IR electric winches and car pullers offer maximum performance and reliability.

n Standard features:

- Totally enclosed fan cooled (TEFC) motors are high torque design, Nema "B" class with an average of 280 percent starting torque. Rated for continuous duty.
- Winches utilize an automatic disc brake rated at 200% motor torque
- Structural steel frames allow flexibility in installation
- Car pullers have a lever operated, jaw clutch that allows for:
  - – disengagement of the drum for free spooling of wire rope
  - – bi-directional rail car pulling
- Car pullers have an adjustable drag brake to control drum spinning and cable over-run during free spooling operation

n Options:

- Available in single or three phase motors (single phase through 3hp only)
- IEEE 45 marine grade motor (three phase only) and gear box available (specify by adding ***M*** to model; see ***How to Order*** information)
  - – Three phase marine grade winch motors have a corrosion-resistant coating on motor windings to prevent corrosion due to condensation
  - – Marine grade gear-boxes incorporate bronze filters and breather cover caps
- Longer or shorter drum sizes
- Drum divider flange and extra cable anchors
- Grooved drums

6000B20
Electric Winch

- Control packages consisting of:
  - – NEMA 4 magnetic reversing starters (single and three phase)
  - – NEMA 4 wall-mount pushbutton stations
  - – NEMA 3R or NEMA 4 hand-held pushbutton pendents
  - – NEMA 1 or NEMA 4 reversing drum switches (through 2hp only)
- Sandblast/carbozinc primer with a Marine 812 finish
- Heaters (in motor windings)
- Limit switch; 2 position; upper and lower; NEMA 4 class enclosure
- Adjustable torque limiting clutch
- Disengaging clutch
- Horizontal Load Reversing (HLR) designs for load movement in two directions. Includes grooved drum, two wire rope anchors and a drum length to spool all wire rope on the first layer
- Explosion-proof components
- Design and manufacturing expertise for special applications

Specifications

Model single/ three phase	Rated capacity at 2nd layer(1)		Appx line spd/min			Starting line pull				Running line pull				Rec'd wire rope		Drum capacity(2)				Shipping weight	
						1st layer		4th layer		1st layer		4th layer				2nd layer		full drum			
	lbs	kg	ft	m	hp	lbs	kg	lbs	kg	lbs	kg	lbs	kg	in.	mm	ft	m	ft	m	lbs	kg
200A40/B40	200	91	40	12.2	1/3	550	280	438	199	220	100	175	80	1/4	6	81	25	288	88	160	73
250A40/B40	250	114	20	6.1	1/4	688	313	538	245	275	125	215	98	1/4	6	81	25	288	88	160	73
500A20/B20	500	227	20	6.1	1/2	1375	625	1075	489	550	250	430	195	1/4	6	81	25	288	88	160	72
500A40/B40	500	227	40	12.2	3/4	1375	625	1075	489	550	250	430	195	1/4	6	81	25	288	88	160	72
700A40/B40	700	318	40	12.2	1	1938	881	1525	693	775	352	610	277	1/4	6	81	25	288	88	150	68
800A20/B20	800	364	20	6.1	2	2200	1000	1750	795	880	400	700	318	1/4	6	81	25	288	88	190	86
1300A20*/B20*(3)	1300	591	20	6.1	1	3240	1473	2550	1159	1410	641	1110	505	5/16	8	120	37	605	184	370	168
1400A40*/B40*(3)	1400	636	40	12.2	2	3540	1609	2780	1264	1540	700	1210	550	5/16	8	120	37	605	184	370	168
1600B90	1600	727	90	27.4	5	4400	2000	3350	1523	1760	800	1340	609	3/8	10	105	32	460	140	625	283
2000A20*/B20*(3)	2000	909	20	6.1	1 1/2	4950	2250	3750	1705	2150	977	1675	761	3/8	10	105	32	460	140	375	170
2000A40*/B40*(3)	2000	909	40	12.2	3	4970	2259	3770	1714	2160	982	1675	761	3/8	10	105	32	460	140	445	202
2000B60	2000	909	60	19.3	5	5400	2455	4175	1898	2160	982	1670	759	3/8	10	105	32	460	140	575	261
3000B40*(3)	3000	1364	40	12.2	5	7600	3455	5900	2682	3300	1500	2560	1164	7/16	12	119	36	422	129	575	261
3500B80	3500	1591	80	24.4	12	9450	4295	7450	3386	3780	1718	2980	1355	7/16	12	125	38	875	267	690	313
4000A20*/B20*(3)	4000	1818	20	6.1	3	9700	4409	7270	3305	4220	1918	3160	1436	1/2	13	107	33	309	94	525	239
4500B50*(3)	4500	2045	50	15.2	7 1/2	11200	5091	8450	3841	4840	2200	3680	1673	1/2	13	107	33	309	94	630	286
6000B20*(3)	6000	2727	20	6.1	5	15400	7000	11600	5273	6700	3045	5040	2291	5/8	16	146	45	422	129	930	422
6000B40*(3)	6000	2727	40	12.2	7 1/2	17200	7818	12950	5886	7480	3400	5630	2559	5/8	16	146	45	422	129	950	431
10000B20*	10000	4545	20	6.1	7 1/2	29670	13486	22200	10091	12900	5864	9650	4386	3/4	19	146	45	323	98	1525	692
10000B40*(3)	10000	4545	40	12.2	15	27150	12341	20350	9250	11800	5364	8850	4023	3/4	19	146	45	323	98	1740	789
15000B20*(3)	15000	6818	20	6.1	12	37500	17045	30000	13636	17200	7818	13000	5909	1	25	230	70	600	183	2750	1247
25000B25*(3)	25000	11363	25	7.6	20	62800	28545	48300	21955	27300	12409	21000	9545	1 1/4	32	240	73	860	262	3550	1614

*Chain drive from motor drum. Design factor 6:1 or more on chain at rated line pulls.

(1) Capacities rated at specified voltage with single line on second layer on drum, providing 5:1 design factor. Starting line pulls for reference only.

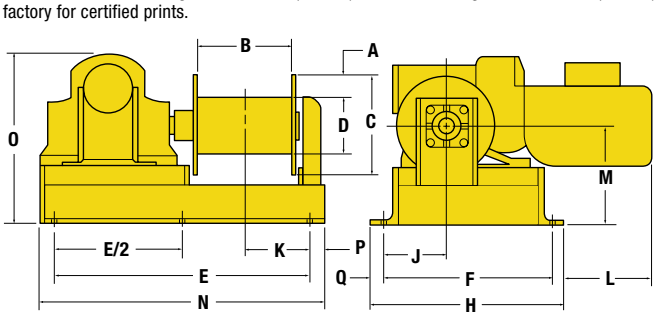
(2) Drum capacities shown represent tightly spooled wire rope. Recommended drum working capacity is 80% of value shown.

(3) Also available as car puller models. Add ***CP*** to model number when ordering. Example: ***CP1300B20***

Dimensions

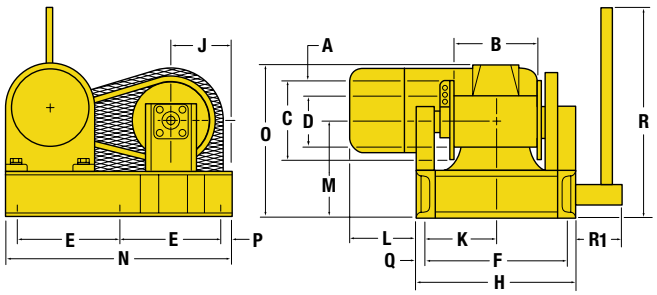
Model		Dimensions in inches																
Single	Three phase	A	B	C	D	E	F	H	J	K	L	M	N	O	P	Q	R	R_1
200A40	200B40	1.75	8	8	4.50	18	13.50	15.50	6	5.75	7.50	7.50	20	13.63	1	1	-	-
250A20	250B20	1.75	8	8	4.50	8	13.50	15.50	6	5.75	7.50	7.50	20	13.63	1	1	-	-
500A20	500B20	1.75	8	8	4.50	18	13.50	15.50	6	5.75	9.31	7.50	20	14.63	1	1	-	-
500A40	500B40	1.75	8	8	4.50	18	13.50	15.50	6	5.75	9.31	7.50	20	14.63	1	1	-	-
700A40	700B40	1.75	8	8	4.50	18	13.50	15.50	6	5.75	9.31	7.50	20	14.63	1	1	-	-
800A20	800B20	1.75	8	8	4.50	18	13.50	15.50	6	5.75	9.31	7.50	20	14.63	1	1	-	-
1300A20	1300B20	2.69	12	12	6.63	12.63	18.50	20	8	9	5	9.50	27.25	16.75	1	0.75	44	2.50
1400A40	1400B40	2.69	12	12	6.63	12.63	18.50	20	8	9	8	9.50	27.25	16.75	1	0.75	44	2.50
	1600B90	2.69	12	12	6.63	28	18	20	7	8.13	15.81	9.13	30	17.25	1	1	-	-
2000A20	2000B20	2.69	12	12	6.63	12.63	18.50	20	8	9	6.25	9.50	27.25	16.75	1	0.75	44	2.50
2000A40	2000B40	2.69	12	12	6.63	12.63	18.50	20	8	9	6.25	9.50	27.25	16.75	1	0.75	44	2.50
	2000B60	2.69	12	12	6.63	28	18	20	7	8.13	15.81	9.13	30	17.25	1	1	-	-
	3000B40	2.69	12	14	8.63	15.50	20	21.50	9	9.50	9.50	12.50	33	20.25	1	0.75	51	4
	3500B80	4.69	12.75	18	8.63	32	20	22	10	8.19	30.81	13.50	34.50	20.25	1	1	-	-
4000A20	4000B20	2.69	12	14	8.63	15.50	20	21.50	9	9.50	9½	12.50	33	23.81	1	0.75	51	4
	4500B50	2.69	12	14	8.63	15.50	20	21.50	9	9.50	14	12.50	33	21.38	1	0.75	51	4
	6000B20	3.63	16	18	10.75	18	25	27.25	11.50	12	8.50	13.50	38	25.50	1	1.13	58	6
	6000B40	3.63	16	18	10.75	18	25	27.25	11.50	12	11.63	13.50	38	22.75	1	1.13	58	6
	10000B20	3.63	16	20	12.75	22.50	28	31	12.63	13.19	8.88	14.75	47	28.25	1	1.50	58	6
	10000B40	3.63	16	20	12.75	22.50	28	31	12.63	13.19	11	14.75	47	26.25	1	1.50	58	6
	15000B20	6	24	30	18	3 at 18	34	37	19.88	15.06	7.25	20	60.75	39	1.88	1.50	58	6
	25000B25	8	24	40	24	4 at 17	37	40	22	15.50	15.75	26.25	72	48.25	2	1.50	58	6
		Dimensions in millimeters																
200A40	200B40	1118	203	203	114	457	343	394	152	146	191	191	508	346	635	635	-	-
250A20	250B20	1118	203	203	114	203	343	394	152	146	191	191	508	346	635	635	-	-
500A20	500B20	1118	203	203	114	457	343	394	152	146	237	191	508	371	635	635	-	-
500A40	500B40	1118	203	203	114	457	343	394	152	146	237	191	508	371	635	635	-	-
700A40	700B40	1118	203	203	114	457	343	394	152	146	237	191	508	371	635	635	-	-
800A20	800B20	1118	203	203	114	457	343	394	152	146	237	191	508	371	635	635	-	-
1300A20	1300B20	68	305	305	168	321	470	508	203	229	127	241	692	425	635	19	1118	64
1400A40	1400B40	68	305	305	168	321	470	508	203	229	203	241	692	425	635	19	1118	64
	1600B90	68	305	305	168	711	457	508	178	206	402	232	762	438	635	635	-	-
2000A20	2000B20	68	305	305	168	321	470	508	203	229	159	241	692	425	635	19	1118	64
2000A40	2000B40	68	305	305	168	321	470	508	203	229	159	241	692	425	635	19	1118	64
	2000B60	68	305	305	168	711	457	508	178	206	402	232	762	438	635	635	-	-
	3000B40	68	305	356	219	394	508	546	229	241	241	318	838	514	635	19	1295	102
	3500B80	119	324	457	219	813	508	559	254	208	783	343	876	514	635	635	-	-
4000A20	4000B20	68	305	356	219	394	508	546	229	241	241	318	838	605	635	19	1295	102
	4500B50	68	305	356	219	394	508	546	229	241	356	318	838	543	635	19	1295	102
	6000B20	92	406	457	273	457	635	692	292	305	216	343	965	648	635	29	1473	152
	6000B40	92	406	457	273	457	635	546	292	305	295	343	965	578	635	29	1473	152
	10000B20	92	406	508	324	572	711	787	321	335	225	375	1194	718	635	38	1473	152
	10000B40	92	406	508	324	572	711	787	321	335	279	375	1194	667	635	38	1473	152
	15000B20	152	610	762	457	3 at 457	864	940	505	383	184	508	1543	991	48	38	1473	152
	25000B25	203	610	1016	610	4 at 432	940	1016	559	394	400	667	1829	1226	1295	38	1473	152

Bolt sizes: 200A40 through 800B20: ½" (13 mm); 1300A20 through 4500B50: ⅝" (16 mm); 6000B20 through 25000B25: ¾" (19 mm). Dimensions are subject to change. Contact factory for certified prints.



Direct drive model *– for model numbers 200A40/B40, 250A40/B40, 500A20/B20, 500A40/B40, 700A40/B40, 800A40/B40, 1600B90, 2000B60, and 3500B80*

Dimensions are subject to change. Contact factory for certified prints



Chain drive from motor drum; *design factor 6:1 or more – for model mumbers 1300A20/B20, 1400A40/B40, 2000A20/B20, 2000A40/B40, 3000B40, 4000A20/B20,4500B50, 6000B20, 6000B40, 10000B20, 10000B40, 15000B20, and 25000B25*

Winch options	Code	Description
Drum divider	***D***	One steel flange is welded to the center of the drum. Includes second cable anchor. Standard is based on right lay rope for overwound rotation.
Grooved drum	***G***	Standard drum lengths only. Grooving is left hand spiral for overwind rope take-off. Recommended rope is right lay. Engineering review is required for units specified with longer drums and/or divider flanges.
Heater in motor	***H***	Recommended for extreme high or low temperature conditions, to eliminate condensation in the motor enclosure.
Marine duty	***M***	Marine duty motor and gearboxes. Marine duty 3 phase electric winches are designed to meet the Institute of Electrical and Electronic Engineers (IEEE) specification number 45 for shipboard severe duty and washdown environments. To meet the requirements of such harsh operating conditions, all marine duty motors are built with cast iron end shields and special stators constructed of “Silafront-13,” an aluminum-silicon alloy resistant to corrosive elements. All motor windings are treated with “Polane,” a unique polyurethane coating which prevents corrosion due to condensation. Marine duty winch motors also incorporate class “F” electrical insulation and have a 1.15 service factor capable of delivering, if needed, 115% of the motor’s rated horsepower during the entire duty cycle of that motor. Should the user so desire, each marine duty winch motor can be furnished with a ⅛" NPT drain plug rather than the standard ⅛" drain hole to prevent water damage should the motor be submerged. ***This special option must be requested at the time of order.*** All marine duty 3 phase winches are supplied with gearboxes that incorporate protected breathers to equalize gearbox pressure without the risk of exposure to corrosive elements. ***Marine grade motor features apply to 3 phase motors only. Single phase motor manufacturers’ interpretation of marine grade requirements vary. Therefore, motor features may vary. Please advise single phase motor requirements before ordering.***
Marine 812 finish	***P***	An excellent corrosion, chemical, and abrasive resistant alkyd enamel finish over a rust inhibitive primer.
Rotary limit switch	***S***	Rotary switch counts drum revolutions. Different ratios are available depending on actual rope travel. Specify rope travel distance between upper and lower limits so we may select the proper ratio. Please understand that rope spooling and rope stretch must be taken into account and final adjustments will be necessary.
Torque limiter	***T***	Adjustable clutch acts to limit pull by slipping when load exceeds setting. Mounted on the outboard side of drum.
Sandblast/carbozinc	***Z***	The best corrosion resistant primer available. Sandblast to “white” metal followed by an inorganic zinc primer. Marine 812 finish ***(P)*** recommended. Note: motors are chemically cleaned, not sandblasted.

How to Order Classic Electric Winches and Car Puller Models

Specify complete model code as shown below. Electric winches and car pullers exclude winch control and starter options.

Control options: A control package consists of magnetic reversing starter and controls. Starter and control options may be ordered in two ways:

1. When specified in the model code, starters and controls will be mounted on the winch and tested. Installation charge additional.
2. By specifying part numbers, controls may be ordered separately for customer installation by a qualified electrician. Starter and control option packages consist of the following items:

   A. Magnetic reversing starter, sized according to winch hp and voltage. Magnetic reversing starters with internal 110 volt control transformer are now standard. These starters are available in single and three phase models and are intended for use with either two motion control stations or pendents used in remote control applications.

   B. Remote pendent or wall mount pushbutton control (requires the use of a magnetic reversing starter)

   C. Reversing drum switch to be used when winch power supply is:

   Single phase: 115 volt to 1.5 hp, 230 volt to 2 hp. Three phase: 230/460 volt to 2 hp.

   To use a reversing drum switch, a magnetic reversing starter is not required. Drum switches should only be mounted directly to the winch itself. Drum switches when used in this manner have a control voltage equal to the operating voltage of the winch. Drum switches are intended for mounting on the unit itself and must have their enclosures grounded to the electrical system ground.

Example: ***CP2000B40M2-12-8G-M4P3-50***

Series	Line pull (1) 2nd layer (lbs)	Phase (2)	Speed (fpm)	Motor type	Voltage	-	Drum length (in.)	-	Wire rope size	Winch options	-	Starter options	Control options
CP	2000	B	40	M	2	-	12	-	8	G	-	M4	P3-50

CP = Carpuller model prefix

A = Single phase
B = Three phase

(-) = Std. **T**otally **E**nclosed **F**an **C**ooled
M = Marine (three phase only) grade motor and gearbox

1 = 115-1-60
2 = 230-1-60, 230-3-60
3 = 380-3-50
4 = 460-3-60
5 = 575-3-60
6 = 208-3-60
7 = 415-3-50

Wire rope in sixteenths (e.g. 8/16 = ½ inch)

D = Drum divider flange
G = Grooved drum
H = Heater in motor
P = Marine 812 finish
Q = Special paint; please specify
R = Press roller
S = Rotary limit switch
T = Torque limiter clutch
Y = Electronic overload*
Z = Sandblast/carbozinc primer

* Requires the purchase of a magnetic reversing starter (see control options)

M4 = Mag. rev. starter NEMA 4

D1 = Drum switch NEMA 1
D4 = Drum switch NEMA 4
P3-XX = Pushbutton pendent NEMA 3R
P4-XX = Pushbutton pendent NEMA 4
W4 (3) = Wall mount pushbutton station NEMA 4
XX = Specify hand held pendent control cord (ft)

Drum extensions (see dim. B on previous page) **Drum width in. (mm)**

Model	8 (203)	12 (305)	16 (406)	20 (508)	24 (610)	30 (762)	36 (915)	42 (1067)
200 – 800	Standard	yes	yes	yes	no	no	no	no
1300 – 4500	no	Standard	yes	yes	yes	no	no	no
6000 – 10000	no	no	Standard	yes	yes	yes	no	no
15000 – 25000	no	no	no	no	Standard	yes	yes	yes

Drum extensions over standard require engineering approval to confirm design acceptability. For delivery on units with non-standard drum lengths please contact Customer Service.

(1) Please refer to specification chart for line pull information.
(2) Please specify voltages when ordering "A" models 115/230-1-60; "B" models 230/460-3-60, and for 380-3-50, 415-3-50 and 575-3-60.
(3) Wall mount pushbutton controls will be shipped loose for customer installation. The National Electrical Code requires wall mount control stations to be installed with conduit enclosed wiring.

Winch and Hoist Solutions

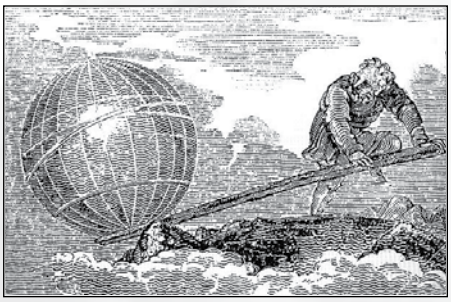
Fulcrum Winches

www.ingersollrandproducts.com/lifting

Ingersoll Rand®

Fulcrum Winch Series

5300 to 45600 lb (2409 to 20727 kg) capacity



Around 450 B.C. the Greek mathematician Archimedes declared, "Give me a fulcrum on which to rest, and I will move the earth." Archimedes had created the fulcrum as a tool, a way to gain leverage, and to make it easier for people to accomplish a task. The goal of the new FULCRUM Winch Series is to accomplish the same thing—provide the simplest, most cost-effective and efficient solution to your application.

We surveyed a variety of professionals actively operating, installing, and inspecting winches as to which features they'd like to see as part of a new winch line. This diverse group of riggers, end users, and regulatory officials responded back with their requirements: Safety, Versatility, Reliability, Simplicity, and Availability—all at a reasonable price!

Ingersoll-Rand has taken on the challenge with over 80 years of electric winch manufacturing experience, creating a tool (much like Archimedes) to make your work simpler and easier…The Fulcrum winch series.

The Fulcrum Leverage…

Safety

Instill security and confidence with winches that are built to meet or exceed American National Standard Institute/American Society of Mechanical Engineers (ANSI/ASME) specification B30.7 featuring two dedicated models:

- EL Series for lifting applications with an 18:1 *D/d* ratio
- EP Series for pulling applications with a 15:1 *D/d* ratio
- Plus a **5:1 Design Factor** on every Fulcrum model

Versatility

With a wide variety of options the Fulcrum allows you to "customize" a winch to meet your specific needs including:

- 5300 lbs. to 45600 lbs. capacity range
- 69 standard line pull / line speed configurations
- All world wide voltages
- Variable mounting configurations (inverted, side, etc.)
- Underwound or overwound cable take-offs
- 30+ standard options
- Air, Hydraulic and Man Rider™ models available on request
- Engineering support and design modifications available

Reliability

Reduce down time and maintenance costs with motors rated for continuous duty operation and gearboxes that are fully sealed to exclude harmful contaminants. The Fulcrum's planetary type gear reducer is 95% efficient, thereby decreasing the harmful friction and heat build-up so common in helical and worm style gearboxes. These same gear reducers have proven their durability with years of usage in the harsh environment of the offshore oil industry. We're so confident in the Fulcrum's design it comes with a ***full two-year warranty***, one of the longest available in the industry today!

Simplicity of design

- A completely enclosed gearbox and fan-cooled motor, with a self-adjusting brake coupled directly to the drum, provide a straightforward rugged assembly which is simple to operate and maintain.

Simplicity of product offering

- Our survey concluded that confusion between different ratings, different design factors, and radically different pricing is common when comparing various manufacturer's winches. Simply put, the Fulcrum utility winch is available in two versions.

Fulcrum Model	Line pull rated at layer	Winch design factor	*D/d* ratio	Built to meet or exceed
Pulling (EP)	1st	5:1	15:1	ANSI/ASME B30.7
Lifting (EL)	1st	5:1	18:1	ANSI/ASME B30.7

(1) based on the recommended wire rope for each winch

Availability

With locally stocked components, state of the art manufacturing systems, and a winch designed for easy assembly we've drastically reduced the long lead-time factors from our delivery equation. The Fulcrum winch series is ready to meet the customer's "need it now" expectations. Tell us where you want it, when it has to be there, and let us do the rest…

Pricing

Dollar for dollar the Fulcrum series is priced to provide value not only at the time of purchase, but over the entire lifetime of the winch. It is built to the highest industry standards with quality components, and a 5:1 design factor, resulting in a winch that continues to provide savings through reduced operating and maintenance costs year after year.

The Fulcrum Leverage...

Optional Free-Spooling Drum Clutch
Totally enclosed to eliminate pinch points, the oil bath lubricated, clutch module allows the drum to free-spool. Unique design applies slight resistance on drum to prevent over-running and birdnesting of the cable.

Integral Lifting Eyes
Preformed lifting points are provided on all units to facilitate transport and installation of the winch.

Planetary Gear Boxes
Fully sealed to exclude harmful contaminants. The Fulcrum's planetary type gear reducer is 95% efficient and features constant oil bath lubrication.

Right Angle Drive Gear Reducer
Provides a multitude of mounting configurations by "clocking" the reducer around its mounting flange. The winch can be deck, wall, or ceiling (inverted) mounted.

Regreasable Roller Bearings
All external bearings have readily accessible grease zerks for ease of maintenance.

Cable Anchor
Versatile design accepts multiple wire rope sizes and allows the cable to be spooled from the bottom (underwound) or top (overwound) of the drum.

Manual Brake Release Handle
for lowering of loads in the event of power loss

Standard High Torque Continuous Duty Motors
Totally enclosed, fan cooled (TEFC) motors are squirrel cage design, with heavy duty insulation for extended operations in high cycle applications. Available in all worldwide 3 phase voltages.

Drum Diameter Designed to Meet ANSI/ASME B30.7
Large drum diameter enhances spooling and reduces wear on wire rope. 15:1 D/d ratio (EP) pulling models, 18:1 D/d ratio on (EL) lifting models. (D/d = Diameter of the wire rope compared to diameter of drum expressed as a ratio. Lower the ratio the more a rope is forced to bend to wrap around the drum).

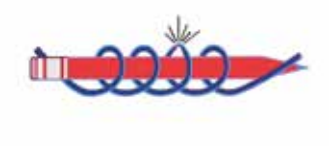
Fulcrum FAQs

Q: What is the basis of the Fulcrum design?
A: The Fulcrum is a modular design which allows it to be easily modified to provide the most efficient solution for a given application. A planetary gearbox with a wide range of ratios coupled with a universal motor adaptor allows us to mix and match components to provide line pulls and speeds to meet a client's requirements. From feet per minute to inches per hour, the Fulcrum is able to provide the solutions you require.

Q: What specification is the Fulcrum designed to?
A: Each Fulcrum is designed to meet or exceed ANSI/ASME B30.7 BASE MOUNTED DRUM HOISTS. Since B30.7 does not specifically address what a unit's design factor should be, and because these units could be used for lifting, Ingersoll-Rand has opted for a higher design factor of 5:1 on all models to maximize safety and reliability. This ratio is derived from ANSI/ASME B30.16 OVERHEAD HOISTS (UNDERHUNG) which requires a 5:1 (minimum) design factor for all load bearing components used in a hoisting application.

Q: Why is there one winch for lifting and one for pulling?
A: Two reasons: First, the Fulcrum is built to ANSI/ASME B30.7 which recommends a minimum winch *D*rum diameter to wire rope *d*iameter ratio (*D/d* ratio) of 18:1 for lifting and 15:1 for pulling. This requirement drives the need for two different winch models. Second, the drum diameter affects the amount of torque a winch can provide, so as the diameter increases the line pull decreases slightly (due to "torque arm effect") which results in different rating by model.

Q: What is this D/d ratio?
A: The relationship between the wire rope *d*iameter as it's bent around the *D*rum's diameter is expressed as a (*D/d*) ratio. The smaller the ratio the sharper the bend a wire rope must make as it spools onto a drum. Imagine how a garden hose (small "*d*") would bend and kink if you wrapped it around the small diameter of a pencil (big "*D*").



Q: Why is the D/d ratio so important?
A: Using a smaller than recommended *D/d* ratio aggravates the bending motion thereby causing fatigue, irregular wear and accelerated deterioration of wire rope. Increased wear usually results in more frequent inspections and/or wire rope replacement so as to avoid unexpected failures. For this reason Ingersoll-Rand (and most wire rope manufacturers) conform to ANSI/ASME B30.7 which recommends a minimum of 15:1 (*D/d*) ratio for pulling and hauling applications and a minimum of 18:1 (*D/d*) ratio for lifting and lowering applications.

To calculate the *D/d* ratio: Add the drum barrel diameter to the diameter of the wire rope you want to use. Then divide the result by the diameter of the wire rope.

Example: When using .5" wire rope on a 10.75" drum barrel.
10.75" + .5" = 11.25". 11.25 divided by .5 = 22.5:1 *D/d* ratio. This meets both the 15:1 minimum for pulling and the 18:1 for lifting applications.

Q: Why would anyone build a winch that doesn't have the correct D/d ratio or meets ANSI/ASME recommendations?
A: With all inputs being equal, the smaller the drum diameter the greater the load a winch can lift or pull. This is due to the "torque arm" effect. By using a smaller diameter drum, a winch is capable of pulling much greater loads using a lower horsepower motor and less costly gearbox. While this design philosophy provides a cheaper winch, hidden costs such as reduced safety factor, increased maintenance, greater liability, and reduced winch life span can begin to add up. Consequently, some manufacturers will modify their winch to meet B30.7 only upon request and at an additional charge. The illustrations to the right demonstrate the effects of high loads being pulled around a small diameter drum. Such damage shortens the life span of a wire rope and may lead to more frequent replacement of this critical component. *Photos courtesy of Wire Rope Users Manual, Third Edition, Second Printing.*

Q: Will the Fulcrum be available in Air and Hydraulic versions?
A: Air ("A" series) and hydraulic ("H" series) are available upon request. Please contact Client Services with your requirements so they may provide a quotation.

Q: What about design modifications to meet special applications?
A: "All you have to do is ask." 30-40% of our business is providing customized solutions for specific applications. We recognize that not all jobs are created equal and that the most cost-effective solutions may not be in an off-the-shelf item. We've designed and manufactured winches for applications as simple as moving bags of lettuce, to as intricate as installing critical payloads on space vehicles.

Fulcrum Winch

5300 to 45600 lb (2409 to 20727 kg) capacity

Line Speed Specifications (US)

Frame	Pulling model 15:1 *D/d* ratio	Lifting model 18:1 *D/d* ratio	Std drum length in.	hp	Line pull, layer (lbs) 1st	mid	full	Std line speed, layer (fpm) 1st	mid	full	Wire rope size in.	Drum capacity, layer (ft) 1st	mid	<2 layers[1]	full[2]
3	EP5300-17-18	EL5300-17-18	18	3	5300	4000	3200	17	23	28	1/2	84	387	768	1066
3	EP6700-20-17		18	5	6700	4900	4200	20	28	32	9/16	75	351	578	840
3		EL6000-23-18	18	5	6000	4900	4200	23	28	32	9/16	84	277	506	768
4	EP8200-23-24	EP8200-23-24	24	7.5	8200	6200	5000	23	30	37	5/8	111	515	1024	1421
4	EP11700-13-27		24	5	11700	8500	7200	13	17	21	3/4	93	443	733	1070
4		EL9200-23-24	24	7.5	9200	7700	7100	23	28	30	3/4	120	394	548	892
5	EP15900-19-24		24	10	15900	11900	10200	19	26	30	7/8	103	481	790	1145
5		EL14100-22-24	24	10	14100	11700	10100	22	26	30	7/8	117	385	699	1059
5	EP20600-19-24		24	15	20600	16400	13600	19	24	29	1	90	305	566	872
5		EL16400-20-24	24	15	16400	14900	13600	20	22	24	1	114	240	378	686
6	EP26000-17-24		24	20	26000	18900	16000	17	23	28	1-1/8	91	433	718	1048
6		EL21300-21-24	24	20	21300	17700	16300	21	25	27	1-1/8	112	371	518	1026
7	EP31900-20-24		24	20	31900	26000	22000	20	24	28	1-1/4	101	338	619	1127
7		EL27000-22-24	24	20	27000	22700	21000	22	28	30	1-1/4	120	395	549	892
7	EP38400-20-24		24	25	38400	30800	25700	20	25	30	1-3/8	92	310	573	881
7		EL32600-19-24	24	20	32600	29500	27000	19	21	22	1-3/8	109	230	362	659
8	EP45600-18-30		30	30	45600	37200	31500	18	22	26	1-1/2	127	423	776	1186
8		EL42400-20-30	30	30	42400	35100	29900	20	24	28	1-1/2	137	453	826	1255

Line Speed Specifications (Metric)

Frame	Pulling model 15:1 *D/d* ratio	Lifting model 18:1 *D/d* ratio	Std drum length mm	hp	Line pull, layer (kg) 1st	mid	full	Std line speed, layer (mpm) 1st	mid	full	Wire rope size (mm)	Drum capacity, layer (m) 1st	mid	<2 layers[1]	full[2]
3	EP5300-17-18	EL5300-17-18	457	3	2409	1818	1455	5	7	9	13	26	118	234	325
3	EP6700-20-17		457	5	3045	2227	1909	6	9	10	14	23	107	176	256
3		EL6000-23-18	457	5	2727	2227	1909	7	9	10	14	26	84	154	234
4	EP8200-23-24	EP8200-23-24	610	7.5	3727	2818	2273	7	9	11	16	34	157	312	433
4	EP11700-13-27		610	5	5318	3864	3273	4	5	6	20	28	135	223	326
4		EL9200-23-24	610	7.5	4182	3500	3227	7	9	9	20	37	120	167	272
5	EP15900-19-24		610	10	7227	5409	4636	6	8	9	22	31	147	241	349
5		EL14100-22-24	610	10	6409	5318	4591	7	8	9	22	36	117	213	323
5	EP20600-19-24		610	15	9364	7455	6182	6	7	9	26	27	93	173	266
5		EL16400-20-24	610	15	7455	6773	6182	6	7	7	26	35	73	115	209
6	EP26000-17-24		610	20	11818	8591	7273	5	7	9	28	28	132	219	320
6		EL21300-21-24	610	20	9682	8045	7409	6	8	8	28	34	113	158	313
7	EP31900-20-24		610	20	14500	11818	10000	6	7	9	32	31	103	189	344
7		EL27000-22-24	610	20	12273	10318	9545	7	9	9	32	37	120	167	272
7	EP38400-20-24		610	25	17455	14000	11682	6	8	9	36	28	95	175	269
7		EL32600-19-24	610	20	14818	13409	12273	6	6	7	36	33	70	110	201
8	EP45600-18-30		762	30	20727	16909	14318	5	7	8	40	39	129	237	362
8		EL42400-20-30	762	30	19273	15955	13591	6	7	9	40	42	138	252	383

(1) <2 layers = full drum less 2 layers for working
(2) full = full drum for storage

Drum Lengths

Frame	Pulling	Lifting	Available Drum Length in. (mm) 18 (457)	24 (610)	30 (762)	36 (914)	42 (1067)	48 (1219)	54 (1372)
3	EP5300-18	EL5300-18	Std	–	Opt	–	Opt	–	–
3	EP6700-23	EL6700-25	Std	–	Opt	–	Opt	–	–
4	EP8200-19	EL8200-19	–	Std	–	Opt	–	Opt	–
4	EP11700-14	EL9200-18	–	Std	–	Opt	–	Opt	–
5	EP15900-21	EL14100-23	–	Std	–	Opt	–	Opt	–
5	EP20600-21	EL16400-26	–	Std	–	Opt	–	Opt	–
6	EP26000-18	EL21300-23	–	Std	–	Opt	–	Opt	
7	EP31900-21	EL27000-24	–	Std	–	Opt	–	Opt	–
7	EP38400-25	EL32600-25	–	Std	–	Opt	–	Opt	–
8	EP45600-21	EL42400-23	–	–	Std	–	Opt	–	Opt

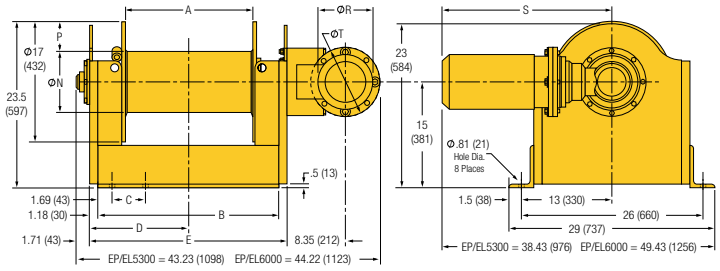
Note: Dimensions are for standard base models only and subject to change. For optional drum lengths and gearbox combinations please contact the factory for dimensional drawings.

Dimensions (Standard Winch Model)

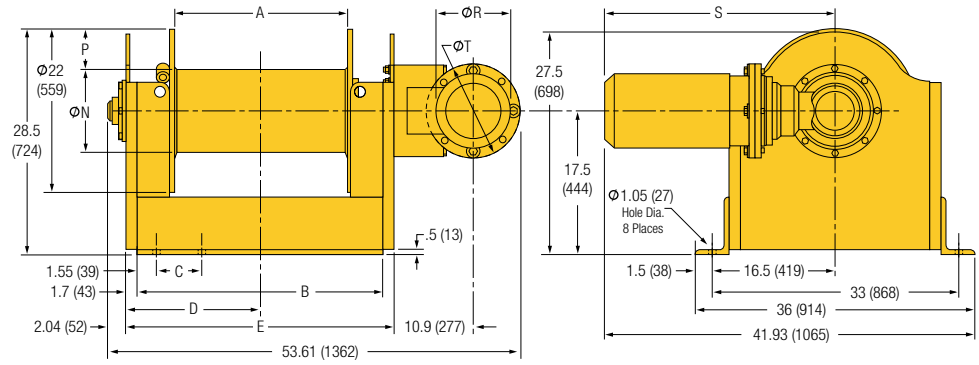
Pulling

		"A" Std Drum		B		C				E		N		P		R		S		T	
Frame	**Model**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**	**in.**	**mm**
3	EP5300-17-	18	457	25.89	658	7.50	190	14.12	359	28.25	718	8.62	219	4.19	106	7.76	197	23.93	608	9.84	250
3	EP6700-20-	18	457	25.89	658	7.50	190	14.12	359	28.25	718	8.62	219	4.19	106	10.83	275	34.93	887	11.81	300
4	EP8200-23-	24	610	32.35	822	9.75	248	17.88	454	35.75	908	10.75	273	5.86	149	7.76	197	23.93	608	9.84	250
4	EP11700-13-	24	610	32.35	822	9.75	248	17.88	454	35.75	908	10.75	273	5.86	149	7.76	197	23.93	608	9.84	250
5	EP15900-19-	24	610	34.64	879	7.63	193	19.25	488	38.50	977	14.00	356	7.00	178	10.83	275	33.80	858	11.81	300
5	EP20600-19-	24	610	34.64	879	7.63	193	19.25	488	38.50	977	14.00	356	7.00	178	10.83	275	34.93	887	13.78	350
6	EP26000-17-	24	610	36.51	927	6.62	168	20.25	514	40.50	1028	16.00	406	9.00	229	13.03	331	40.72	1034	13.78	350
7	EP31900-20-	24	610	36.65	931	8.12	206	20.82	529	41.65	1058	20.00	508	9.00	229	13.03	331	40.72	1034	13.78	350
7	EP38400-20-	24	610	36.65	931	8.12	206	20.82	529	41.65	1058	20.00	508	9.00	229	13.03	331	43.56	1106	13.78	350
8	EP45600-18-	30	762	42.50	1080	9.50	241	24.75	629	49.50	1257	24.00	610	10.50	267	13.03	331	43.56	1106	13.78	350
Lifting																					
3	EL5300-17-	18	457	25.89	658	7.50	190	14.12	359	28.25	718	8.62	219	4.19	106	7.76	197	23.93	608	9.84	250
3	EL6000-23-	18	457	25.89	658	7.50	190	14.12	359	28.25	718	9.75	248	3.63	92	10.83	275	34.93	887	11.81	300
4	EP8200-23-	24	610	32.35	822	9.75	248	17.88	454	35.75	908	10.75	273	5.86	149	7.76	197	23.93	608	9.84	250
4	EL9200-23-	24	610	32.35	822	9.75	248	17.88	454	35.75	908	14.00	356	4.00	102	7.76	197	23.93	608	9.84	250
5	EL14100-22-	24	610	34.64	879	7.63	193	19.25	488	38.50	977	16.00	406	6.00	152	10.83	275	33.80	858	11.81	300
5	EL16400-20-	24	610	34.64	879	7.63	193	19.25	488	38.50	977	18.00	457	5.00	127	10.83	275	34.93	887	13.78	350
6	EL21300-21-	24	610	36.51	927	6.62	168	20.25	514	40.50	1028	20.00	508	7.00	178	13.03	331	40.72	1034	13.78	350
7	EL27000-22-	24	610	36.65	931	8.12	206	20.82	529	41.65	1058	24.00	610	7.00	178	13.03	331	40.72	1034	13.78	350
7	EL32600-19-	24	610	36.65	931	8.12	206	20.82	529	41.65	1058	24.00	610	7.00	178	13.03	331	43.56	1106	13.78	350
8	EL42400-20-	30	762	42.50	1080	9.50	241	24.75	629	49.50	1257	26.00	660	9.50	241	13.03	331	43.56	1106	13.78	350

Frame 3



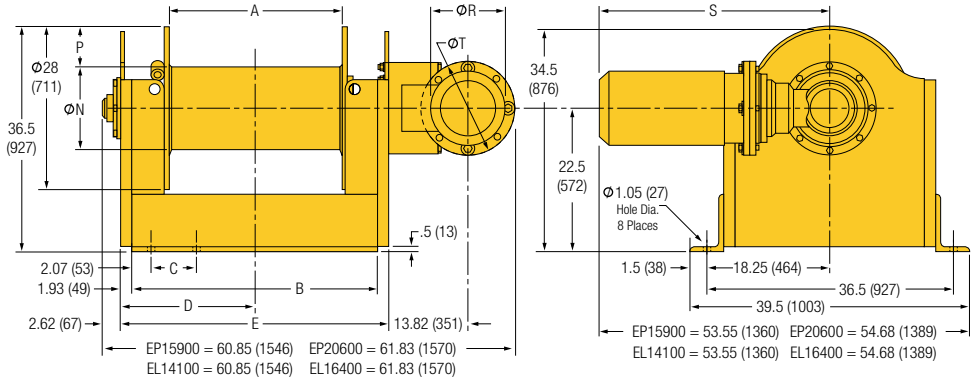
Frame 4



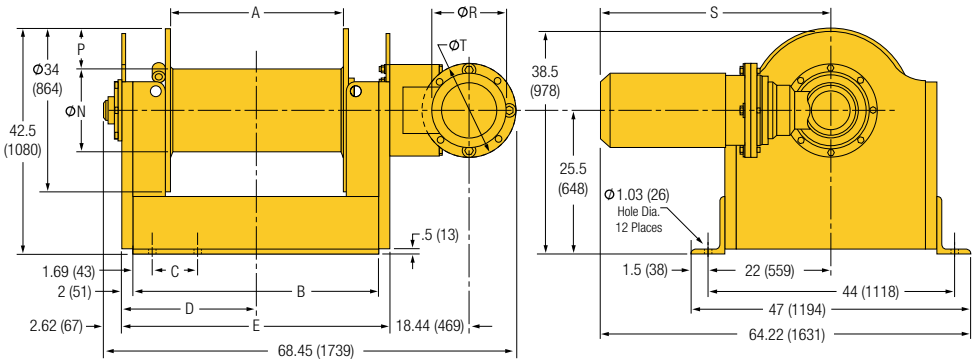
Note: Dimensions are for standard base models only and subject to change. For optional drum lengths and gearbox combinations please contact the factory for dimensional drawings.

Dimensions

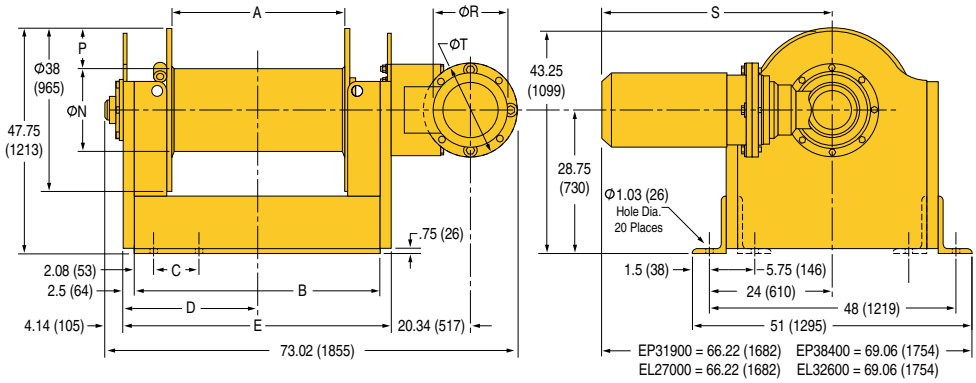
Frame 5



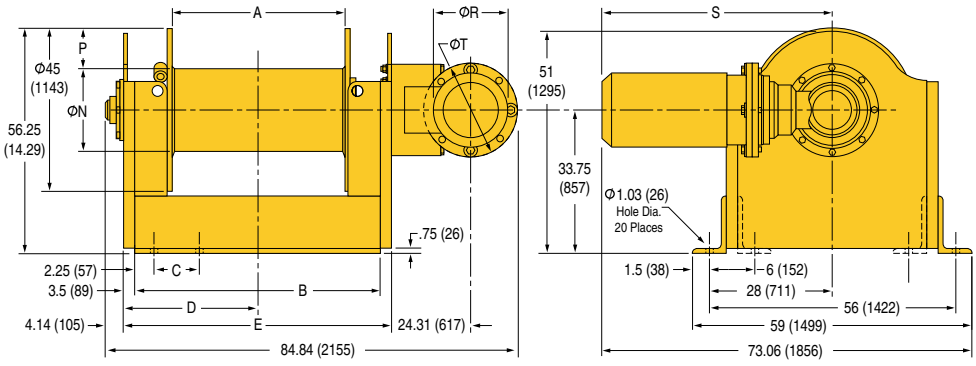
Frame 6



Frame 7



Frame 8



Note: Dimensions are for standard base models only and subject to change. For optional drum lengths and gearbox combinations please contact the factory for dimensional drawings.

Fulcrum versatility provides...

Winch Standard Options

- Drum divider flanges
- Mainline disconnect with “on-off” on pendent
- Free-spooling clutch
- Grooved drums
- Space heater in motor and control boxes
- Hand crank for manual operation in the event of power failure
- Drum locking pin
- Marine duty, IEEE45 motor
- Mirror image versions
- Marine 812-X paint specification
- Press roller on drum
- NEMA 4 upper and lower, rotary limit switches
- Drum guards
- Manual level wind and drum guard combinations
- Dual speed motors
- Electronic overload limiter
- Sandblast/Carbozinc surface preparations

50,000 pound hose positioning winch

38,400 pound railway car moving winch

Other engineered options available upon request

- Horizontal load reversing drums
- Multiple brakes
- Explosion proof motors and control systems
- Programmable logic controls (PLC)
- Variable frequency (speed) drives (VFD) and vector duty motors
- Wireless infrared and radio controls
- Man Riding winches
- European Machinery Directive compliant models
- Hydraulic and air versions
- Custom paint coating systems and colors

21,300 pound maintenance winch with dual brakes and vector duty motor

16,400 pound hydraulic pipe handling winch

Custom launch vehicle payload handling winch

Man Rider™ winches

Explosion proof motors and controls

Extended drums

IR Winch Check List

This form should accompany all winch inquiries. Use of this check list will help minimize changes after the order has been entered.

Distributor _____ End user _____

Contact name _____ Contact name _____

Fax/phone no. _____ Fax/phone no. _____

Reference no. (order/inquiry/bid) Reference no. (order/inquiry/bid)

General description/model or application requirements (please describe in detail the application and provide a sketch or drawing if possible). _____

_____

_____ Quantity _____

Power source:

- ❑ Manual _____
- ❑ Air (pressure, flow) _____
- ❑ Electric (cycles, phase, voltage) _____
- ❑ Hydraulic (pressure, flow) _____

Lifting or pulling application _____ How far/how high _____

Selected winch capacity _____ Winch speed? _____ fpm

Speed at mid-drum, top or first wrap layer? _____ fpm

Drum storage _____ Rope diameter _____ in./min

Duty cycle (if known) _____ Environment _____

Time required to complete lift or pull (speed) _____ fpm

Control type (local, remote, electrical voltage. Include maximum distance.) _____

_____

Special standards or documents required? _____ Name/no. _____

Special paint/color/coating? _____ Details _____

Special manufacturing requirements? _____ QA/QC _____

_____

Options:

Brakes	Manual _____	Auto _____	Band _____
	Disc _____	Special _____	
Drum	Standard _____	Other length _____	Flange _____
	Grooving _____	Divider flange _____	
Drum guard	_____	(fixed/movable)	

Air line equipment (FRL's, muffler, tension manifold) _____

Other options _____

_____

_____

_____

Attach additional sheets if required and sketches if possible.

WARNING: This equipment is not designed for transporting people or lifting loads over people. It is the user's responsibility to determine the suitability of this product for any particular use and to check compliance with applicable regulations. Before installation, see maintenance and operations manual for additional warnings and precautions.

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www.ingersollrandproducts.com

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