

Insul-8 Mobile Electrification

Cable Reels ♦ Conductor Bar ♦ Festoon ♦ Pendants ♦ Radios ♦ Slip Rings

Solutions From A Single Source

Motor Driven Cable Reels



For the Electrification of:

- Port Cranes
- Iron and Steel Mill Equipment
- Bulk Material Handling Equipment
- Yard Equipment
- Mining Equipment



www.insul-8.com

INSUL-8 – CONDUCTIC DIVISION

Insul-8 Corporation designs and manufactures equipment that provides electrical power to mobile and stationary equipment from small tools and automated machinery to large container cranes and transit systems. Our full line of power delivery equipment includes: Spring and Motor Driven Cable Reels, Conductor Bar from 40 to 6000 amperes, C-Track and I-Beam Festoon, and Slip Rings. Insul-8 can design and manufacture a system that is right for your demanding application.



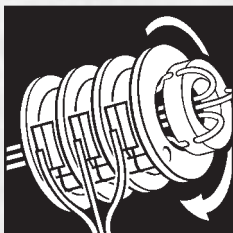
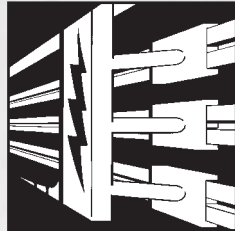
SPRING DRIVEN REELS

Wide range of standard and custom designs to meet your application. Spring reels are used in applications such as

workstations, automated machinery, boom trucks, extendable conveyors, and hundreds of specially engineered applications.

CONDUCTOR BAR SYSTEMS

Full range of insulated conductor bar designs from 40 to 6000 amperes. Many special designs such as collectors, insulated covers, and conductor bars can be modified to fit your application. Conductor bar is used in standard applications such as overhead crane bridge and runway electrification and dockside cranes, to large, complex transit systems.



SLIP RINGS

Insul-8 designs and manufactures the most rugged dependable IER™ slip rings and enclosures for use of supplying 360° continuous power.

Whether you need a simple 1.5" bore, a self-contained assembly, or a complex enclosed ring, Insul-8 can provide the solution.



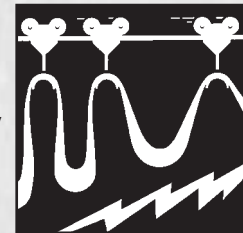
MOTOR DRIVEN REELS

Wide range of standard and custom designs to meet your specifications. IER™ Motor Driven Cable Reels primarily

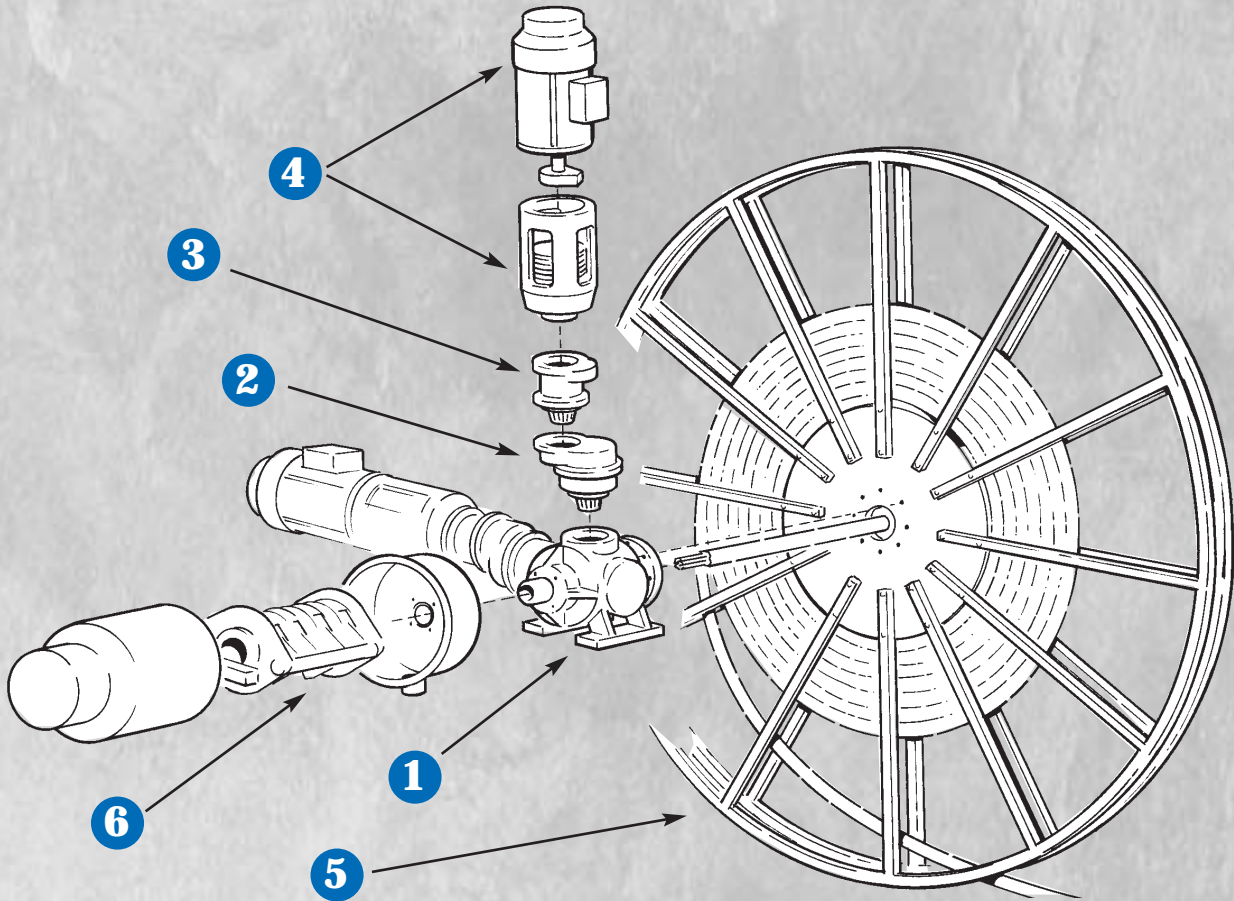
use the magnetic coupler drive package for reliability and long-life dependability. Motor Driven Reels are used in a wide variety of applications including material handling, portside cranes, yard cranes, and mill applications.

FESTOON SYSTEMS

Standard and custom designs to satisfy any application. Festoon line includes stretched wire for small, light-duty applications, C-Track for standard industrial applications, square bar for highly corrosive environments, and I-Beam systems for up to 600 lbs. per carrier. Festoon is used for management of power and control cables for mobile equipment such as overhead and portside cranes.



BASIC COMPONENTS OF A IER™ MOTOR DRIVEN REEL



1 MAIN GEARBOX UNIT

- 7 sizes

2 SECONDARY GEARBOXES

- 9 different models

3 ADDITIONAL GEARBOXES

- 5 different models

4 DRIVE UNIT:

- Common electric motor and the magnetic coupler
- 3 models

5 SPOOL

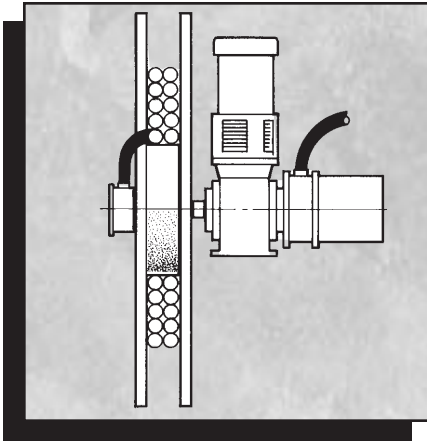
- 5 types and an extended range of sizes and options

6 SLIP RING ASSEMBLY

- Power, control, mixed power/control, fiber optic transmitter

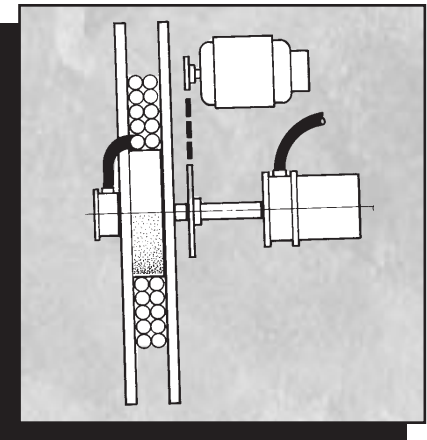
DRIVE OPTIONS

IER™ MAGNETIC COUPLER DRIVE



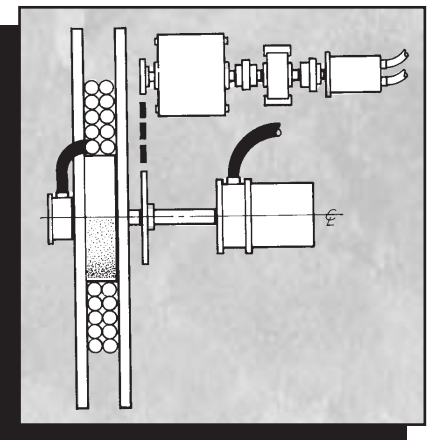
- Because of its simple operating principles, the magnetic coupler drive is among the most economical of all drive systems.
- Smooth consistent torque assures maximum cable life.
- Compact design requires minimal space.
- Continuous 100% stall duty rating.
- No loss of cable tension during power outage.
- Critical components are completely sealed and protected from the atmosphere.
- Explosion-proof reels available.

IER™ TORQUE MOTOR DRIVE



- Torque Motor, 100% stall, 3-phase torque motors.
- Rugged design, minimal maintenance required.
- Frame is considerably larger than standard motor frame size because of the need to dissipate heat.
- Explosion-proof reels available.

IER™ ELECTRO-HYDRAULIC DRIVE



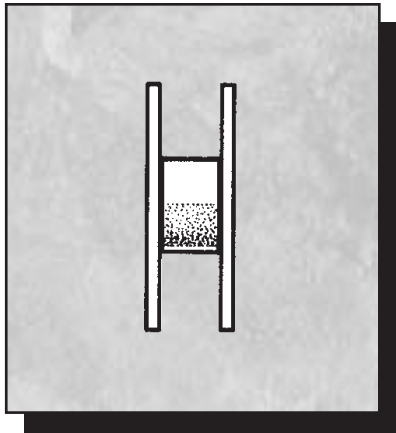
- The drive consists of a totally enclosed electric motor driving a hydraulic pump mounted on a hydraulic reservoir that includes the fittings, gauges, control valves, and interconnected plumbing necessary for automatic operation of the reel.
- Simple torque and speed adjustment.
- Drive is well-suited for high speed and high torque applications.
- Hydraulic pump can be driven by single or three-phase A.C. and D.C. standard electric motors.
- Explosion-proof reels available.

POOL OPTIONS

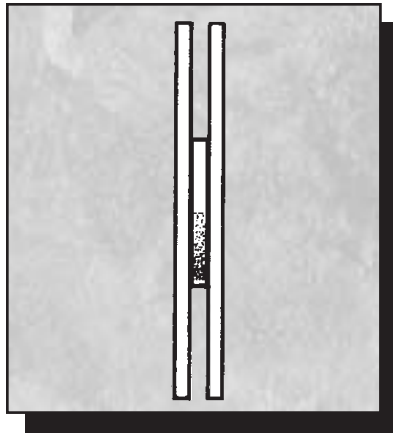
IER™ Motor Driven Cable Reels come in a variety of spool configurations including bulk wrap, monospiral, and level wind. A comparison chart of the various spool configurations is given below.

Type of Reel	Bulk Wrap	Monospiral	Level Wind
Reel Size	Smallest	Medium	Medium
Spool Diameter	Small	Large	Medium
Drum-to-Spool Rim Ratio	2.5 Average	2.5 Average	None
Line Pull Variance	Variable	Variable	Constant
Output Torque	Average	Greatest	Medium
Wrapping Characteristics	Not controlled	100% positive	Good but must be controlled
Applying Cable Guides	Difficult	Not difficult	Not difficult
Cable Selection (Based on derating)	Max. derating required	Min. derating required	Min. derating required
Cost Index Less Cable	Low	Medium	High
Overall Cable Life	Low	Medium	High
Shipping & Installation	Normal	Normal	Normal

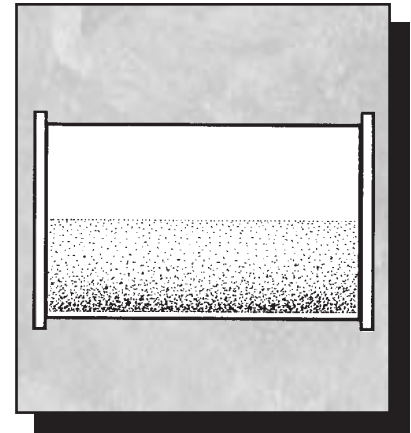
TYPICAL POOLS



Bulk Wrap:
Four wraps max. (standard),
67% fill (average).



Monospiral:
One wrap wide designed to
accommodate two dead wraps
& one safety wrap at the rim.



Level Wind:
One layer standard with two to
four layers available. Designed
to accommodate two dead
wraps & four wraps.

IER™ STANDARD SLIP RINGS



Heavy industrial-duty slip ring assemblies are supplied on all IER™ Motor Driven Reels.

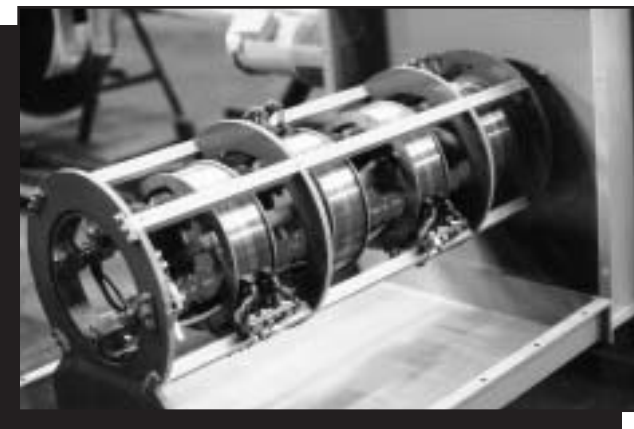
The slip rings are copper alloy with finely machined surface finish to afford concentricity and minimum brush-to-ring contact resistance. The brushes are copper graphite, precision-machined to contact the diameter of the slip rings at 100% rated current collection.

The rugged, corrosion-resistant metal brush holders have a hinged mounting clamp for precision adjustment and can be individually removed from the slip ring assembly. The holder's adjustable brush springs are factory set for the proper amount of tension, thus eliminating the possibility of the spring

becoming loose, resulting in the loss of brush spring tension.

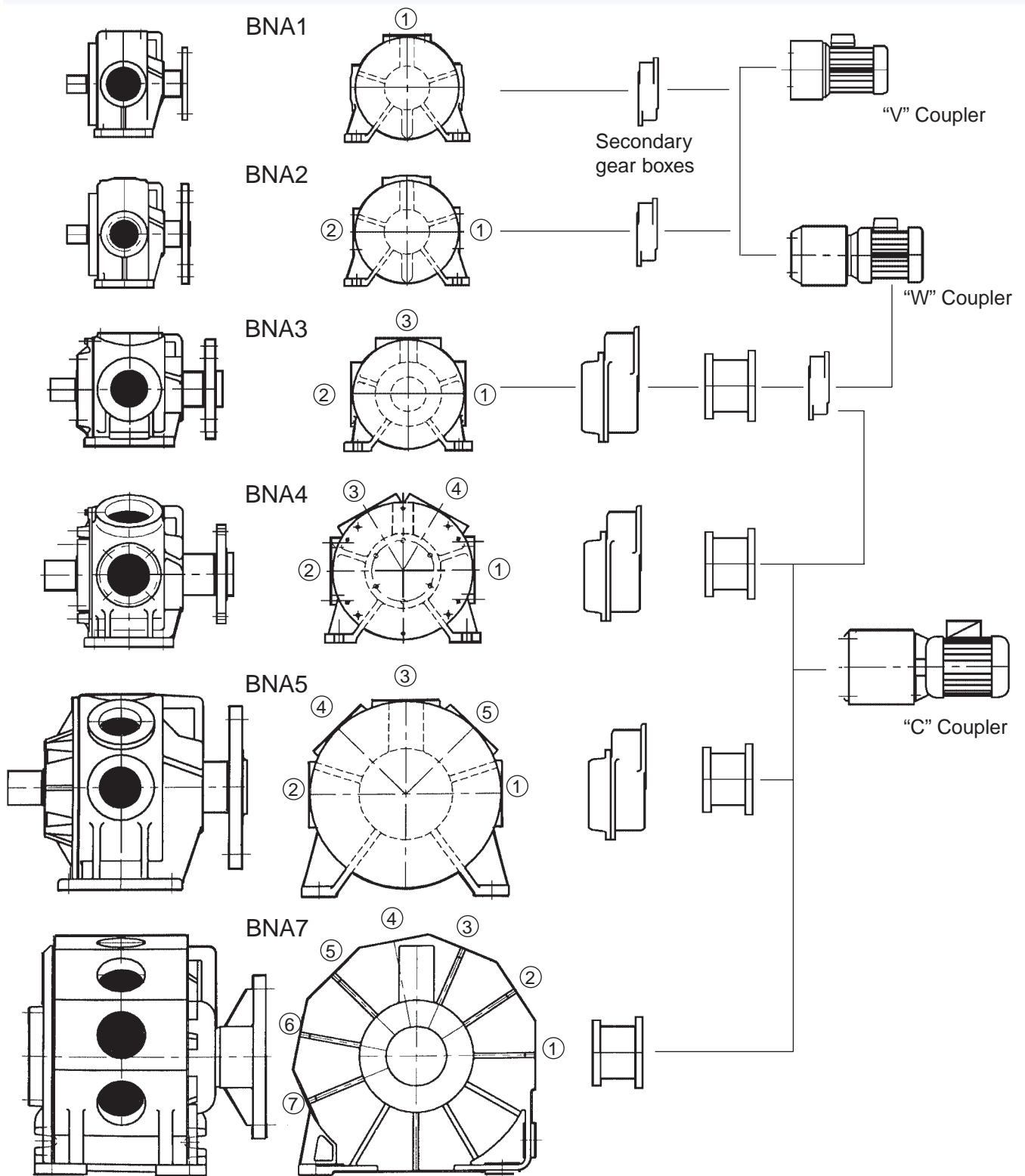
The slip ring insulators are composed of high di-electric strength, shock and moisture-proof, glass-filled material providing an extremely high arc resistance and comply with IUL self extinguishing (SE-1) requirements. The insulator barriers (widths complying with UL standards for general purpose reels) are rated for 600 volts on reels using up to 4 conductors. Reels with over 4 conductors are rated for 250 volts per UL requirements. The insulator barriers (widths complying with UL standards for special use reels) are rated for or at 600 volts for any number of conductors.

IER™ HIGH VOLTAGE SLIP RINGS



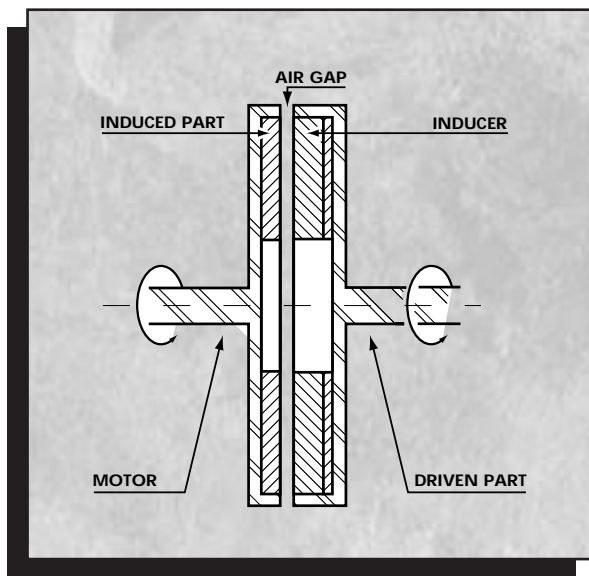
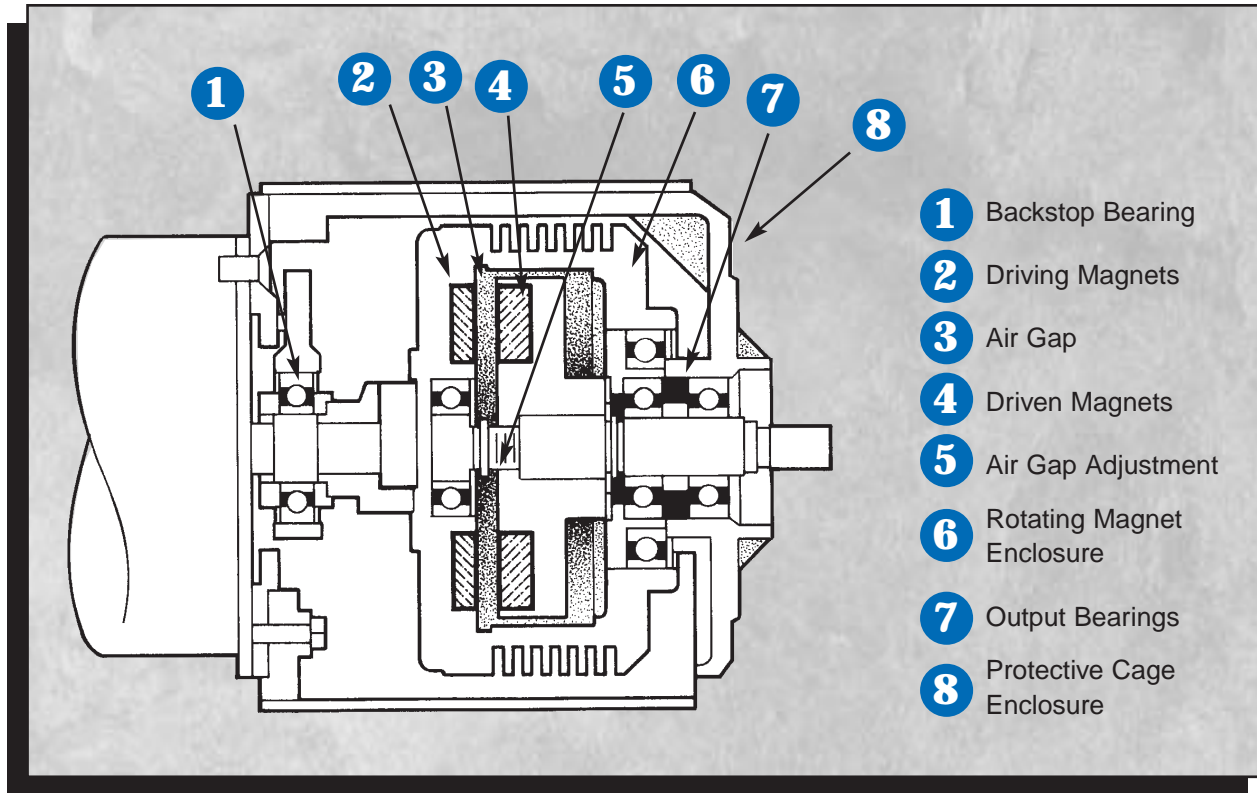
These slip rings are constructed with all the same features which are found on the 600 volt rings. In addition, surface and air gaps have been expanded in accordance with NEC specifications for high voltage apparatus. High di-electric strength insulator spacers are installed between conductors to increase surface gap. The 5-8Kv rings are each tested with a DC Highpot at 22Kv. The maximum allowable current leakage is 150 microamps with an average current leakage of less than 55 microamps. High-voltage rings are available in all current ratings shown for 600 volt rings. The 10-25Kv slip rings incorporate an air gap construction. A ground check ring (usually 35 ampere, 600 volt) is furnished on most high-voltage rings.

IER™ MAGNETIC COUPLER DRIVE CONFIGURATIONS



MAGNETIC COUPLER DRIVE

OPERATING PRINCIPLES OF THE IER™ MAGNETIC COUPLER DRIVE



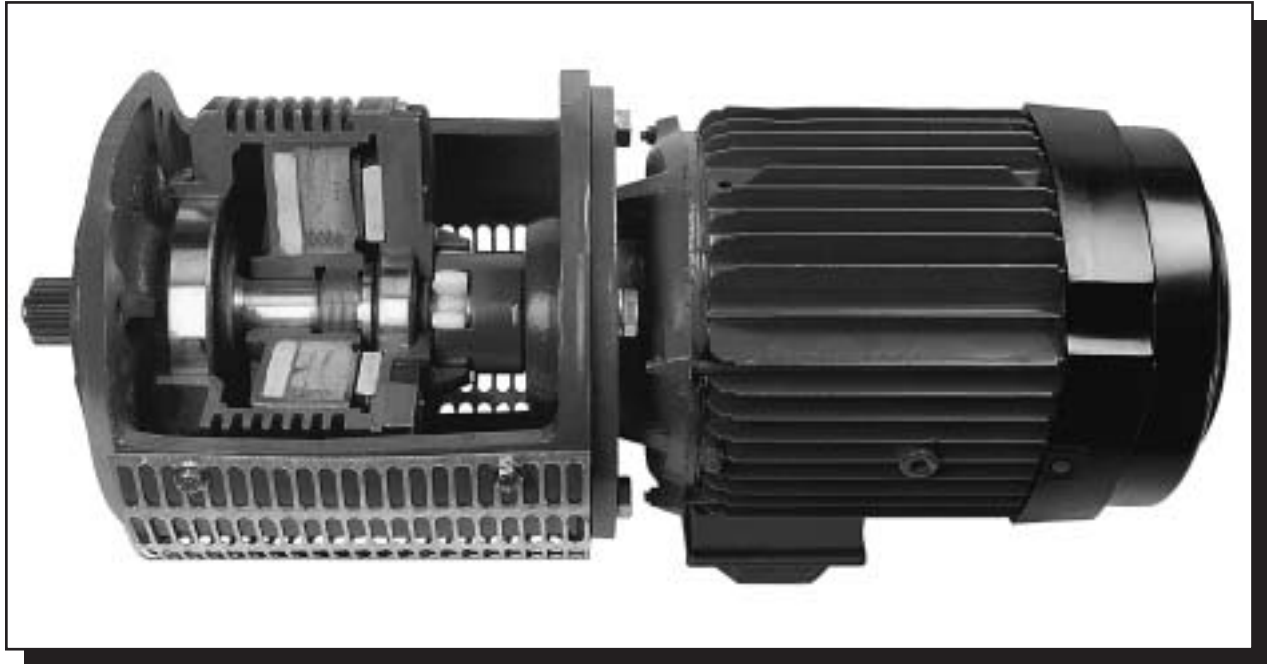
IER™ Magnetic Coupler can be driven by any substantial constant speed power input (normally a 1725 RPM electric motor).

The power input turns the driving magnet (#2) at motor speed. An air gap (#3) separates the driving magnet (#2) from the driven magnets (#4), spool side. The speed differential (slip RPM) between the electric motor shaft (driving magnet) and the cable reel spool (driven magnets) is accommodated by the hysteresis coupler using an air gap with the resulting magnetic coupler as the slipping interface. The magnets within the coupler are all permanent; therefore, the clutch requires no external power or controls.

The rating of the coupler is continuous and can be 100% stalled, with heat dissipated by the rotating magnet enclosure (#6). The output torque can be changed by adjustment of the air gap (#5). The one-way bearing (#1) on the input side allows the magnets to become a brake if the motor is shut off.

ADVANTAGES OF THE IER™ MAGNETIC COUPLER DRIVE

With our modular design concept, which involves building reeling devices using several variations of 83 gear reducer drives along with our 30 basic spool designs and all of our standard collector ring designs; IER has the experience and expertise to build a reel to meet *your* application requirements.



Cut-A-Way view of a typical Magnetic Coupler Drive

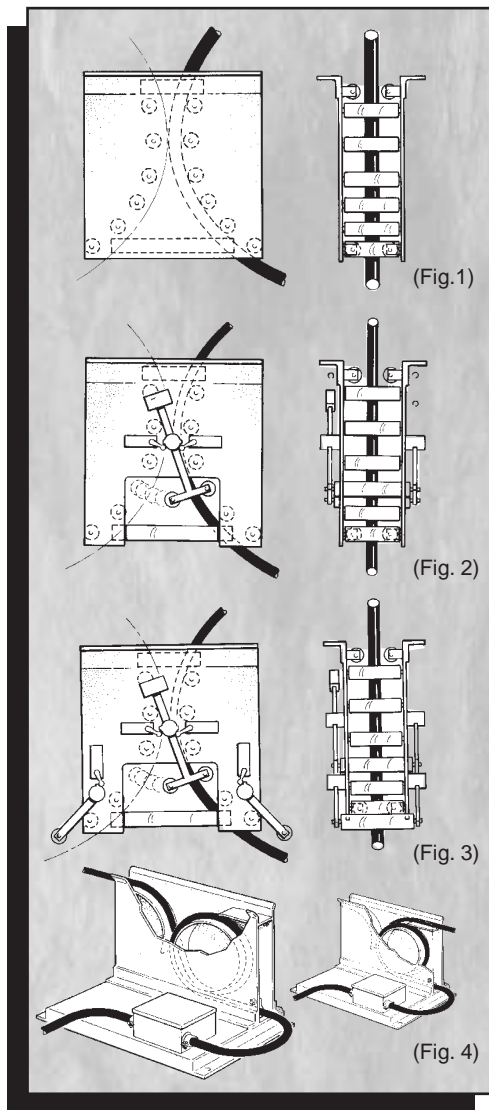
- **Permanent Magnets** - No electric coils or D.C. power supply are required.
- **Explosion Proof** - Because there is no mechanical connection between the permanent magnets Insul-8 can accommodate most explosion-proof reel requirements.
- **Minimal Maintenance** - The sealed ball bearing requires little or no maintenance. The gearbox and gear reducers all have gears running in oil. You can expect a 5-year life or 15,000 operating hours without any standard maintenance.
- **Fully Adjustable** - All magnetic (hysteresis) couplers can be adjusted by changing the air gap between permanent magnets. Lower torque settings are preferred because less stress is applied on the cable.
- **100% Stall Duty** - Motor turns at nameplate speed (usually 1725 RPM) while spool is turning at zero speed at 100% stall.
- **Standard Motors** - Any NEMA C-faced motor of the proper size can be mounted to the hysteresis coupler. Generally the electric motors used are a stock "off the shelf" item and are readily available.
- **Braking** - The "one-way" bearing will only rotate in one direction. This eliminates any free-wheeling of the spool, and acts as a brake.
- **Power Consumption** - Permanent magnet couplers use less power than other electric motor-driven reels. When compared with 100% stalled electric torque motors, only half of the electric power is required.

IER™ CABLE GUIDES

Many cable reel applications require the use of cable guides to serve the cable in various directions. An improperly designed or misapplied cable guide can become a source for immediate problems affecting not only the operating performance of the reel, but also causing considerable damage to the cable. With this in mind, the cable guides offered are based on design criteria obtained through many years of experience and explained by the dissertation in the various guides below. All of the cable guides offered afford the user minimum bend diameter recommended by most cable manufacturers.

- A) Single and multiple conductor cables, 600 volt rated, up to 6 conductors max.-12 x diameter of cable.
- B) Multiple conductor cables, 600 volt rated, 7 or more conductors-16 x diameter of cable.
- C) Multiple conductor cables, 5Kv rated, power cables-12 x diameter of cable.
- D) Multiple conductor cables, 8Kv through 25Kv rated, power cables-16 x diameter of cable.

CABLE GUIDE DESCRIPTIONS



Standard Two-way Payout (Fig. 1): The type G/M multiple roller cable guide is used where cables are served in two directions and one end of the cable is terminated at the center of the total machine travel. Attachment of the cable at the center feed must be in the same vertical plane as the cable guide to provide straight line pickup. The multiple roller two-way guide is used where structural members or other obstructions would interfere with the normal windup and payout attitudes of the cable. The multiple roller two-way cable guide is equipped with flat faced rollers to provide minimum contact with the cable.

For certain classes of service, smaller guide rollers can be more economically used, but it is never advisable to use cable guides with smaller bend diameters than the cable manufacturers recommended minimum. All multiple roller cable guides require separate mounting from the reel.

Standard Two-way Payout with Slack Cable Detection (Fig. 2): The type G/M-S multiple roller cable guide detects a slack cable condition by use of a guide pendulum swinging in an arc controlled by cable tension. By use of a rotary geared limit switch on the cable reel and snap type limit switches on the cable guide, a condition of slack cable is automatically detected. The wiring of these switches in conjunction with the machine travel permissive relay circuit will automatically stop the machine in the event of slack cable. The slack cable initiating contacts are inhibited at the zero deflection point (passing over the center feed point) allowing the machine to travel through this point without shutting down.

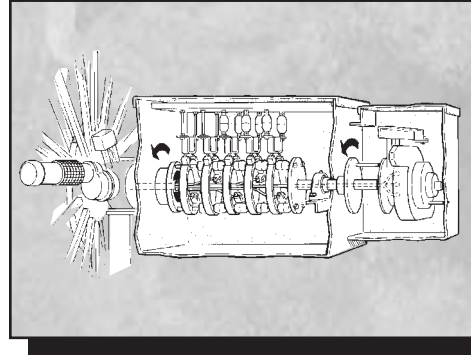
Standard Two-way Payout with Overtension and Slack Cable Detection (Fig. 3): The type G/M-S-O multiple roller cable guide functions in the same manner as the type G/M-S and has the added feature of detecting cable overtension. Cable controlled swinging arms will initiate contacts of limit switches, controlling both direction and overtension conditions.

Two-way Payout Anchor (Fig. 4): As the name implies, it serves as an anchoring device for the free end of the cable in two-way payout applications. It is usually installed below the level of the grade to allow the cable to transfer over the center point without damage to the cable.

MOTOR DRIVEN REEL OPTIONS

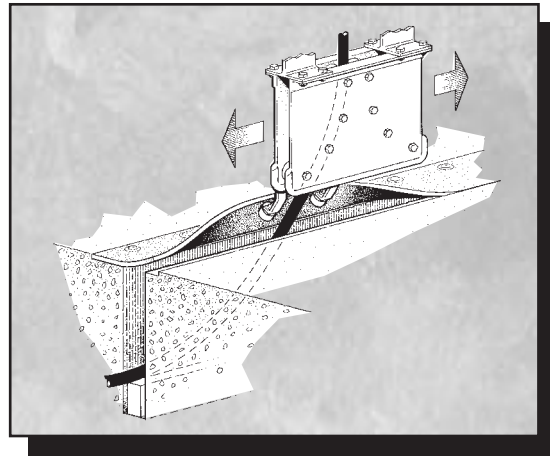
FIBER OPTIC TRANSMITTER

The Delachaux Group was the first cable reel manufacturer to develop a continuous fiber optic transmitter. It allows the transmission of large amounts of information with low-level attenuation - less than 1 dB without strain on the fiber optics. Automated stacking cranes and continuous container unloaders rely on the transmitter to keep up with the greater stream of computer data, video signals of high-speed, efficient operations.



COMESFLEX

The trench cover protects against damage to power and control cable caused by vehicles or falling objects. This simple but effective system includes trench channel protective material and a steel plate. COMES-FLEX is a recommended accessory where there is high rate of traffic around the primary moving application.



CONSTANT PULL REGULATION

- A) Constant Pull (Open Loop): It is referred to as an "open loop" as all information required to control the reel drive is relayed by the crane control system.
- B) Constant Pull (Closed Loop): This system is referred to as a "closed loop" as all the information required to regulate the reel drive is gathered by a sensor on the reel itself.

PULL & STORE

Insul-8 has added the Pull & Store reeling system for cable management. This system has been added due to the increased speed requirements, and the need to reduce line pull on the cable itself, as well as addition of fiber optics in many applications.

The system uses two reels. A small pull reel is used to "pull" the cable up slightly higher than the storage reel in diameter to provide at least 120 degrees of contact area over the circumference of the spool drum. The drive unit of the pull reel creates sufficient pull to lift the cable off the ground to the height that the two reels in the system are mounted.

PORT EQUIPMENT



Container Crane
To retrieve 1100 feet of #2 AWG, 3 conductor,
type SHD-GC-5 KV high voltage cable.

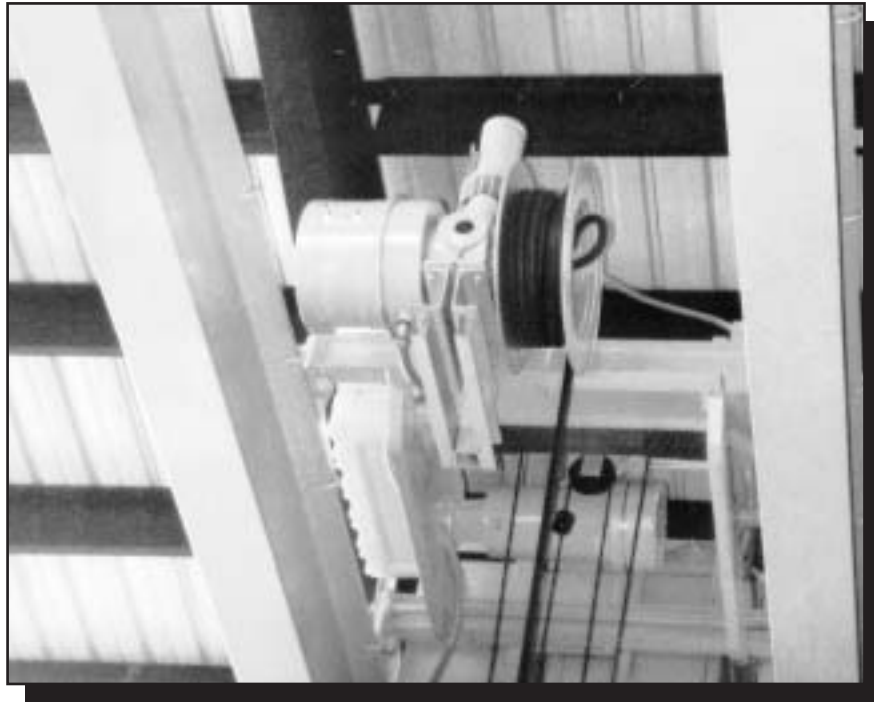
- **Ship to Shore Container Cranes**
- **Rail Mounted Gantry Cranes**
- **Mobile Harbor Cranes**
- **Whirley Cranes**



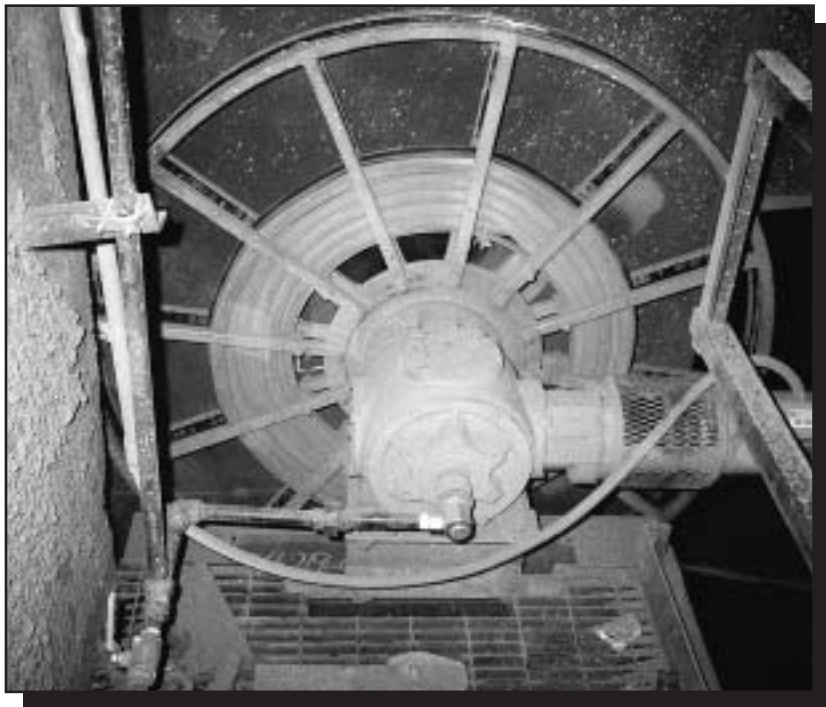
Ship Loader
To retrieve 800 feet of #1/0 AWG, 3 conductor,
SHD-GC-8 KV high voltage cable.

MILL EQUIPMENT

- **Tundish Cars**
- **Magnet Cranes**
- **Transfer Cars**
- **Ladel Cars**



Magnet Crane
To lift 85 feet of #2 AWG, 2 conductor, magnet cable.



BOF area, ladle stirring
application. To retrieve, 90 feet
of 1" I.D. hose carrying argon gas.

BULK MATERIAL HANDLING EQUIPMENT

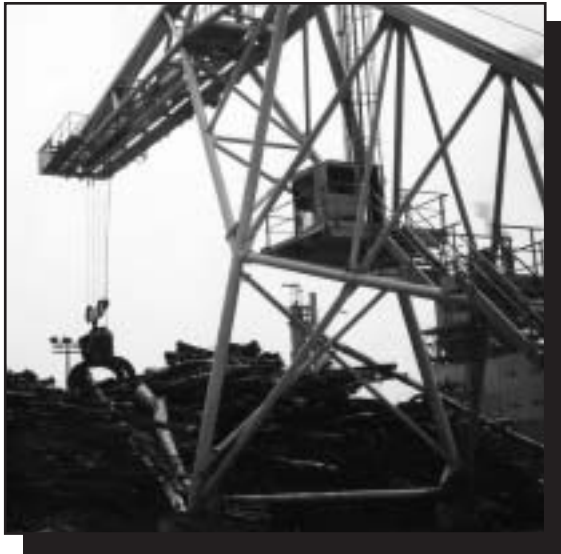
Stacker Reclaimer
To retrieve 550 feet of #4 AWG,
3 conductor, 5 KV, plus 6 fiber
optic fibers combination cable.



- **Stacker Reclaimers**
- **Mobile Trippers**
- **Ship Loaders & Unloaders**
- **Clamshell Unloaders**
- **Shuttle Conveyors**

IER™ MOTOR DRIVEN REEL APPLICATIONS

YARD EQUIPMENT



Log Handling Crane
To lift 60 feet of 12 AWG, 12 conductor,
type SO cable for grapple.

- **Yard Cranes • Portal Cranes**
- **Gantry Cranes**

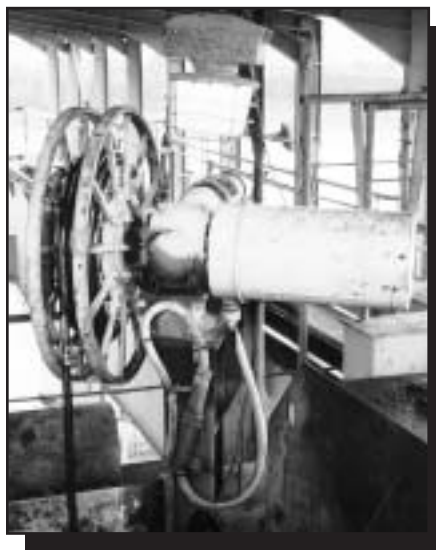


Tripper Conveyor
To retrieve 600 feet of #4 AWG, 3 conductor,
type G-GC, 600 volt cable.

OTHER EQUIPMENT



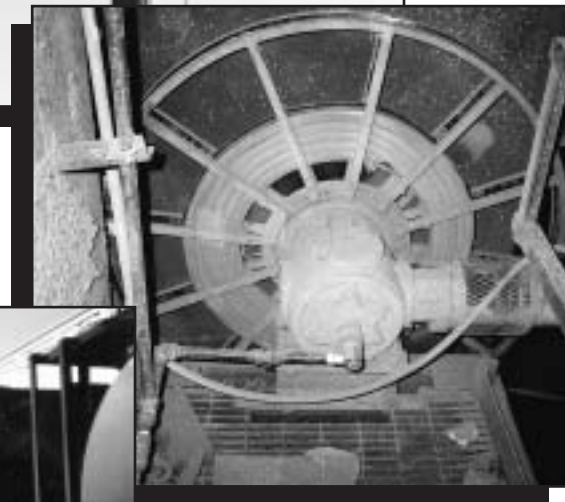
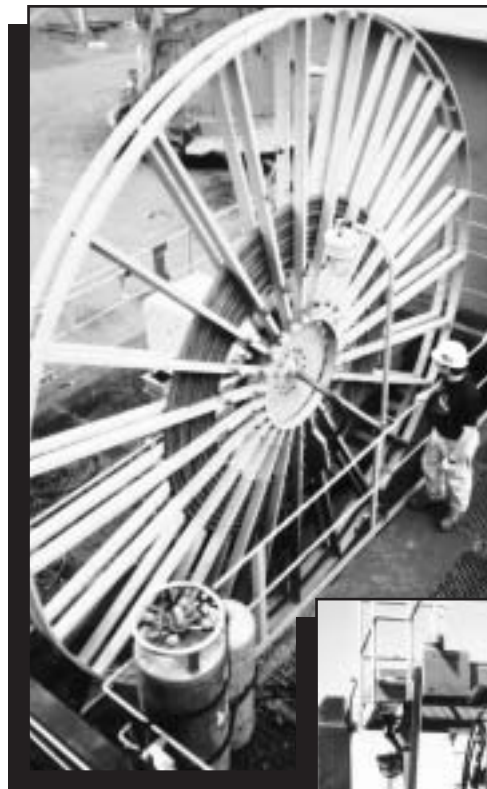
Container Spreader
To lift 130 feet of #12 AWG,
36 conductor, type SO cable.



- **Refuse Cranes**
- **Pallet Loaders**
- **Tunnel Boring
Machines**

Phosphate Loader
To lift 125 feet of #12 AWG,
20 conductor, type SO cable.

IER™ MOTOR DRIVEN REELS



MOTOR DRIVEN REEL CUSTOMER CHECKLIST

Date: _____ Salesperson: _____

Required by: _____

Customer: _____ Job #: _____

Qty: _____ Cat #: _____

Phone: _____ Fax: _____

CABLE SPECIFICATIONS

AWG _____ No. of conductors _____ Type _____ Stranding _____

Voltage _____ Diameter _____ Weight (lb./ft.) _____

If composite cable, describe _____

Maximum cable payout length _____ total travel distance or
active cable length of machine _____

(If cable feed point is at the center of total travel distance, maximum cable payout length is equal to 1/2 of the total travel distance of machine)

Note: Total length of cable will include payout length + reel height above cable support surface + 2 dead wraps + length for connections.

Retrieve _____

Lift _____ Active length _____ Total length _____

Stretch _____ % Sag _____

Drag _____

If retrieve, what is the approximate height the reel base will be mounted above the cable support surface _____ ft.?

HOSE SPECIFICATIONS

I.D. _____ O.D. _____ P.S.I. _____ Air/Water _____

Gas _____ Hydraulic _____ Other _____

Machine Total H.P. _____ @ _____ volts.

Required amperes _____

QUOTATION INFORMATION, CONT.

MOTOR DRIVEN REEL CUSTOMER CHECKLIST, CONT.

Total H.P. working simultaneously _____

Required amperes _____

Duty cycle of machine _____

Travel speed of machine (ft./min.) _____

Acceleration _____ ft./sec.² or time _____ sec.

Does machine coast when power is off? _____

Environmental conditions _____

Operating position of reel _____

Cable guides required? _____ Type _____

Type: Stall torque motor _____ Electro hydraulic _____

Mag coupler _____ Air motor _____

Constant Pull Regulation (open or Closed Loop) _____

Motor voltage _____ Phase _____ Cycles _____

Motor enclosure: Totally enclosed _____ or

Class _____ Div. _____ GRP _____

Other _____

Type of System: Bulk Wrap _____ Monospiral _____

Level Wind _____ Pull & Store _____

Is an enclosure anti-condensation heater & thermostat desired? _____

Voltage _____

Is an external junction box with terminal strips pre-wired to collector ring desired? _____

Paint: Mfg Std. _____ Special Prep _____ Special _____

Cable last wrap limit switch desired? _____

Special construction specifications (describe or furnish) _____

Remarks _____

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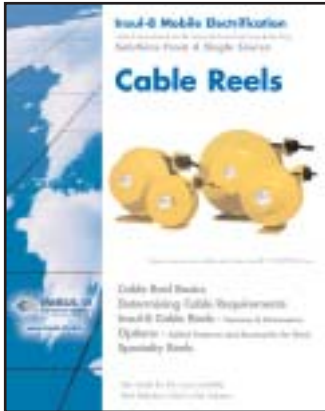
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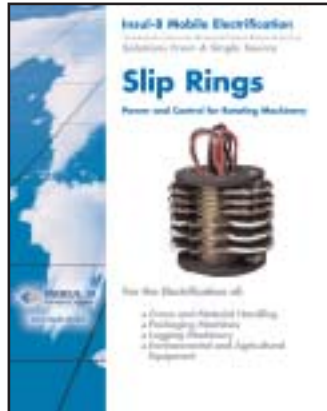
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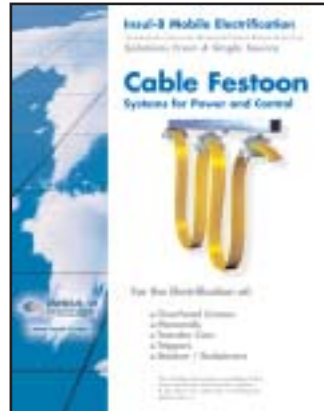
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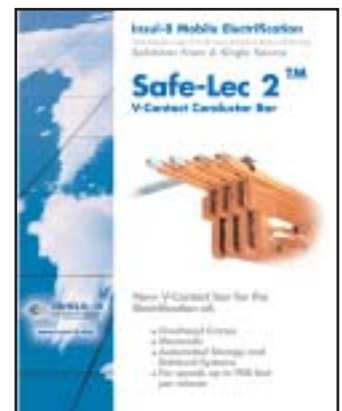
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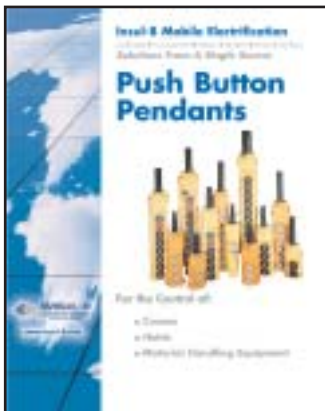
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