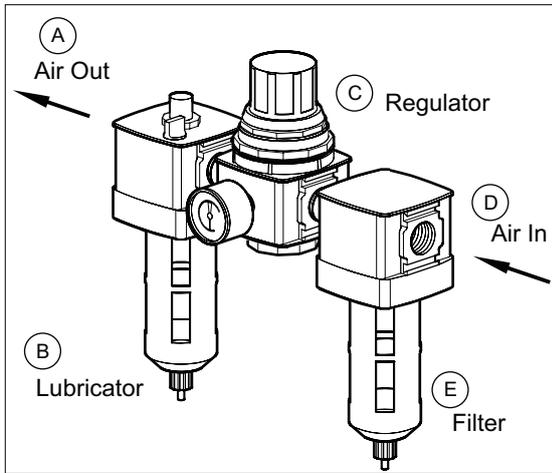


Figure 5. MHP2686

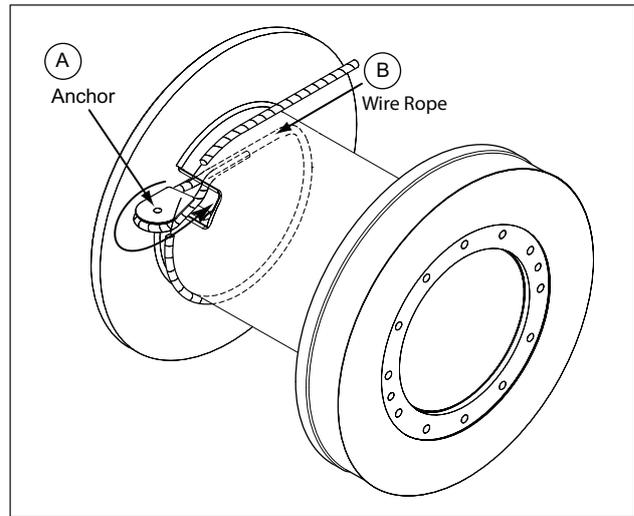


Figure 6. MHP1809

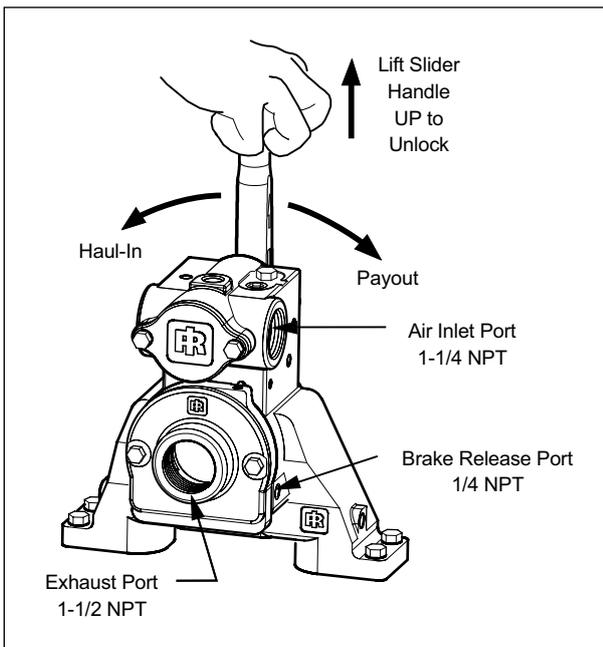


Figure 7. MHP2619

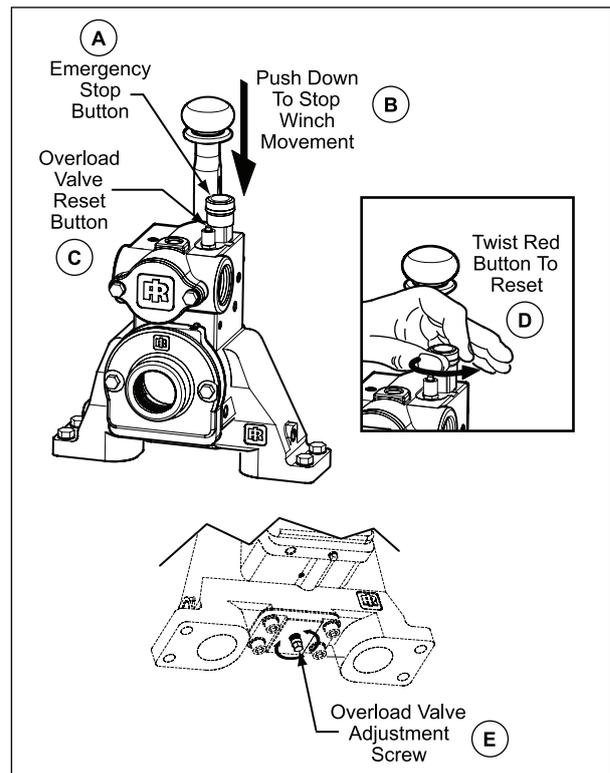


Figure 8. MHP0140

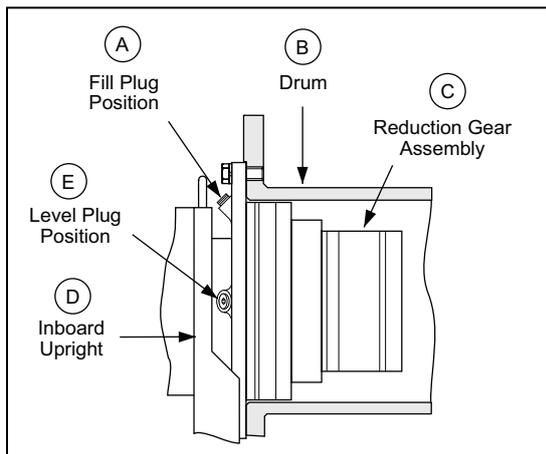


Figure 9. MHP2126

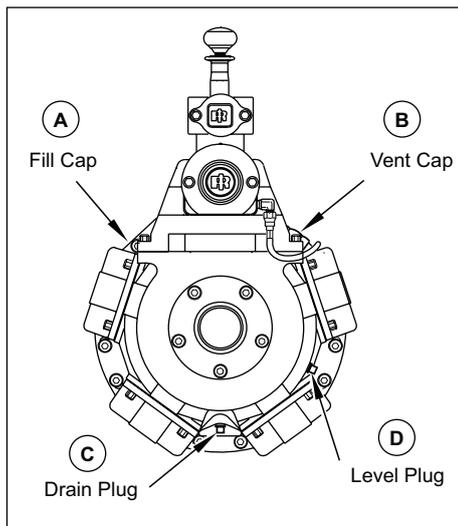


Figure 10. MHP1348

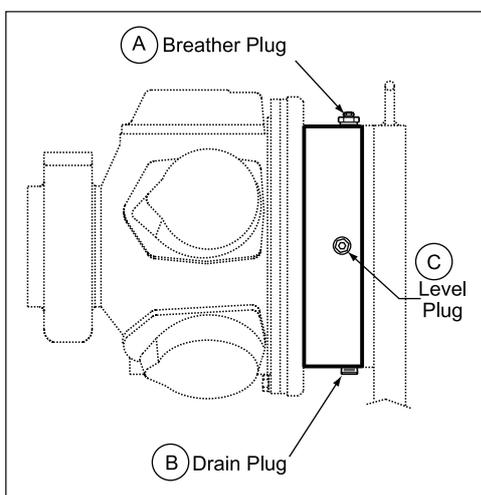


Figure 11. MHP1176

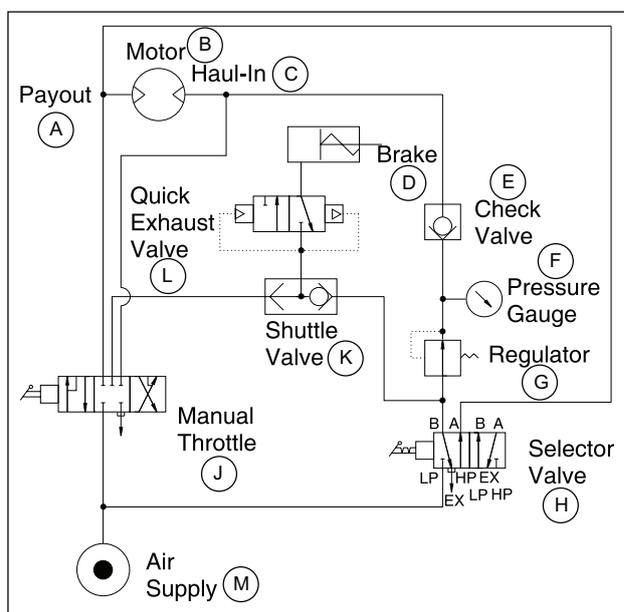


Figure 12. MHP2043

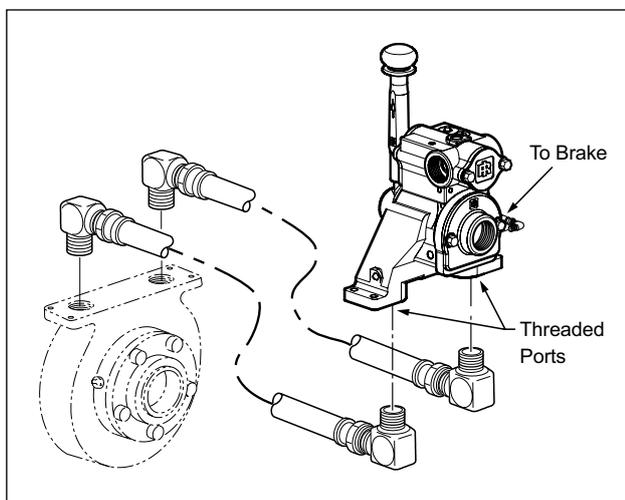


Figure 13. MHP2688

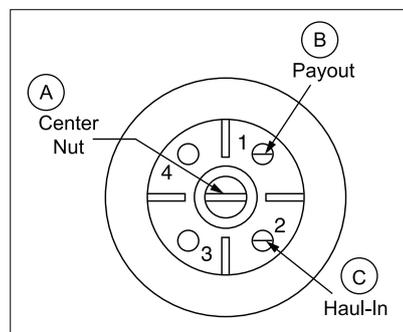


Figure 14. MHP2398

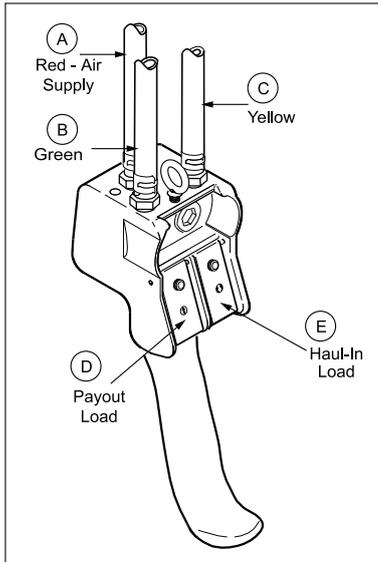


Figure 15. MHP1892

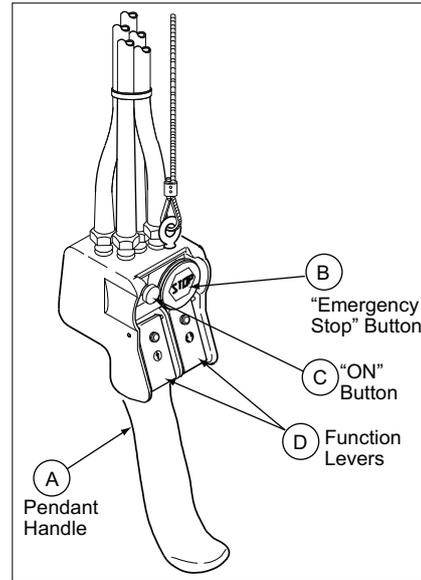
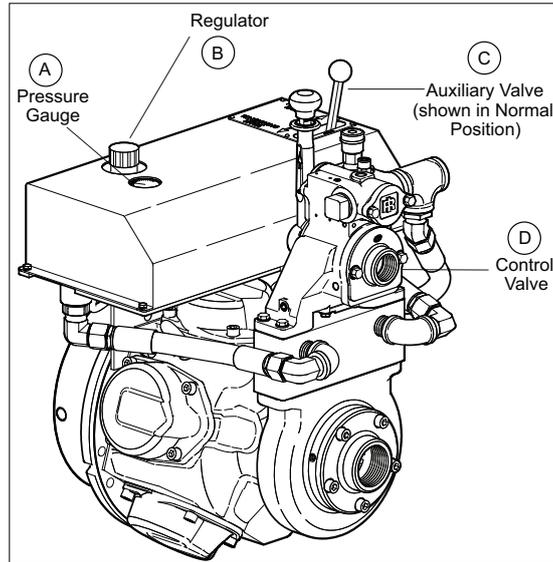


Figure 16. MHP1865



CE