# RIPPED Ironcore Linear Motors

Parker Trilogy's RIPPED ironcore linear motors, with their patent-pending anti-cog technology, can produce the large forces needed for many industrial applications – without the roughness associated with traditional ironcore linear motors. With forces ranging from 13 lbf (57.8 N) continuous up to 1671 lbf (7433 N) peak, the RIPPED family is well suited for a broad range of extremely demanding applications.

The RIPPED motor connector modules allow quick and easy installation while reducing overall maintenance costs. Ultra-high-flex cables come standard. In addition, we offer modular magnet tracks for unrestricted travel length.

Virtually cog-free operation combined with powerful ironcore technology make the RIPPED family of motors a superior choice for high-force, ultra-smooth motion and affordability.

Features and Benefits
• RIPPED Ironcore Linear Motor for high force applications
• Patent Pending ultra-smooth anti-cog technology
• Connector modules allow quick and easy installation
• Internal thermal cutout switch protects coil
• Digital HEDs, Home & +/-Limit Sensors incorporated into Connector Module
• Modular magnet tracks with flush mounted magnet separators
• Built in cable strain relief
• Two lengths of modular magnet tracks allow unlimited length of travel
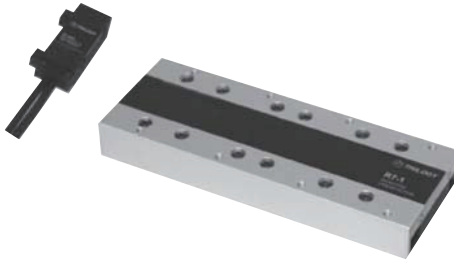
- RIPPED Ironcore motor, patent pending
- Cross-section: 55mm (2.165") x 37.5mm (1.476")
- Peak forces to 325N (73lbs), continuous forces to 97N (22lbs)
- Two lengths of modular magnet tracks allow unlimited length of travel
- Connector module allows quick and easy installation
- Internal thermal cutout switch protects coil

PERFORMANCE

MOTOR MODEL		R5-1	R5-2
Peak Force*	N	190	325
	lbs	43	73
Continuous Force	N	56	97
	lbs	13	22
Peak Power	W	1920	2806
Continuous Power	W	96	140

ELECTRICAL

MOTOR MODEL		R5-1	R5-2
WIRING TYPE	Units	S-Series	S-Series
Peak Current	$A^{pk\ sine}$	11.2	19.2
	(RMS)	7.9	13.5
Continuous Current	$A^{pk\ sine}$	2.5	4.3
	(RMS)	1.7	3.0
Force Constant *	N/A	22.5	22.5
	lbs/A	5.1	5.1
Back EMF	Vm/s	26.0	26.0
	V/ips	0.66	0.66
Resistance	Ohms	15.7	7.8
Inductance	mH	21.5	11.2
Electrical Time Constant	ms	1.4	1.4
Motor Constant	$N/\sqrt{W}$	5.8	8.2

THERMAL

MOTOR MODEL		R5-1	R5-2
Thermal Resistance Wind-Amb	degC / W	0.78	0.53
Thermal Time Constant	min	5.9	5.9
Maximum Winding Temperature	º C	100	100

MECHANICAL

MOTOR MODEL		R5-1	R5-2
Coil Weight	kg	0.6	1.0
	lbs	1.4	2.1
Coil Length (does not include connector module)	mm	130	190
	in	5.118	7.480
Attractive Force	N	667	979
	lbs	150	220
Electrical Cycle Length	mm	40	40
	in	1.575	1.575

*Note: The force constant decreases at high current levels. The force constant at peak current is 3.80 lbs/A/pole.

MODULAR TRACKS R5-160-M-N R5-240-M-N

Clearance for #10-32 Button Head or M5 Socket Head Screw

11.1 1.0
55.0
55.0 45.0
8.0
25.4
37.5
5.0
40.0
80.0 Typical
40.0 Magnetic Pitch
Between Magnet Spacers for Smooth Surface
160.0
240.0
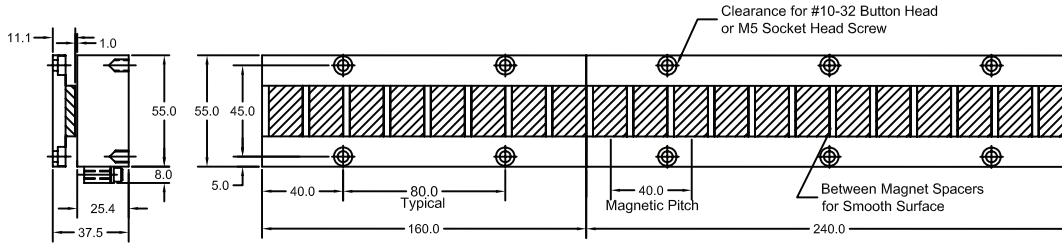
Incremental Length:
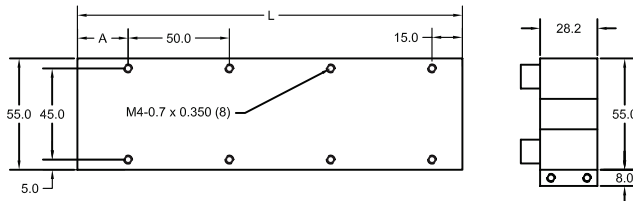80mm (3.1496)

Minimum Length:
40mm (1.5748)

Weight:
3.0kg/m (2.0lb/ft)

R5-160-M-N (Nickel Plated Magnets)
R5-240-M-N (Nickel Plated Magnets)

R5-160-COVER (Optional)
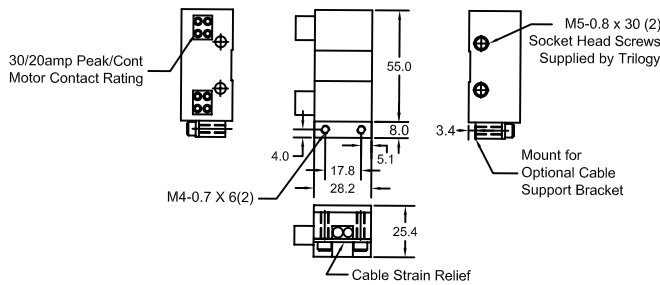R5-240-COVER (Optional)

COIL ASSEMBLY R5-xxxxx

L
A 50.0 15.0
55.0 45.0
M4-0.7 x 0.350 (8)
5.0
28.2
55.0
8.0

R5 COIL ASSEMBLY

R5-xA-NC-MS	L	N	OAL	A
R5-1A-NC-MS	130	6	158.2	15
R5-2A-NC-MS	190	8	218.2	25

R5-1A-NC-MS   Series Winding only
R5-2A-NC-MS   Series Winding only

CONNECTOR MODULE R5-xxx-xx-x

30/20amp Peak/Cont Motor Contact Rating

M5-0.8 x 30 (2) Socket Head Screws Supplied by Trilogy

55.0
8.0
4.0
17.8
5.1
28.2
3.4
Mount for Optional Cable Support Bracket
M4-0.7 X 6(2)
25.4
Cable Strain Relief

R5 CONNECTOR MODULE

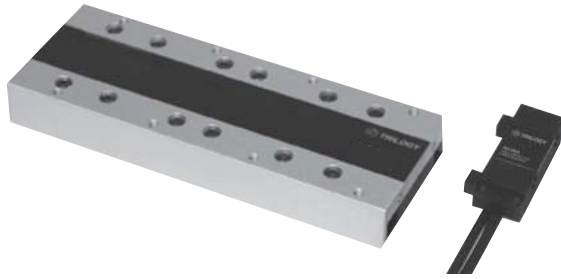| R5-xxx-Rx-x	Motor Connector	Digital HED's	Limit Sensors
R5-CM-Rx-x	✔		
R5-HED-Rx-x	✔	✔	✔

R5-xxx-RS-1 or -RP-1 or -RT-1: 1m cable standard.
Module and Coil Assembly winding (S, P or T) must match.

NOTES

1. Peak force and current based on 5% duty cycle results in the maximum temperature rise.
2. The force constant gradually decreases at high current levels. At the peak current the force constant is reduced by 24%. Refer to www.trilogysystems.com for motor performance curves at different current levels. TIPS sizing software accommodates the changing force constant with current in its algorithms.
3. Specifications are based on the maintaining the air gap between the coil and track shown in the drawings. Refer to www.trilogysystems.com for motor performance curves at different air gaps.
4. Continuous force and current based on coil winding temperature maintained at 100˚C.
5. Motor resistance measured between any two motor leads with motor connected in Wye winding at 25˚C. For temperature at 100˚C, multiply resistance by 1.295 (75˚C rise * 0.393%/˚C).
6. Thermal Resistance is the number of degrees (Celsius) of temperature rise in the winding per watt of power dissipated. Determined experimentally.
7. Motor Constant is a measure of efficiency. Calculated by dividing the force constant by the square root of the motor resistance at maximum operating temperature.
8. Use TIPS sizing software for the most accurate estimate of coil temperature for a particular motion profile.

SAFETY

1. USE EXTREME CAUTION IN HANDLING TRACKS. Ironcore Linear Motors contain exposed magnets and have an open magnetic field. Any ferrous metal, steel or iron, will be attracted to the magnet track. The amount of attractive force increases significantly as the distance from the magnet decreases. Severe injury may occur to fingers or hands if caught between the track and coil or other metal object.
2. USE EXTREME CAUTION WHEN INSTALLING THE COIL. The data sheet lists the attractive force between the coil and track. Refer to the "Motor Installation Guide" for proper installation instructions.
3. ANY PERSON WITH MEDICAL ELECTRONIC IMPLANTS SHOULD USE EXTREME CAUTION WHEN NEAR AN OPEN MAGNETIC FIELD. The magnetic field could interfere with the medical device's operation.
4. ANY PERSON WORKING OR HANDLING THE TRACKS SHOULD REMOVE PERSONAL EFFECTS. Items such as jewelry, watches, keys and credit cards may be damaged or adversely affected by the magnetic field.

- RIPPED Ironcore motor, patent pending
- Cross-section: 70mm (2.756") x 37.5mm (1.476")
- Peak forces in three sizes to 1761N (396lbs), continuous forces to 462N (104lbs)
- Two lengths of modular magnet tracks allow unlimited length of travel
- Connector modules allow quick and easy installation
- Internal thermal cutout switch protects coil

PERFORMANCE

MOTOR MODEL		R7-1	R7-2	R7-3
Peak Force	N	587	1174	1761
	lb	132	264	396
Continuous Force	N	154	308	462
	lb	35	69	104
Peak Power	W	3600	7200	10800
Continuous Power	W	180	360	540

ELECTRICAL

MOTOR MODEL		R7-1	R7-2		R7-3	
WIRING TYPE	UNITS	S-Series	S-Series	P-Parallel	S-Series	T-Triple
Peak Current	A pk sine	29.7	29.7	59.4	29.7	89.1
	(RMS)	21.0	21.0	42.0	21.0	63.0
Continuous Current	A pk sine	6.6	6.6	13.2	6.6	19.8
	(RMS)	4.6	4.6	9.3	4.6	14.0
Force Constant	N/A peak	23.2	46.4	23.2	69.6	23.2
	lb/A peak	5.2	10.4	5.2	15.6	5.2
Back EMF	V/m/s	26.8	53.5	26.8	80.3	26.8
	V/in/s	0.68	1.36	0.68	2.04	0.68
Resistance 25°C, phase to phase	ohms	4.2	8.4	2.1	12.6	1.4
Inductance, phase to phase	mH	6.1	12.2	3.1	18.3	2.0
Electrical Time Constant	ms	1.5	1.5	1.5	1.5	1.5
Motor Constant	N/√W	11.5	16.2	16.2	19.9	19.9
	lb/√W	2.58	3.65	3.65	4.47	4.47
Max Terminal Voltage	VDC	330	330		330	

THERMAL

MOTOR MODEL		R7-1	R7-2	R7-3
Thermal Resistance Wind-Amb	degC / W	0.42	0.21	0.14
Thermal Time Constant	min	12.7	12.7	12.7
Maximum Winding Temperature	°C	100	100	100

MECHANICAL

MOTOR MODEL		R7-1	R7-2	R7-3
Coil Weight	kg	1.5	3.0	4.5
	lb	3.3	6.7	10.0
Coil Length	mm	218.2	378.2	538.2
(includes connector module)	in	8.590	14.890	21.189
Attractive Force	N	1557	3114	4671
	lbf	350	700	1050
Electrical Cycle Length	mm	40	40	40
	in	1.575	1.575	1.575

MODULAR TRACKS R7-160-M-x R7-240-M-x

Clearance for #10-32 Button Head or M5 Socket Head Screw

11.1 1.0 70.0 70.0 60.0 8.0 25.4 37.5 5.0 40.0 80.0 Typical 40.0 Magnetic Pitch 160.0 240.0

Optional 0.12 mm (0.005") Stainless Cover

Spacers for Smooth Surface Between Magnets
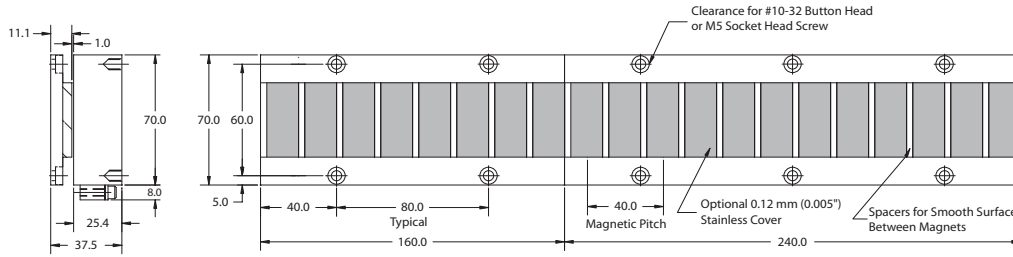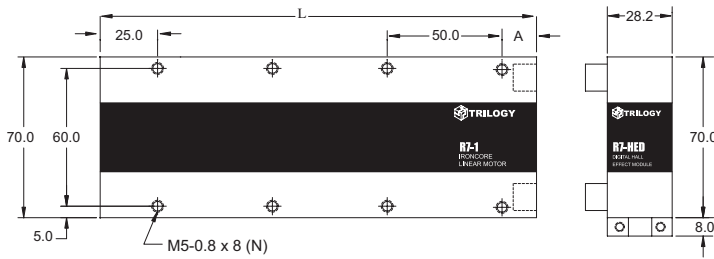
Incremental Length:
80.0mm (3.1496")

Minimum Length:
160.0mm (6.2992")

Weight:
4.57Kg/m (3.08lbs/ft)

R7-160-M-N (Nickel Plated Magnets)
R7-240-M-N (Nickel Plated Magnets)

R7-160-COVER (Optional)
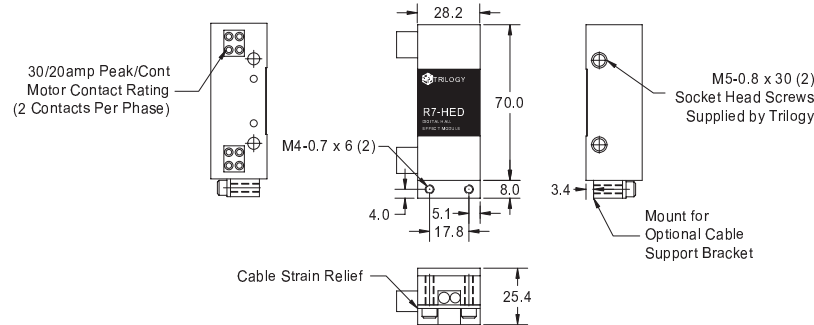R7-240-COVER (Optional)

COIL ASSEMBLY R7-xA-NC-Mx

L 25.0 50.0 A 28.2 70.0 60.0 70.0 5.0 8.0

M5-0.8 x 8 (N)

R7 COIL ASSEMBLY				
R7-xA-NC-Mx	L	N	OAL	A
R7-1A-NC-Mx	190.0	8	218.2	15
R7-2A-NC-Mx	350.0	14	378.2	25
R7-3A-NC-Mx	510.0	20	538.2	35

R7-1A-NC-MS	Series Winding
R7-2A-NC-MS or -MP	Series or Parallel Winding
R7-3A-NC-MS or -MT	Series or Triple Winding

CONNECTOR MODULE R7-xxx-Rx-x

30/20amp Peak/Cont Motor Contact Rating (2 Contacts Per Phase)

28.2 70.0 8.0 4.0 5.1 17.8 3.4

M4-0.7 x 6 (2)

M5-0.8 x 30 (2) Socket Head Screws Supplied by Trilogy

Mount for Optional Cable Support Bracket

Cable Strain Relief 25.4

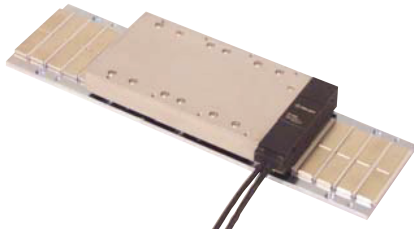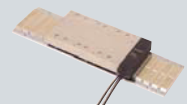| R7 CONNECTOR MODULE			
R7-xxx-Rx-x	Motor Connector	Digital HED's	Limit Sensors
R7-CM-Rx-x	✔		
R7-HED-Rx-x	✔	✔	✔

R7-xxx-RS-1 or -RP-1 or -RT-1: 1m cable standard.
Module and Coil Assembly winding (S, P or T) must match.

NOTES

1. Peak force and current based on 5% duty cycle results in the maximum temperature rise.
2. The force constant gradually decreases at high current levels. At the peak current the force constant is reduced by 24%. Refer to www.trilogysystems.com for motor performance curves at different current levels. TIPS sizing software accommodates the changing force constant with current in its algorithms.
3. Specifications are based on the maintaining the air gap between the coil and track shown in the drawings. Refer to www.trilogysystems.com for motor performance curves at different air gaps.
4. Continuous force and current based on coil winding temperature maintained at 100°C.
5. Motor resistance measured between any two motor leads with motor connected in Wye winding at 25°C. For temperature at 100°C, multiply resistance by 1.295 (75°C rise * 0.393%/°C).
6. Thermal Resistance is the number of degrees (Celsius) of temperature rise in the winding per watt of power dissipated. Determined experimentally.
7. Motor Constant is a measure of efficiency. Calculated by dividing the force constant by the square root of the motor resistance at maximum operating temperature.
8. Use TIPS sizing software for the most accurate estimate of coil temperature for a particular motion profile.

SAFETY

1. USE EXTREME CAUTION IN HANDLING TRACKS. Ironcore Linear Motors contain exposed magnets and have an open magnetic field. Any ferrous metal, steel or iron, will be attracted to the magnet track. The amount of attractive force increases significantly as the distance from the magnet decreases. Severe injury may occur to fingers or hands if caught between the track and coil or other metal object.
2. USE EXTREME CAUTION WHEN INSTALLING THE COIL. The data sheet lists the attractive force between the coil and track. Refer to the "Motor Installation Guide" for proper installation instructions.
3. ANY PERSON WITH MEDICAL ELECTRONIC IMPLANTS SHOULD USE EXTREME CAUTION WHEN NEAR AN OPEN MAGNETIC FIELD. The magnetic field could interfere with the medical device's operation.
4. ANY PERSON WORKING OR HANDLING THE TRACKS SHOULD REMOVE PERSONAL EFFECTS. Items such as jewelry, watches, keys and credit cards may be damaged or adversely affected by the magnetic field.

- RIPPED Ironcore motor, patent pending
- Cross-section: 110mm (4.331) x 37.5mm (1.476)
- Peak forces to 3184N (716lbs), continuous forces to 918N (206lbs)
- Two lengths of modular magnet tracks allow unlimited length of travel
- Connector module allows quick and easy installation
- Internal thermal cutout switch protects coil

PERFORMANCE

MOTOR MODEL		R9-1	R9-2	R9-3
Peak Force	N	1061	2123	3184
	lb	239	477	716
Continuous Force	N	306	612	918
	lb	69	138	206
Peak Power	W	4800	9600	14400
Continuous Power	W	240	480	720

ELECTRICAL

MOTOR MODEL		R9-1	R9-2		R9-3	
WIRING TYPE	UNITS	S-Series	S-Series	P-Parallel	S-Series	T-Triple
Peak Current	A $^{pk\,sine}$	29.5	29.5	59.1	29.5	88.6
	(RMS)	20.8	20.8	41.8	20.8	62.6
Continuous Current	A $^{pk\,sine}$	6.6	6.6	13.2	6.6	19.8
	(RMS)	4.6	4.6	9.3	4.6	14.0
Force Constant	N/A	46.5	92.7	46.4	139.1	46.4
	lbs/A	10.4	20.8	10.4	31.3	10.4
Back EMF	V/m/s	53.5	107.1	53.5	160.6	53.5
	V/ips	1.36	2.72	1.4	4.08	1.4
Resistance	Ohms	5.7	11.3	2.8	17.0	1.9
Inductance	mH	11.5	22.9	5.7	34.4	3.8
Electrical Time Constant	ms	2.0	2.0	2.0	2.0	2.0
Motor Constant	N/√W	19.8	27.9	27.9	34.2	34.2
	lbs/√W	4.44	6.28	6.3	7.69	7.7
Max Terminal Voltage	VDC	330	330		330	

THERMAL

MOTOR MODEL		R9-1	R9-2	R9-3
Thermal Resistance Wind-Amb	degC / W	0.31	0.16	0.10
Thermal Time Constant	min	32.3	32.3	32.3
Maximum Winding Temperature	deg C	100	100	100

MECHANICAL

MOTOR MODEL		R9-1	R9-2	R9-3
Coil Weight	kg	3.0	6.0	9.0
	lbs	6.6	13.2	19.8
Coil Length	mm	190	350	510
(does not include connector module)	in	7.480	13.780	20.080
Attractive Force	N	3114	6227	9341
	lbs	700	1400	2100
Electrical Cycle Length	mm	40	40	40

MODULAR TRACKS R9-160M-N R9-240M-N
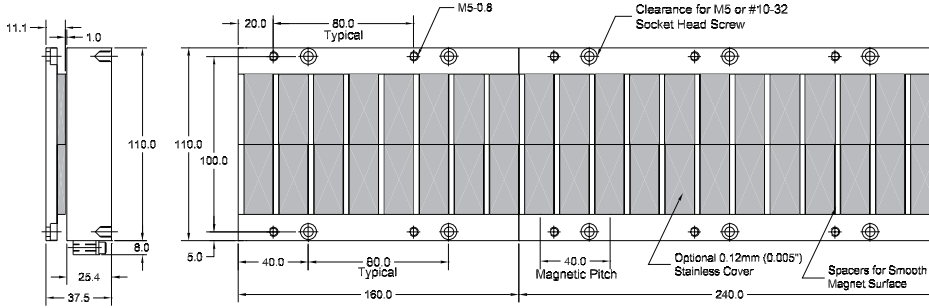
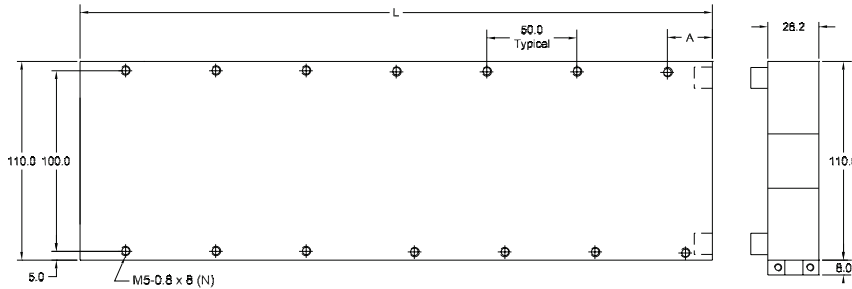**Incremental Length:**
80mm (3.150)

Minimum Length:
40.0mm (1.575)

Weight:
7.8 kg/m (5.2 lbs/ft)

R9-160M-N (Nickel Plated Magnets)
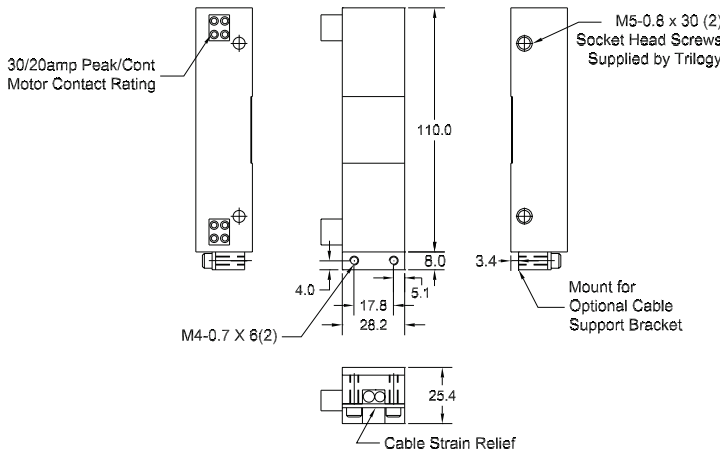**R9-240M-N** (Nickel Plated Magnets)

COIL ASSEMBLY R9-XA-NC-Mx

R9 COIL ASSEMBLY

R9-XA-NC-Mx	L	A	N	OAL
R9-1A-NC-MS	190.0	15.0	8	218.2
R9-2A-NC-Mx	350.0	25.0	14	378.2
R9-3A-NC-Mx	510.0	35.0	20	538.2

R9-1A-NC-MS	Series Winding Only
R9-2A-NC-MS or MP	Series or Parallel Winding
R9-3A-NC-MS or MT	Series or Triple Parallel Winding

CONNECTOR MODULE R9-xxx-Rx-x

30/20amp Peak/Cont Motor Contact Rating

M5-0.8 x 30 (2) Socket Head Screws Supplied by Trilogy

Mount for Optional Cable Support Bracket

M4-0.7 X 6(2)

Cable Strain Relief

R9 CONNECTOR MODULE

	Motor Connector	Digital HEDs	Limit Sensor
R9-CM-Rx-x	●		
R9-HED-Rx-x	●	●	●

R9-xxx-RS-1 or -RP-1 or -RT-1: 1m cable standard Module and Coil Assembly winding (S, P or T) must match

NOTES

1. Peak force for the R9 is not limited by the temperature rise. Using the peak current at a 6.4% duty cycle results in the maximum temperature rise.
2. The force constant gradually decreases at high current levels. At the peak current the force constant is reduced by 27%. www.trilogysystems.com for motor performance curves at different current levels. TIPS sizing software accommodates the changing force constant with current in its algorithms.
3. Specifications are based on the maintaining the air gap between the coil and track shown in the drawings. Refer to www.trilogysystems.com for motor performance curves at different air gaps.
4. Continuous force and current based on coil winding temperature maintained at 100°C.
5. Motor resistance measured between any two motor leads with motor connected in Wye winding at 25°C. For temperature at 100°C, multiply resistance by 1.295 (75°C rise * 0.393% / °C).
6. Thermal Resistance is the number of degrees (Celsius) of temperature rise in the winding per watt of power dissipated. Determined experimentally.
7. Motor Constant is a measure of efficiency. Calculated by dividing the force constant by the square root of the motor resistance at maximum operating temperature.
8. Use TIPS sizing software for the most accurate estimate of coil temperature for a particular motion profile.

SAFETY

1. USE EXTREME CAUTION IN HANDLING TRACKS. Ironcore Linear Motors contain exposed magnets and have an open magnetic field. Any ferrous metal, steel or iron, will be attracted to the magnet track. The amount of attractive force increases significantly as the distance from the magnet decreases. Severe injury may occur to fingers or hands if caught between the track and coil or other metal object.
2. USE EXTREME CAUTION WHEN INSTALLING THE COIL. The data sheet lists the attractive force between the coil and track. Refer to the "Motor Installation Guide" for proper installation instructions.
3. ANY PERSON WITH MEDICAL ELECTRONIC IMPLANTS SHOULD USE EXTREME CAUTION WHEN NEAR AN OPEN MAGNETIC FIELD. The magnetic field could interfere with the medical device's operation.
4. ANY PERSON WORKING OR HANDLING THE TRACKS SHOULD REMOVE PERSONAL EFFECTS. Items such as jewelry, watches, keys and credit cards may be damaged or adversely affected by the magnetic field.

- RIPPED Ironcore motor, patent pending
- Cross-section: 100mm (3.94") x 58mm (2.28")
- Peak forces in three sizes to 4097N (921lbs), continuous forces to 1121N (252lbs)
- Two lengths of modular magnet tracks allow unlimited length of travel
- Connector modules allow quick and easy installation
- Internal thermal cutout switch protects coil

PERFORMANCE

MOTOR MODEL		R10-1	R10-2	R10-3
Peak Force	N	1366	2731	4097
	lb	307	614	921
Continuous Force	N	374	747	1121
	lb	84	168	252
Peak Power	W	6098	12196	18294
Continuous Power	W	305	610	915

ELECTRICAL

MOTOR MODEL		R10-1	R10-2		R10-3	
WIRING TYPE	UNITS	S-Series	S-Series	P-Parallel	S-Series	T-Triple
Peak Current	$A^{pk\ sine}$	35.1	35.1	70.2	35.1	105.3
	(RMS)	24.8	24.8	49.6	24.8	74.4
Continuous Current	$A^{pk\ sine}$	7.8	7.8	15.6	7.8	23.4
	(RMS)	5.5	5.5	11.0	5.5	16.5
Force Constant	N/A peak	47.7	95.5	47.7	143.2	47.7
	lb/A peak	10.7	21.5	10.7	32.2	10.7
Back EMF	V/m/s	55.1	110.2	55.1	165.4	55.1
	V/in/s	1.40	2.80	1.40	4.20	1.40
Resistance 25°C, phase to phase	ohms	5.1	10.2	2.6	15.3	1.7
Inductance, phase to phase	mH	15.4	30.8	7.7	46.2	5.1
Electrical Time Constant	ms	3	3	3	3	3
Motor Constant	N/√W	21.4	30.3	30.3	37.1	37.1
	lb/√W	4.82	6.82	6.82	8.35	8.35
Max Terminal Voltage	VDC	330	330		330	

THERMAL

MOTOR MODEL		R10-1	R10-2	R10-3
Thermal Resistance Wind-Amb	degC / W	0.24	0.12	0.08
Thermal Time Constant	min	14.6	14.6	14.6
Maximum Winding Temperature	°C	100	100	100

MECHANICAL

MOTOR MODEL		R10-1	R10-2	R10-3
Coil Weight	kg	4.5	9.1	13.6
	lb	10.0	20.0	30.0
Coil Length	mm	305.5	545.5	785.5
(includes connector module)	in	12.027	21.476	30.925
Attractive Force	N	3559	7117	10675
	lbf	800	1600	2400
Electrical Cycle Length	mm	60	60	60
	in	2.362	2.362	2.362

MODULAR TRACKS R10-180-M-x R10-240-M-x

11.1
0.9
7.5
95.0 80.0
100.0
46.0
58.0
30.0
60.0 Typical
60.0 Magnetic Pitch
180.0
240.0

Clearance for M6 Button Head Screw
Spacers for Smooth Surface Between Magnets
Optional 0.12 mm (0.005") Stainless Cover
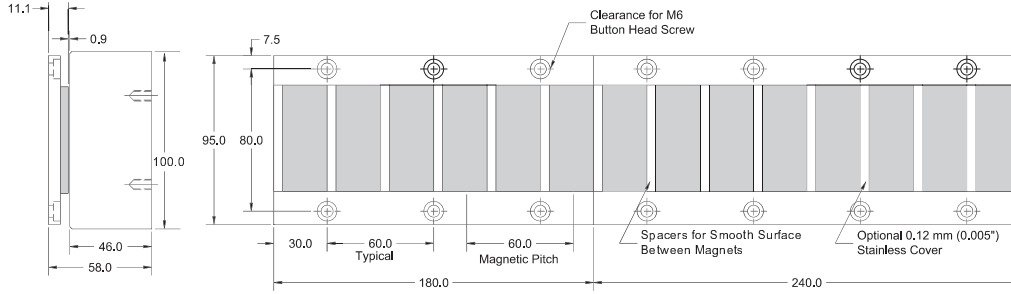
Incremental Length:
60.0mm (2.3622")

Minimum Length:
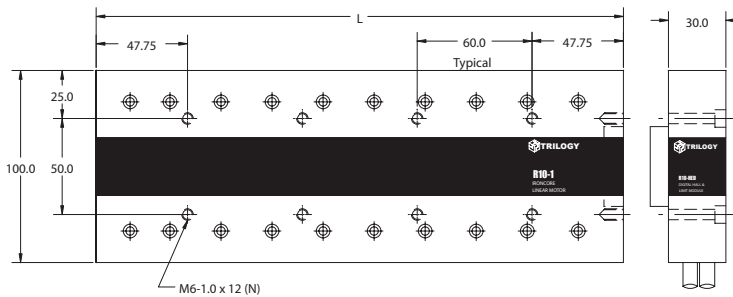180.0mm (7.0866")

Weight:
6.51Kg/m (4.38lbs/ft)

R10-180-M-N (Nickel Plated Magnets)
R10-240-M-N (Nickel Plated Magnets)

R10-180-COVER (Optional)
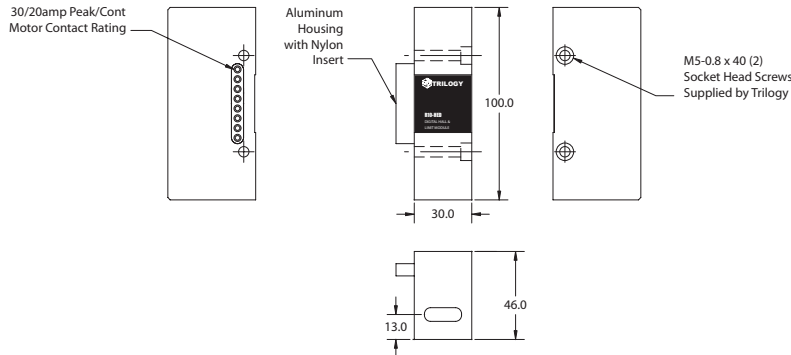R10-240-COVER (Optional)

COIL ASSEMBLY R10-xA-NC-Mx

L
47.75
60.0 Typical
47.75
30.0
25.0
100.0 50.0

R10-1
IRONCORE LINEAR MOTOR

M6-1.0 x 12 (N)

R10 COIL ASSEMBLY

R10-xA-NC-Mx	L	N	OAL
R10-1A-NC-Mx	275.5	8	305.5
R10-2A-NC-Mx	505.5	16	535.5
R10-3A-NC-Mx	755.5	24	785.5

R10-1A-NC-MS	Series Winding
R10-2A-NC-MS or -MP	Series or Parallel Winding
R10-3A-NC-MS or -MT	Series or Triple Winding

CONNECTOR MODULE R10-xxx-Rx-x

30/20amp Peak/Cont Motor Contact Rating

Aluminum Housing with Nylon Insert

100.0
30.0
46.0
13.0

M5-0.8 x 40 (2) Socket Head Screws Supplied by Trilogy

R10 CONNECTOR MODULE

R10-xxx-Rx-x	Motor Connector	Digital HED's	Limit Sensors
R10-CM-Rx-x	✔		
R10-HED-Rx-x	✔	✔	✔

R10-xxx-RS-1 or -RP-1 or -RT-1: 1m cable standard.
Module and Coil Assembly winding (S, P or T) must match.

NOTES

1. Peak force for the R10 is not limited by the temperature rise. Using the peak current at a 6.4% duty cycle results in the maximum temperature rise.
2. The force constant gradually decreases at high current levels. At the peak current the force constant is reduced by 27%. Refer to www.trilogysystems.com for motor performance curves at different current levels. TIPS sizing software accommodates the changing force constant with current in its algorithms.
3. Specifications are based on the maintaining the air gap between the coil and track shown in the drawings. Refer to www.trilogysystems.com for motor performance curves at different air gaps.
4. Continuous force and current based on coil winding temperature maintained at 100°C.
5. Motor resistance measured between any two motor leads with motor connected in Wye winding at 25°C. For temperature at 100°C, multiply resistance by 1.295 (75°C rise * 0.393%/°C).
6. Thermal Resistance is the number of degrees (Celsius) of temperature rise in the winding per watt of power dissipated. Determined experimentally.
7. Motor Constant is a measure of efficiency. Calculated by dividing the force constant by the square root of the motor resistance at maximum operating temperature.
8. Use TIPS sizing software for the most accurate estimate of coil temperature for a particular motion profile.

SAFETY

1. USE EXTREME CAUTION IN HANDLING TRACKS. Ironcore Linear Motors contain exposed magnets and have an open magnetic field. Any ferrous metal, steel or iron, will be attracted to the magnet track. The amount of attractive force increases significantly as the distance from the magnet decreases. Severe injury may occur to fingers or hands if caught between the track and coil or other metal object.
2. USE EXTREME CAUTION WHEN INSTALLING THE COIL. The data sheet lists the attractive force between the coil and track. Refer to the "Motor Installation Guide" for proper installation instructions.
3. ANY PERSON WITH MEDICAL ELECTRONIC IMPLANTS SHOULD USE EXTREME CAUTION WHEN NEAR AN OPEN MAGNETIC FIELD. The magnetic field could interfere with the medical device's operation.
4. ANY PERSON WORKING OR HANDLING THE TRACKS SHOULD REMOVE PERSONAL EFFECTS. Items such as jewelry, watches, keys and credit cards may be damaged or adversely affected by the magnetic field.

- RIPPED Ironcore motor, patent pending
- Cross-section: 160mm (6.30") x 58mm (2.28")
- Peak forces in three sizes to 7435N (1671lbs), continuous forces to 2230N (501lbs)
- Two lengths of modular magnet tracks allow unlimited length of travel
- Connector modules allow quick and easy installation
- Internal thermal cutout switch protects coil

PERFORMANCE

MOTOR MODEL		R16-1	R16-2	R16-3
Peak Force	N	2478	4955	7433
	lb	557	1114	1671
Continuous Force	N	743	1487	2230
	lb	167	334	501
Peak Power	W	7065	14130	21195
Continuous Power	W	353	707	1060

ELECTRICAL

MOTOR MODEL		R16-1	R16-2		R16-3	
WIRING TYPE	UNITS	S-Series	S-Series	P-Parallel	S-Series	T-Triple
Peak Current	A pk sine	34.8	34.8	69.8	34.8	104.5
	(RMS)	24.6	24.6	49.3	24.6	73.9
Continuous Current	A pk sine	7.8	7.8	15.6	7.8	23.4
	(RMS)	5.5	5.5	11.0	5.5	16.5
Force Constant	N/A peak	95.5	190.9	95.5	286.4	95.5
	lb/A peak	21.5	42.9	21.5	64.4	21.5
Back EMF	V/m/s	110.2	220.5	110.2	330.7	110.2
	V/in/s	2.80	5.60	2.80	8.40	2.80
Resistance 25°C, phase to phase	ohms	6.0	12.0	3.0	18.0	2.0
Inductance, phase to phase	mH	29.0	58.0	14.5	87.0	9.7
Electrical Time Constant	ms	4.8	4.8	4.8	4.8	4.8
Motor Constant	N/√W	39.6	55.9	55.9	68.5	68.5
	lb/√W	8.89	12.57	12.57	15.40	15.40
Max Terminal Voltage	VDC	330	330		330	

THERMAL

MOTOR MODEL		R16-1	R16-2	R16-3
Thermal Resistance Wind-Amb	degC/ /W	0.21	0.11	0.07
Thermal Time Constant	min	37.1	37.1	37.1
Maximum Winding Temperature	°C	100	100	100

MECHANICAL

MOTOR MODEL		R16-1	R16-2	R16-3
Coil Weight	kg	9.10	18.20	27.30
	lb	20.0	40.0	60.0
Coil Length	mm	305.5	545.5	785.5
(includes connector module)	in	12.027	21.476	30.925
Attractive Force	N	7117	14234	21351
	lbf	1600	3200	4800
Electrical Cycle Length	mm	60	60	60
	in	2.3622	2.3622	2.3622

MODULAR TRACKS R16-180-M-x R16-240-M-x

Clearance for 1/4-20 or M6 Button Head Screw

11.1
0.9
7.5
160.0
155.0 140.0
2.5
46.0
58.0
30.0
60.0 Typical
60.0 Magnetic Pitch
180.0
240.0

Spacers for Smooth Surface Between Magnets
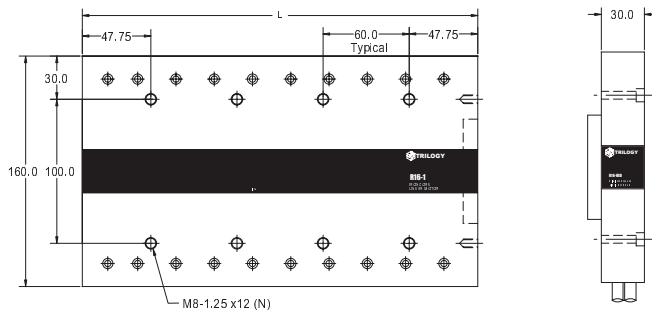Optional 0.12 mm (0.005") Stainless Cover
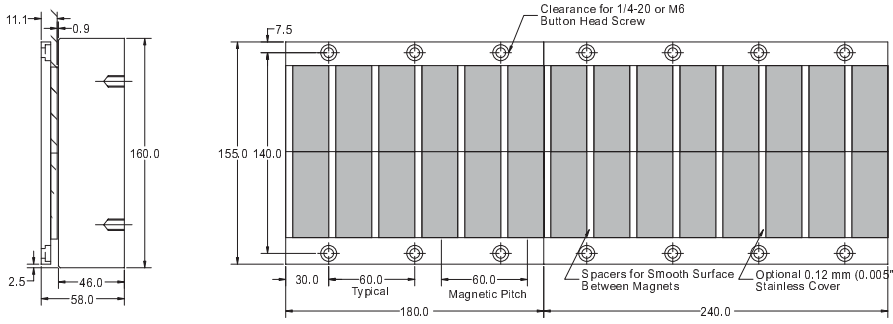
Incremental Length:
60.0mm (2.3622")

Minimum Length:
180.0mm (7.0866")

Weight:
11.34Kg/m (7.60lbs/ft)

R16-180-M-N (Nickel Plated Magnets)
R16-240-M-N (Nickel Plated Magnets)

R16-180-COVER (Optional)
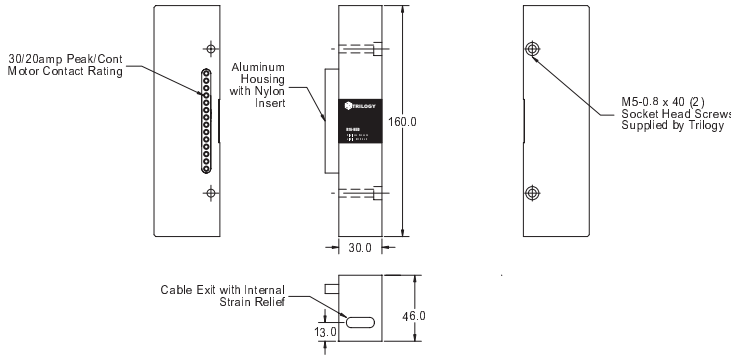R16-240-COVER (Optional)

COIL ASSEMBLY R16-xA-NC-Mx

L
47.75
60.0 Typical
47.75
30.0
30.0
160.0 100.0
M8-1.25 x12 (N)

R16 COIL ASSEMBLY

R16-xA-NC-Mx	L	N	OAL
R16-1A-NC-Mx	275.5	8	305.5
R16-2A-NC-Mx	515.5	16	545.5
R16-3A-NC-Mx	755.5	24	785.5

R16-1A-NC-MS — Series Winding
R16-2A-NC-MS or -MP — Series or Parallel Winding
R16-3A-NC-MS or -MT — Series or Triple Winding

CONNECTOR MODULE R16-xxx-Rx-x

30/20amp Peak/Cont Motor Contact Rating
Aluminum Housing with Nylon Insert
160.0
30.0
M5-0.8 x 40 (2) Socket Head Screws Supplied by Trilogy
Cable Exit with Internal Strain Relief
13.0
46.0

R16 CONNECTOR MODULE

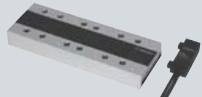| R16-xxx-Rx-x	Motor Connector	Digital HED's	Limit Sensors
R16-CM-Rx-x	✔		
R16-HED-Rx-x	✔	✔	✔

R16-xxx-RS-1 or -RP-1 or -RT-1: 1m cable standard.
Module and Coil Assembly winding (S, P or T) must match.

NOTES

1. Peak force for the R16 is not limited by the temperature rise. Using the peak current at a 6.4% duty cycle results in the maximum temperature rise.
2. The force constant gradually decreases at high current levels. At the peak current the force constant is reduced by 27%. Refer to www.trilogysystems.com for motor performance curves at different current levels. TIPS sizing software accommodates the changing force constant with current in its algorithms.
3. Specifications are based on the maintaining the air gap between the coil and track shown in the drawings. Refer to www.trilogysystems.com for motor performance curves at different air gaps.
4. Continuous force and current based on coil winding temperature maintained at 100°C.
5. Motor resistance measured between any two motor leads with motor connected in Wye winding at 25°C. For temperature at 100°C, multiply resistance by 1.295 (75°C rise * 0.393%/°C).
6. Thermal Resistance is the number of degrees (Celsius) of temperature rise in the winding per watt of power dissipated. Determined experimentally.
7. Motor Constant is a measure of efficiency. Calculated by dividing the force constant by the square root of the motor resistance at maximum operating temperature.
8. Use TIPS sizing software for the most accurate estimate of coil Dimemperature for a particular motion profile.

SAFETY

1. USE EXTREME CAUTION IN HANDLING TRACKS. Ironcore Linear Motors contain exposed magnets and have an open magnetic field. Any ferrous metal, steel or iron, will be attracted to the magnet track. The amount of attractive force increases significantly as the distance from the magnet decreases. Severe injury may occur to fingers or hands if caught between the track and coil or other metal object.
2. USE EXTREME CAUTION WHEN INSTALLING THE COIL. The data sheet lists the attractive force between the coil and track. Refer to the "Motor Installation Guide" for proper installation instructions.
3. ANY PERSON WITH MEDICAL ELECTRONIC IMPLANTS SHOULD USE EXTREME CAUTION WHEN NEAR AN OPEN MAGNETIC FIELD. The magnetic field could interfere with the medical device's operation.
4. ANY PERSON WORKING OR HANDLING THE TRACKS SHOULD REMOVE PERSONAL EFFECTS. Items such as jewelry, watches, keys and credit cards may be damaged or adversely affected by the magnetic field.

Motor Coil:

Order Example:

R7 - 1 A - NC - M S

Series
R5, R7, R9, R10, R16

Coil size
1, 2 or 3 poles

Mounting Type
A standard top mount
C custom

Winding type
S series
P parallel (R7-2 only)
T triple (R7-3 only)

Module ready
receives connector module

Cooling
NC no cooling
AC not available
*LC not available

*Consult factory for water cooling options.

Magnet Track:

Order Example:

R7 - 240 M - N

Series
R5, R7, R9, R10, R16

Track length
160 mm or 240 mm for R5, R7 and R9
180 mm or 240 mm for R10 and R16

Magnet coating
N nickel

Mounting
M modular
C custom

Connector Module:

Order Example:

R7 - CM - R S - 1

Series
R5, R7, R9, R10, R16

Device description
CM connector module
HED Hall effects device with limits

Module type

Cable lengh
1 meter (standard)

Module winding
S series
P parallel
T triple
(must correspond to coil winding)