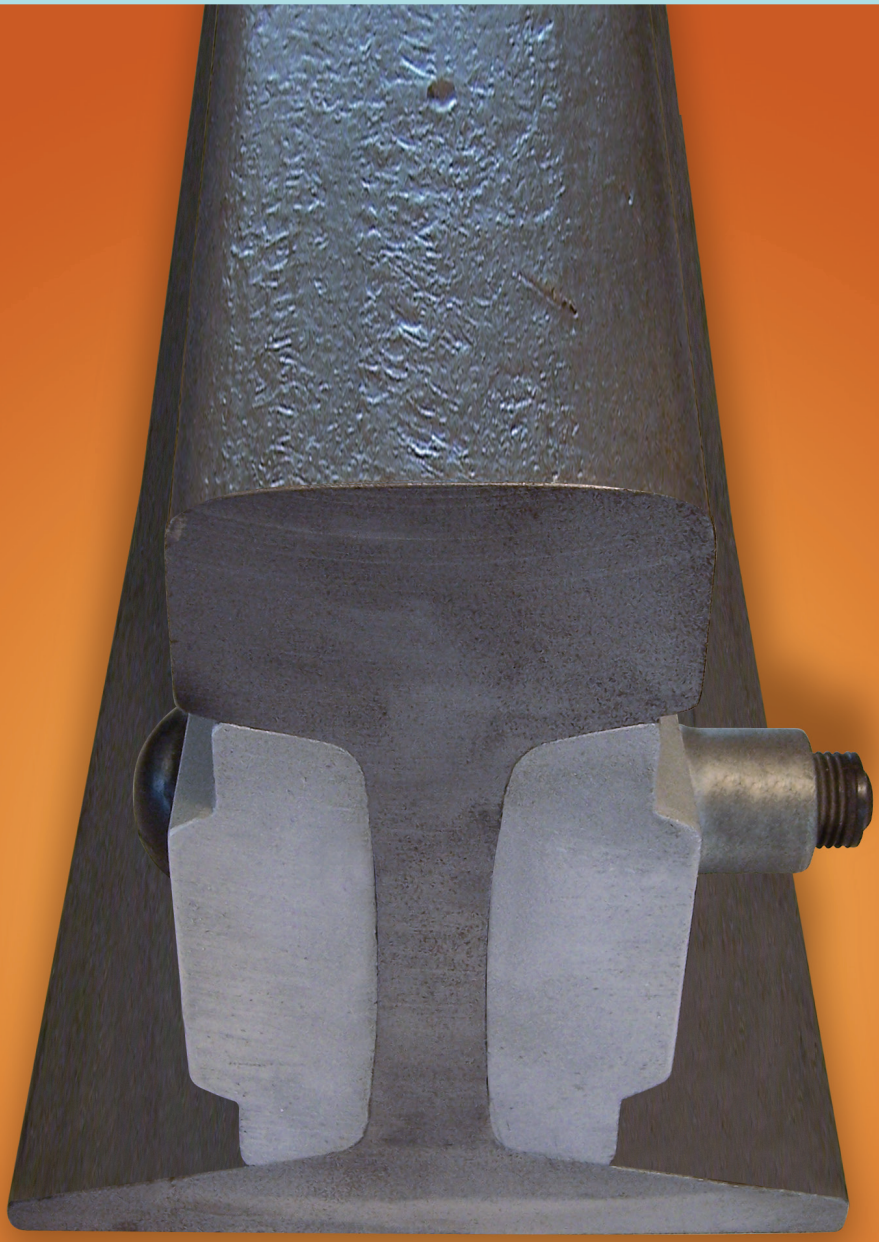
TransDuctor

Engineered Conductor System

TransTech™
POWER TRANSFER SYSTEMS



Extreme-Duty

High Current Capacity

Harsh & High Temperature Environments

No Field Welding or Drilling Required

Suitable for Long Conductor Runs

Moving Electrification *Forward*

Steel Processing Crane

Features

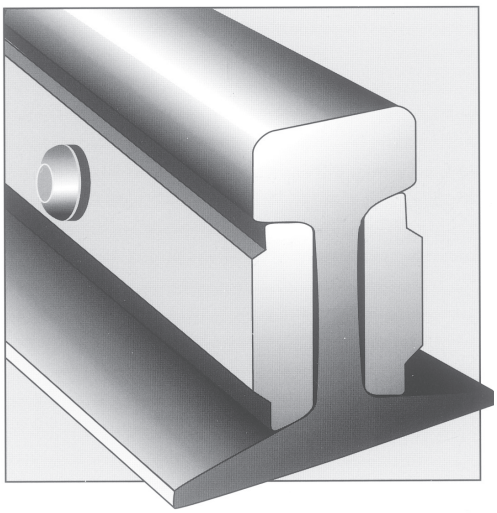
- High current capacity aluminum extrusions compression-bolted to the steel rail with an oxidation inhibitor at the aluminum/steel interface
- Heavy-duty rail and current collectors engineered for harsh and high-temperature environments
- Full range of standard components including hangers, anchors, feeders, splice joints, expansion joints, isolation joints and collector assemblies
- Systems are engineered to customer specifications, including system layout and installation support
- Installation requires only common hand tools

Moving Electrification Forward

Composite Aluminum/Steel Heavy-Duty Conductor System

The conductor-collector system shall be TRANSDUCTOR as manufactured by TransTech. Each system shall consist of the necessary conductor sections; splice joints, rail support insulators, anchors, feeders, expansion joints, collectors, and/or special components as determined from plans and specifications.

The conductor shall be made of aluminum extrusions with a steel rail section. The steel and aluminum sections are fastened together at 18 inch intervals by means of steel compression bolts. The head of the steel rail shall serve as the contact surface. The aluminum portion of the conductor shall have a current carrying capacity of 1800, 2870, 4000, 6000, 8000, or 12,000 amperes based on a 40° C rise over 40° C ambient. The conductor shall have sufficient thermal capacity to withstand a 300% overload for intermittent duty cycles.



The rail support insulator will provide free conductor movement to accommodate expansion or contraction of the conductor rail. The design shall be such that only bolting of the feeders to the conductor is required; no welding of the rail at erection shall be necessary.

The splice joints, feeders and expansion joints shall have an electrical efficiency of greater than 100% when compared to an equal length of conductor.

The temperature rise of the accessory components shall not exceed the 40° C rise of the conductor with which it is intended.

Insulators shall be molded from fiberglass reinforced polyester material, as manufactured by TransTech.

The insulator shall have a dew flashover strength when tested per ASA Specification C29.1 of at least four (4) times normal system voltage.

Porcelain insulators as manufactured by TransTech shall be provided for extreme conditions such as high temperature or chemical considerations.

Terminal lugs shall be tin plated to prevent electrolytic corrosion between the aluminum and the copper alloy connector.

Project Engineering and On-Site Installation Support

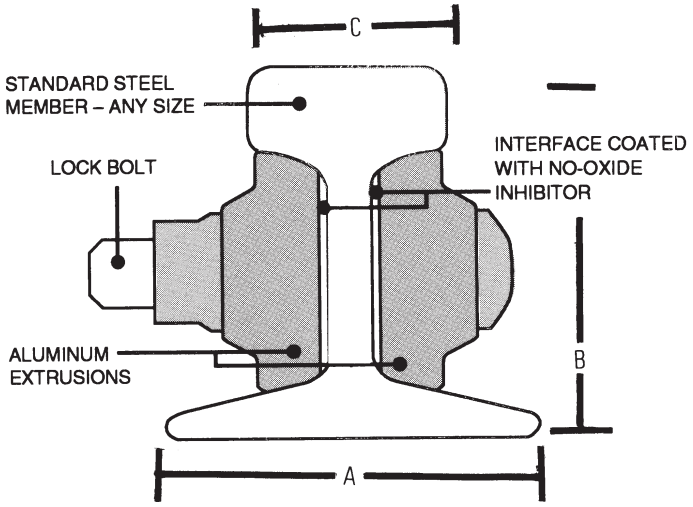
TransTech's engineers custom-configure our products and systems to meet each customer's unique application requirements. We provide on-site technical installation support and layout drawings to our customers and their installation teams.

Conductor

The TRANSDUCTOR® conductor is designed primarily for heavy-duty main runway electrification. It may be mounted for either overrunning or underrunning operation.

The conductor rail assembly consists of a high carbon steel rail and two aluminum extrusions. During production the steel rail is cleaned of all mill scale and foreign material. The aluminum extrusions are also cleaned to remove the aluminum oxides. The steel web of the rail is coated with an oxide inhibition compound, NO- OX-IO which creates a protective interface between the two materials. The aluminum extrusions are fastened to the steel rail by high strength steel compression bolts on 18 inch centers. Each end of the conductor assembly is factory drilled for splice bars.

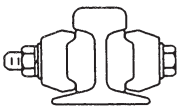
Conductor sections are normally supplied in 30 or 39 foot lengths depending on the steel rail size to be used. Shorter lengths can be furnished where required.



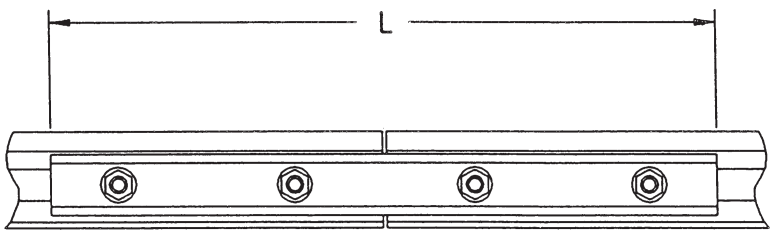
Rail Size	Current Rating	Conductor Cat. No.	D.C. Resist. Ω /1000 ft	Standard Length	Dim. A	Dim. B	Dim. C	Weight Lbs/Ft
25	1800	112147-L	0.0061	30 ft.	2 3/4	2 3/4	1 1/2	10.7
40	2870	111593-L	0.0043	30 ft.	3 1/2	3 1/2	1 7/8	16.7
60	4000	111752-L	0.0033	30 ft.	4 1/4	4 1/4	2 3/8	24.3
115	6000	112377-L	0.0012	39 ft.	5 1/2	6 5/8	2 23/32	51.8
115	8000	112132-L	0.0009	39 ft.	5 1/2	6 5/8	2 23/32	56.6
115	12000	113282-L	0.0008	39 ft.	5 1/2	6 5/8	2 23/32	59.0

Splice Joint Assembly

The splice joint assembly connects and aligns adjoining conductor sections without drilling and welding. Simplicity of the assembly requires only standard tools. Plated steel bolts, lockwashers and nuts are employed to securely fasten two aluminum splice plates to the conductor. The aluminum splice joint has an electrical efficiency of greater than 100% when compared to an equal length of conductor. The splice joint can be used for either overrunning or underrunning operation.



Transductor	Splice Joint Cat. No.	Dim. L	Bolt Size	Weight
25-1800	112144	18 7/8	1/2 - 13 x 4 1/2	10
40-2870	111595	22	1/2 - 13 x 5	11
60-4000	111753	22	5/8 - 11 x 5 1/2	13
115-6000	112133	22	3/4 - 10 x 8	34
115-8000	113307	22	3/4 - 10 x 10	44
115-12000	113283	22	3/4 - 10 x 12	53



Insulator Support

The rail support insulator assembly supports and guides the Transductor®. The assembly mainly consists of an insulator, a rail base and adjustable clamps. Clamps are designed to permit free movement of the conductor to allow for expansion and contraction due to temperature changes. A two-hole mounting base is optional.

Transductor	Insul. Support Cat. No.	Figure	Dim. A	Dim. B	Wt.
25-1800	114282	1	5	$2^1/_2$	4
40-2870	113493	1	$6^1/_4$	$3^1/_2$	5
60-4000	091795	1	6	$3^1/_2$	5
115-6000	112378	2	8	$5^{13}/_{16}$	15
115-8000	112378	2	8	$5^{13}/_{16}$	15
115-12000	112378	2	8	$5^{13}/_{16}$	15

Figure 1

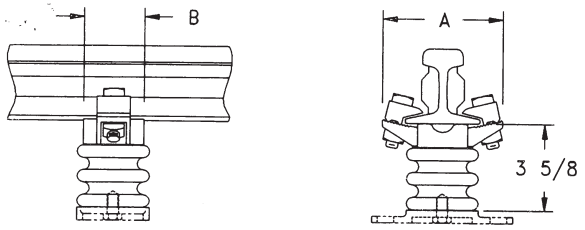
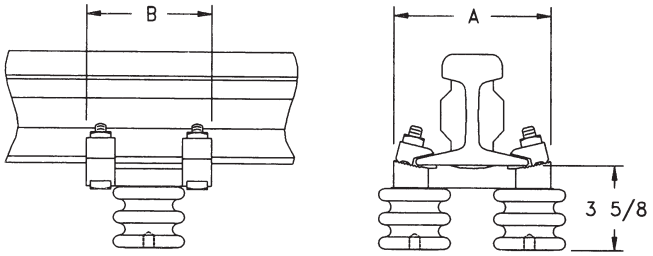


Figure 2



Feeder Assembly

The feeder assembly provides the electrical connection from the power source to the conductor system. It may be located at any point within the system. On long systems the feeder should be located near the center of the system which reduces the effective system length, consequently reducing voltage drop. Feeders are also used in conjunction with the optional isolation joints.

Feeders should be located no closer than six inches from the nearest rail support. The assembly consists of an aluminum plate with mounting hardware to secure the assembly to the aluminum section of the conductor. Feeders will accommodate one or more terminal lugs to match the current capacity of the conductor. Feeder plates are predrilled for NEMA standard hole spacing. Terminal lugs supplied by TransTech are tin plated to reduce electrolytic corrosion between the copper alloy and aluminum feeder plate.

Figure 1

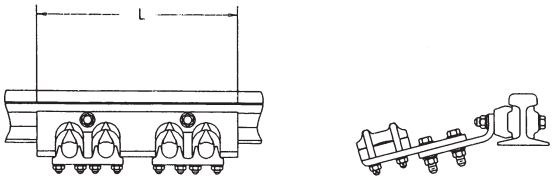


Figure 2

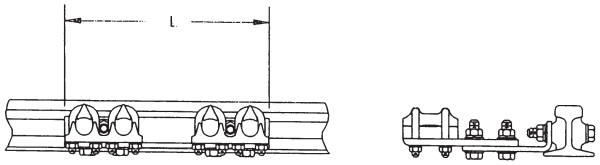
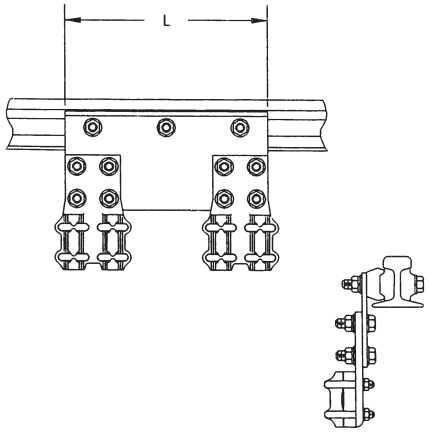


Figure 3



Transductor	Feeder Cat. No.	Figure	Dim. L	NEMA Hole Pattern	Cable Connector	Wt
25-1800	112146	3	11	(2) NEMA 4 Holes	Not Included See Page 4 & 5	5
25-1800	114222	3	11	(1) NEMA 2 Holes		5
40-2870	111598	1	12	(2) NEMA 4 Holes		4
40-2870	111649	1	16	(3) NEMA 4 Holes		6
40-2870	114041	1	8	(2) NEMA 4 Holes		3
60-4000	111755	2	6	(2) NEMA 2 Holes		3
60-4000	112159	2	16	(3) NEMA 4 Holes		6
60-4000	112161	2	10	(2) NEMA 4 Holes		5
115-12000	113285	3	16	(6) NEMA 2 Holes		28

Terminal Lugs

TYPE "FU"
For Stranded Cables

The type "FU" high compression terminal lug has a longitudinal wave cast in both the body and adjustable saddle, or yoke, providing a definite wrapping action which slightly deforms the cable as the bolts are tightened. This provides positive pressure between all strands and assures a high conductivity joint with high pullout strength.

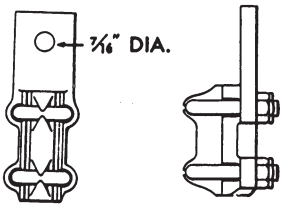


Figure 1

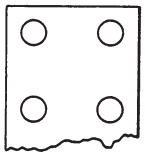
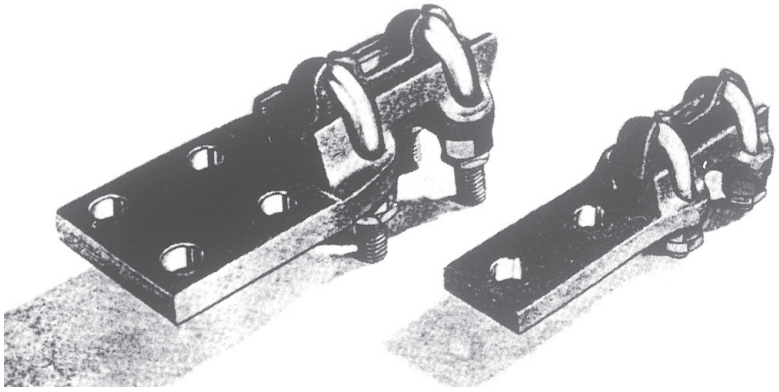


Figure 3



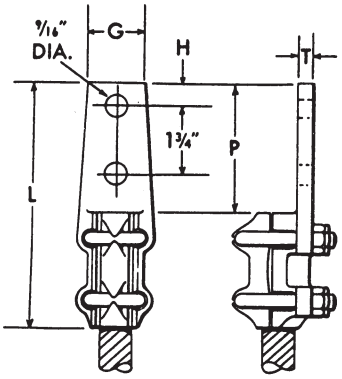


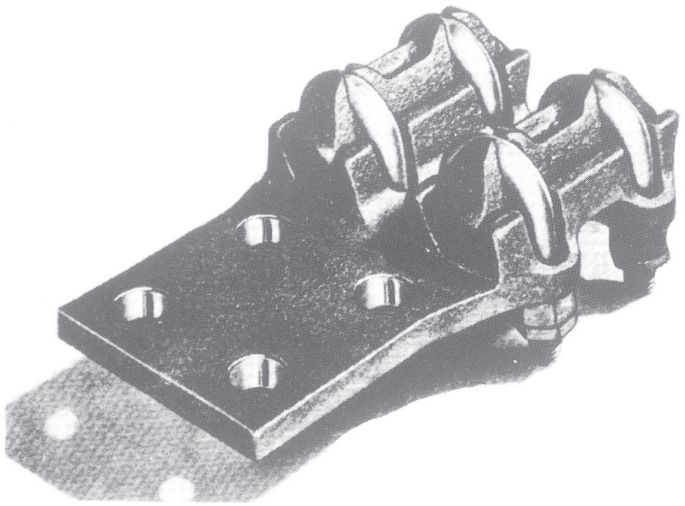
Figure 2

Cable Range		Rated Amp. Cap. of Switch	Catalog Number	Figure Number	Dimensions in Inches					U-Bolt Diameter
Min.	Max.				G	H	L	P	T	
6	2/0	200	FU-100	1	1 1/2	3/4	3 5/8	1 5/8	1/4	3/8
6	2/0	400 & 600	FU-101	2	1 1/2	5/8	5 1/4	3 1/4	1/4	3/8
1	4/0	200	FU-110	1	1 1/2	3/4	4	1 5/8	5/16	3/8
1	4/0	400 & 600	FU-111	2	1 1/2	5/8	5 1/2	3 1/8	5/16	3/8
1/0	300	200	FU-120	1	1 1/2	3/4	4 3/4	2	11/32	3/8
1/0	300	400 & 600	FU-121	2	1 1/2	5/8	5 7/8	3 1/4	11/32	3/8
1/0	300	1200	FU-122	3	3	5/8	6 1/16	3 5/16	11/32	3/8
1/0	300	2000	FU-123	3	4	1 1/8	7	4 1/4	1/4	3/8
300	500	400 & 600	FU-131	2	1 1/2	5/8	6 3/8	3 3/8	3/8	3/8
300	500	1200	FU-132	3	3	5/8	6 5/16	3 1/4	3/8	3/8
300	500	2000	FU-133	3	4	1 1/8	7 1/4	4 1/4	1/4	3/8
500	800	400 & 600	FU-140	2	1 1/2	5/8	7 1/2	3 3/4	3/8	1/2
500	800	1200	FU-141	3	3	5/8	7	3 1/4	3/8	1/2
500	800	2000	FU-142	3	4	1 1/8	8	4 1/4	3/8	1/2
750	1000	400 & 600	FU-150	2	1 1/2	5/8	7 3/4	3 3/4	3/8	1/2
750	1000	1200	FU-151	3	3	5/8	7 5/16	3 5/16	3/8	1/2
750	1000	2000	FU-152	3	4	1 1/8	8 1/4	4 1/4	7/16	1/2
1000	1500	400 & 600	FU-159	2	1 5/8	5/8	7 3/4	3 1/4	3/8	1/2
1000	1500	1200	FU-160	3	3	5/8	8	3 1/2	1/2	1/2
1000	1500	2000	FU-161	3	4	1 1/8	8 3/4	4 1/4	3/8	1/2
1500	2000	400 & 600	FU-169	2	1 1/23	5/8	7 3/4	3 1/4	1/2	1/2
1500	2000	1200	FU-170	3	3	5/8	7 3/4	3 1/4	1/2	1/2
1500	2000	2000	FU-171	3	4	1 1/8	8 3/4	4 1/4	9/16	1/2
To order connectors with all through bolts, add suffix "TB" to catalog number and note exact A.W.G. or M.C.M. size.										

Terminal Lugs

TYPE "FD"
For Two Stranded Cables

Utilizing the same principals of those used in the type "FU" connectors, these twin lugs find many applications on disconnecting switches for oil circuit breakers, transformers, and similar uses. Adjustable yoke permits the use of a wide range of cable size connector.



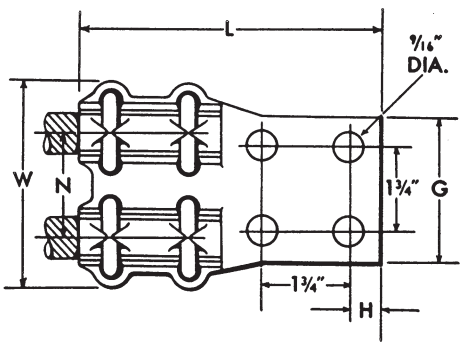


Figure 1

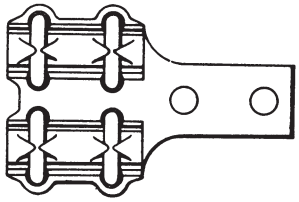
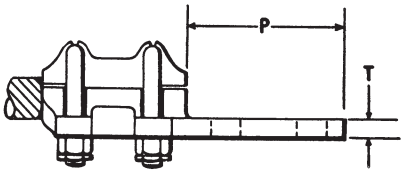


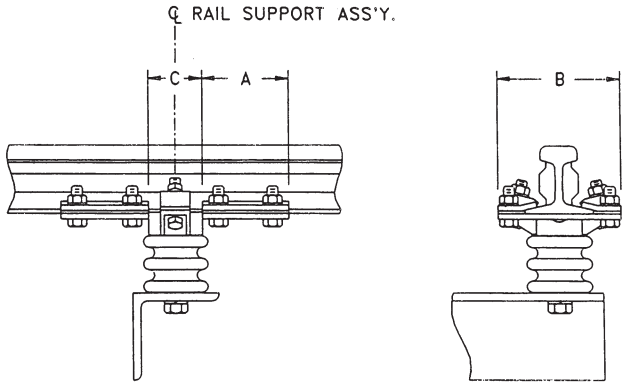
Figure 2



Cable Range		Rated Amp. Cap. of Switch	Catalog Number	Figure Number	Dimension in Inches							U-Bold Dia.
Min.	Max.				G	H	L	N	P	T	W	
6	2/0	400 & 600	FUD-100	1	1 1/2	5/8	5 1/4	1 22/32	3 1/4	5/16	3 5/16	3/8
1	4/0	400 & 600	FUD-110	1	1 1/2	5/8	5 5/8	1 13/16	3 1/4	11/32	3 1/2	3/8
1	4/0	1200	FUD-111	2	3	5/8	5 5/8	1 13/16	3 1/4	5/16	3 1/2	3/8
1/0	300	400 & 600	FUD-120	1	1 1/2	5/8	6	2	3 1/4	3/8	3 7/8	3/8
1/0	300	1200	FUD-121	2	3	5/8	6	2	3 1/4	13/32	3 7/8	3/8
300	500	400 & 600	FUD-131	1	1 1/2	5/8	6 1/4	2 1/8	3 1/4	3/8	4 1/8	3/8
300	500	1200	FUD-132	2	3	5/8	6 1/4	2 1/8	3 1/4	3/8	4 1/8	3/8
300	500	2000	FUD-133	2	4	1 1/8	7 1/4	2 1/8	4 1/4	3/8	4 1/8	3/8
500	800	400 & 600	FUD-140	1	1 1/2	5/8	7	2 11/16	3 1/4	3/8	5 1/4	1/2
500	800	1200	FUD-141	2	3	5/8	7	2 11/16	3 1/4	7/16	5 1/4	1/2
500	800	2000	FUD-142	2	4	1 1/8	8	2 11/16	4 1/4	1/2	5 1/4	1/2
750	1000	400 & 600	FUD-150	1	1 1/2	5/8	7 1/4	2 7/8	3 1/4	7/16	5 5/8	1/2
750	1000	1200	FUD-151	2	3	5/8	7 1/4	2 7/8	3 1/4	1/2	5 5/8	1/2
750	1000	2000	FUD-152	2	4	1 1/8	8 1/4	2 7/8	4 1/4	1/2	5 5/8	1/2
1000	1500	1200	FUD-160	2	3	5/8	7 3/4	3 1/8	3 1/4	1/2	6 1/4	1/2
1000	1500	2000	FUD-161	2	4	1 1/8	8 3/4	3 1/8	4 1/4	1/2	6 1/4	1/2
1500	2000	1200	FUD-170	2	3	5/8	7 3/4	3 7/16	3 1/4	9/16	6 3/4	1/2
1500	2000	2000	FUD-171	2	4	1 1/8	8 3/4	3 7/16	4 1/4	1/2	6 3/4	1/2
To order connectors with all through bolts, add suffix "TB" to catalog number and note exact A.W.G. or M.C.M. size.												

Anchor Assembly

Anchor assemblies are used at one or more points in the system to secure the conductor to a fixed point from which it can expand or contract through the rail supports. Two heavy-duty steel clip assemblies are located adjacent to a rail support to provide an anchor point in the conductor system.



Transductor	Anchor Cat. No.	Dim. A	Dim. B	Dim. C	Wt.
25-1800	112145	$3^{1}/_{16}$	$5^{3}/_{8}$	$2^{1}/_{2}$	3
40-2870	111597	$4^{1}/_{4}$	6	$3^{1}/_{2}$	4
60-4000	111754	$5^{3}/_{8}$	$6^{1}/_{2}$	$3^{1}/_{2}$	5
115-6000	114320	$8^{1}/_{2}$	$7^{3}/_{4}$	$5^{13}/_{16}$	12
115-8000	114320	$8^{1}/_{2}$	$7^{3}/_{4}$	$5^{13}/_{16}$	12
115-12000	114320	$8^{1}/_{2}$	$7^{3}/_{4}$	$5^{13}/_{16}$	12

Isolating Joint Assembly

The isolating joint assembly is used to insulate adjacent conductor sections from each other without interfering with collector travel. It allows portions of the system to be electrically disconnected while operations continue on other live sections. At installations where more than one crane will be operated on a single conductor system, the isolating joint is used to create maintenance and repair bays. The isolating joint may be inserted at any point on the system in place of a standard splice joint assembly. When installed, it assures correct alignment between adjacent conductors. There are two methods of feeding the conductor system at isolation joints. (See Diagram). Each side can be fed individually through adequate safety switches or the isolation joint can be by-passed with the use of feeder assemblies and a suitable disconnect switch.

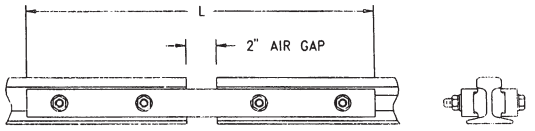


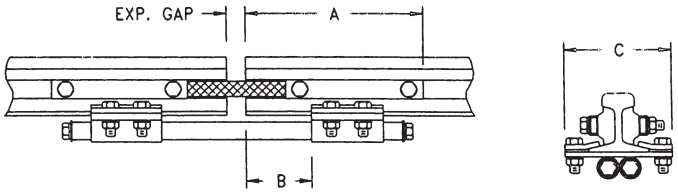
FIG. 1

Transductor	Isolating Joint Cat. No.	Figure	Dim. L	Bolt Size	Wt.
25-1800	112158	1	20	$^{1}/_{2}$ - 13 x $4^{1}/_{4}$	4
40-2870	111596	1	22	$^{1}/_{2}$ - 13 x 5	4
60-4000	111757	1	24	$^{5}/_{8}$ - 11 x 5	5
115-6000	114321	2	24	$^{3}/_{4}$ - 10 x 8	15
115-8000	114322	2	24	$^{3}/_{4}$ - 10 x 11	20
115-12000	114325	2	24	$^{3}/_{4}$ - 10 x 12	25

Expansion Joint Assembly

Expansion joints are sometimes necessary to accommodate building or support structure expansion. Normal indoor installations do not require expansion joints if the temperature ranges do not exceed 50˚C. Extreme variations in temperature based on the application (Example: ladle crane, slab storage, etc.) may necessitate expansion joints and will be recommended by the factory.

Electrical continuity is provided by flexible copper shunts. Mechanical alignment across the conductor gap is maintained by sliding steel bars attached to the conductor base. The conductor gap setting is based on both the ambient temperature at the time of installation and the expected temperature variation to which the system is exposed.



Transductor	Expansion Joint Cat. No.	Dim. A	Dim. B	Dim. C	Max. System Length (ft.)		Wt.
					Indoor	Outdoor Center Anchor	
25-1800	114026	$8^{1}/_{4}$	$8^{1}/_{2}$	$5^{3}/_{8}$	Not Required for Normal Installation	1500	27
40-2870	113494	$8^{1}/_{4}$	2	6		2000	30
60-4000	114324	$8^{1}/_{4}$	2	$6^{1}/_{2}$		2500	37
115-6000	113308-04	11	2	$9^{1}/_{2}$		2500	97
115-8000	113308-05	11	2	12		2500	124
115-12000	113308-06	11	2	$14^{1}/_{2}$		2500	151

Collectors

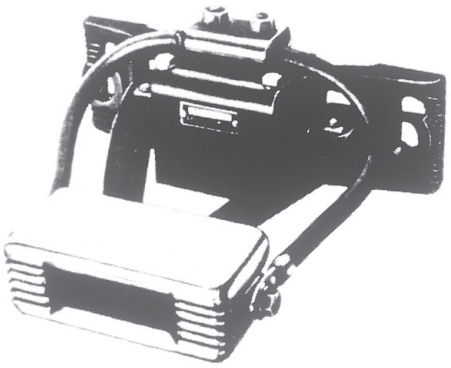
Collectors consist of an assembly of vertical mounting frame plus a spring loaded arm supporting the contact member. Adjustable spring assures proper contact with the conductor and may be varied to meet the paticular working conditions.

Types LMI, LM Pony and LM Standard are assembled for either overrunning or underrunning service.

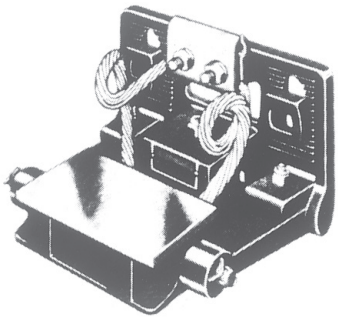
The mounting frame is provided with a corrugated surface around an elongated slot interlocking with a corrugated washer for vertical adjustment.

Feeder connections are made to a bronze solderless connector on tile mounting frame. Flexible copper cable connects the terminal lug and the contact member, thus bridging and bonding the hinged portion.

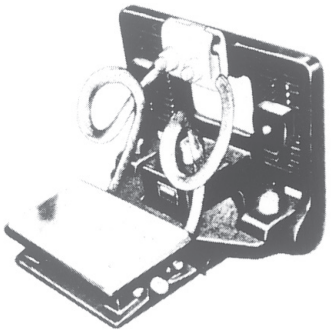
Replaceable contact members on all styles are reversible, there-by providing increased life. These contact members have a swiveling action to allow for any slight misalignment In the conductor.



LMI PONY



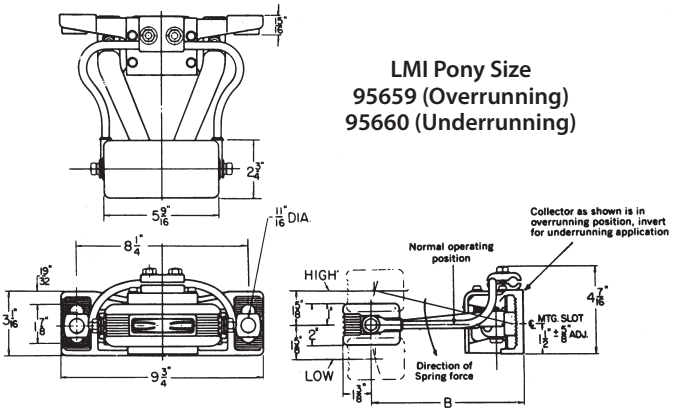
LM PONY

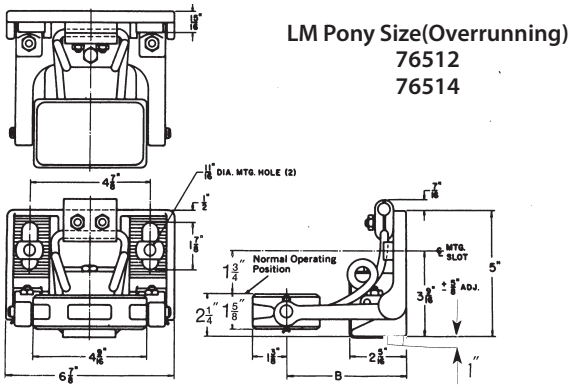


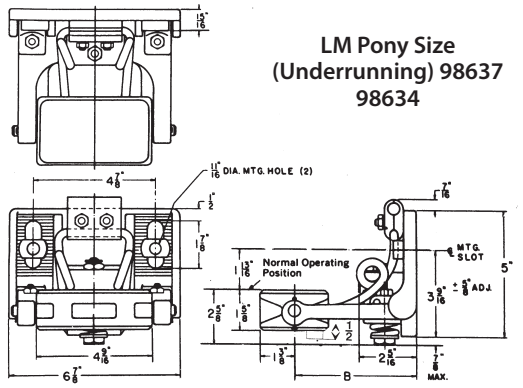
LM STANDARD

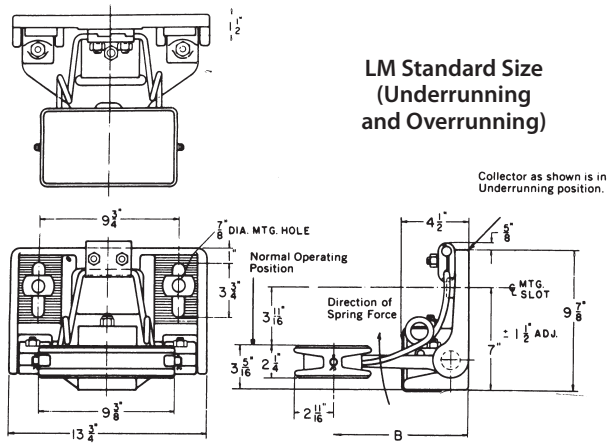
Description	Extension B	Contact Member	Range		Net Wt. Each — Lbs.	Catalog Number
			Up	Down		
LMI Pony Size Collectors						
LMI Collector — Overrunning	7 3/8″	88810	1 5/8″	1 5/8″	16	95659
LMI Collector — Underrunning	7 3/8″	88810	1 5/8″	1 5/8″	16	95660
LM Pony						
LM Pony — Underrunning	4 15/16″	45650	5/8″	1″	12	98637
LM Pony — Overrunning	4 15/16″	45650	1″	5/8″	12	76512
LM Pony — Underrunning	7 3/8″	45650	1″	1 5/8″	13	98634
LM Pony — Overrunning	7 3/8″	45650	1 5/8″	1″	13	76514
LM Standard						
LM Standard — Underrunning	9 5/16″	45715	1″	1 1/4″	67	45712
LM Standard — Overrunning	9 5/16″	45715	1 1/4″	1″	67	76507
LM Standard — Underrunning	10 13/16″	45715	1 1/4″	1 3/8″	69	45713
LM Standard — Overrunning	10 13/16″	45715	1 3/8″	1 1/4″	69	76508
LM Standard — Underrunning	12 5/16″	45715	1 1/2″	1 3/4″	71	45714
LM Standard — Overrunning	12 5/16″	45715	1 3/4″	1 1/2″	71	76509
LM Standard — Underrunning	15 1/16″	45715	1 7/8″	2 1/2″	75	48474
LM Standard — Overrunning	15 1/16″	45715	2 1/8″	2 1/8″	75	76510

Collectors









Comparison Chart			
	LMI Pony Series Page 7	**LM Pony Series Page 7**	**LM Standard Series Page 7**
Approx. Current Capacity (Amperes) Average Conditions Continuous Load Intermittent Load	250 500	250 500	550 1000
Contact Member	Contact Surface $2^1/_4$" x $5^9/_{16}$" Cast Iron. Copper Coated. Reversible.	Contact Surface $2^1/_2$" x $4^1/_2$" Cast Iron. Reversible.	Contact Surfact 5" x 9" Cast Iron. Reversible.
Bronze Cable Terminals	Adjustable for wire diameters .414" to .528"	Adjustable for wire diameters .414" to .528"	Adjustable for wire diameters .536" to .772"
Service	Under or Overrunning	Under or Overrunning	Under or Overrunning
Height of Mounting Back	$3^1/_{16}$"	5"	$9^7/_8$"
Vertical Adjustment of Corrugated Mounting Washer	$1^1/_4$"	$1^1/_4$"	3"
Mounting Bolt Diam. (Not Included with Collectors)	$^5/_8$"	$^5/_8$"	$^3/_4$"
(Mounting Bolt Length Depends on Mounting conditions.) thickness of back and corrugated washer	$^{15}/_{16}$"	$^{15}/_{16}$"	$1^1/_2$"

TECHNICAL DATA

CONDUCTOR SIZE CALCULATION

There are two accepted methods of determining the maximum ampere demand of one or more cranes on a single runway.

Method A

Maximum load equals the sum of all main and auxiliary hoist H.P. plus one-half ($^1/_2$) the sum of all bridge motor and trolley H.P.

Method B

Maximum load equals one-half ($^1/_2$) the sum of all motor and accessory H.P.

CALCULATION

Load H.P. (Method A or B) x amperes per H.P. (Table A) = maximum ampere demand.

Maximum ampere demand x crane factor (Table C) = adjusted maximum ampere demand

VOLTAGE DROP CALCULATION

Symbols

VL = Line Voltage at Feeder (Source).

VD = Voltage Drop.

I = Load Amperes.

L = Effective System Length in Feet. Maximum distance from feeder to end of system.

RDC = D. C. Resistance-ohms/1000 feet.

K = Voltage Drop Multiplier. A factor derived from tests which accounts for variables such as A. C. resistance, inductive reactance, power factor, phase spacing, and conductor shape factors.

Formulas

Direct Current

$$VD = \frac{ILR_{DC}}{500}$$

Alternating Current - Three Phase
(80 percent Power Factor-Flat Spacing)
VD=I L K (Line to Line*)

*For Line to Neutral Voltage Drop divide by 1.73.

Voltage Regulation

$$\% \text{ Regulation} = \frac{VD}{VL\text{-}VD} \times 100$$

TABLE A
Amperes Per Horsepower Conversion

Current	Voltage	Multiplier*
D.C.	115	8
	230	4
	600	1.6
A.C. (3ø)	110	7.0
	220	3.0
	440	1.5
	550	1.2
	2300	0.25
A.C. (2ø)	110	6.0
	220	2.6
	440	1.3
	550	1.1
	2300	0.21

*Average conversion factors calculated from National Electric Code Full Load Current Motor Charts. Motors built for especially low speeds or high torques may require more running current. In which case, name-plate or design current ratings should be used.

TABLE C
CRANE FACTOR (C^F)

Current	Multiplier*
1	1
2	0.95
3	0.91
4	0.87
5	0.84

*In the event there are two or more cranes operating on the same load side of the feeder, the multiplying factors shown in Table C would be applied to the maximum ampere demand calculated by Method A or B.

TABLE B

"K" Voltage loss multiplier for AC applications - Consult factory

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