

Kinetix 6000M Integrated Drive-Motor

Catalog Numbers MDF-SB1003, MDF-SB1153, MDF-SB1304

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Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

About the Kinetix 6000M Integrated Drive-Motor

Kinetix® 6000M integrated drive-motor (IDM) systems include up to 16 integrated drive-motor (IDM) units, along with an IDM power interface module (IPIM). IDM units are mounted directly on the machine and the IPIM module mounts on the Bulletin 2094 power rail.

IDM units and the IPIM module are compatible with only 400V-class Kinetix 6000 or Kinetix 6200 multi-axis drive systems.

IMPORTANT The Kinetix 6000M integrated drive-motor system is not compatible with 200V-class drive systems.

Each IDM unit is controlled by a communication network that connects to the IPIM module. The IPIM module passes network data to the IDM units through daisy-chained network cables. A network terminator plug connects to the last IDM unit and returns the network signal to the IPIM module.

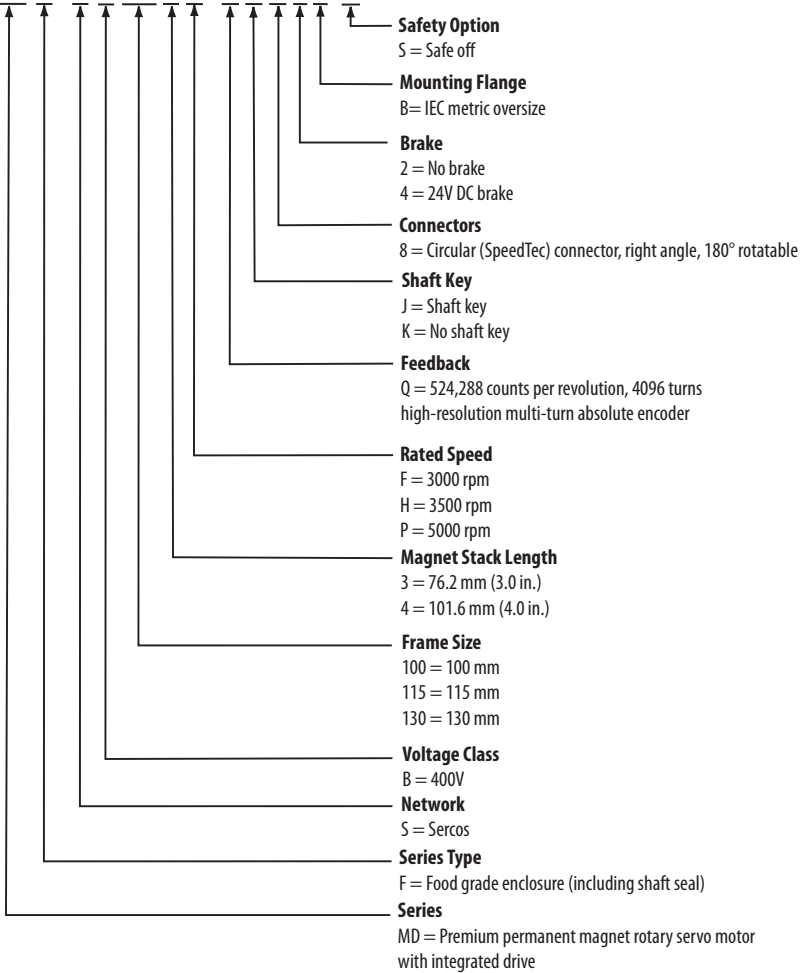
Hybrid cables provide both power and inter-module communication to the IDM units. These cables daisy-chain from one IDM unit to another and a hybrid terminator is required at the last IDM unit.

IMPORTANT One terminator plug set is provided with the Kinetix 6000M IDM power interface module. It contains a 2090-CTHP8 hybrid terminator and a 2090-CTSRP network terminator.

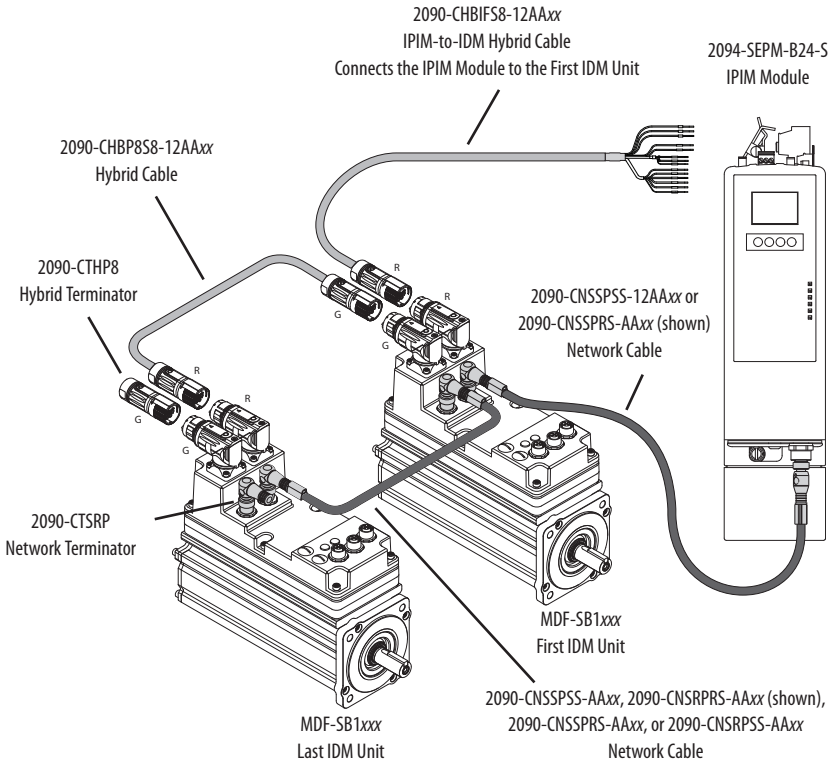
Refer to the Kinetix 6000M Integrated Drive-Motor System User Manual, publication [2094-UM003](#), for detailed information on wiring, applying power, troubleshooting, and integration with ControlLogix®, CompactLogix™, or SoftLogix™ controller platforms.

Catalog Number Explanation

MD F - S B xxx x x - Q x 8 x B - S

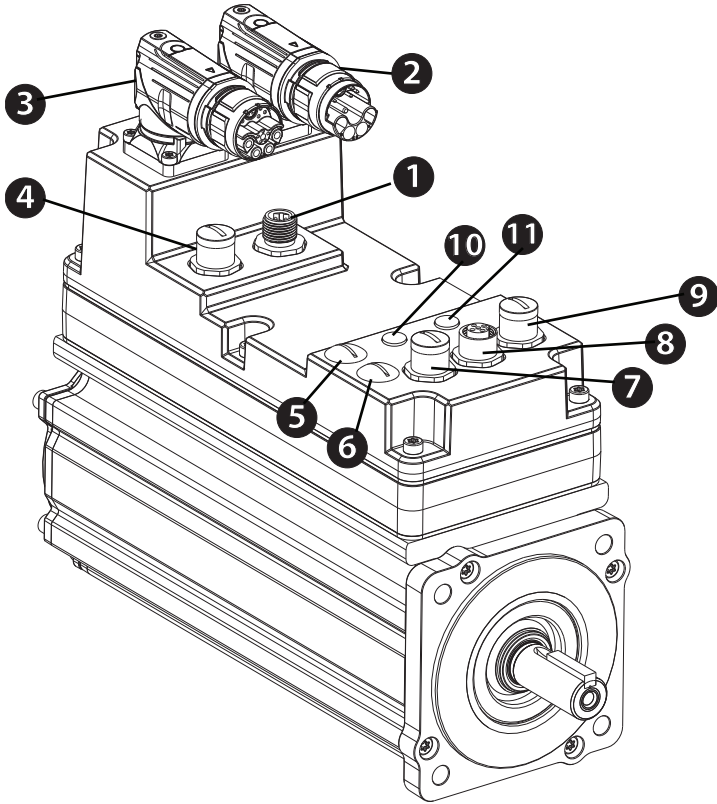


Kinetix 6000M Integrated Drive-Motor System Cable Diagram



IMPORTANT The colored rings on the hybrid connectors and the mating cable must match: red-to-red or green-to-green.

IDM Unit Connectors and Indicators



Item	Description	Panel ID
1	Network In	–
2	Hybrid In	–
3	Hybrid Out	–
4	Network Out	–
5	Node Address LSB (0...9)	S1
6	Node Address MSB (10...99)	S10

Item	Description	Panel ID
7	Digital Input/Output 1: Registration 2 and Overtravel -	1
8	Digital Input/Output 2: Registration 1 and Overtravel +	2
9	Digital Input/Output 3: Home and not used	3
10	Drive status indicator	D
11	Network status indicator	N

Before You Begin

Remove all packing material, wedges, and braces from within and around the components. After unpacking, check the item nameplate catalog number against the purchase order.



ATTENTION: Do not attempt to open or modify the IDM unit. This manual describes modifications that you can perform in the field, but do not attempt other changes. Only qualified Allen-Bradley technicians can service an IDM unit.



ATTENTION: To avoid personal injury and damage to the motor, do not lift or handle the motor by the motor shaft. The cap on the shaft can come loose and cause you to drop the motor.

Removing the Shaft Cap

Use your hand to remove the protective cap that is installed on the motor shaft or pry off the cap with a screwdriver. Do not use a hammer or other tools as they can damage the motor shaft.

Installation and Maintenance Guidelines

These guidelines advise you on how to install your product for safe and reliable service.



ATTENTION: Damage can occur to the bearings and the feedback device if sharp impact is applied to the shaft during the installation of couplings and pulleys or when removing the shaft key. Damage to the feedback device can also result by applying leverage to the faceplate to remove devices mounted on the shaft. Do not strike the shaft, key, couplings, or pulleys with tools during installation or removal. Use a wheel puller to apply pressure from the user-end of the shaft to remove any friction fit or stuck device from the shaft.

A shaft seal is factory installed on an IDM unit. A shaft seal is required if any of these environmental conditions exist:

- The IDM unit is exposed to fine dust.
- The IDM unit is exposed to fluids, or is attached to an oil-lubricated device.
- The IDM unit requires an IP65 or IP66 rating.

Replace the shaft seal at or before its expected lifetime of 12 months. Refer to Cables and Accessory Kits on [page 19](#) for catalog numbers of shaft seal kits.

Refer to Specifications on [page 21](#) for a description of IP ratings.

Installing the Integrated Drive-Motor

Installing the IDM unit involves the proper alignment on the machine, effective cable shield grounding, mounting the IDM unit, and connecting the cables.

Aligning the IDM Unit

The IDM unit can be mounted in any position. The mounting pilot aides in aligning the IDM unit on a machine. Refer to Product Dimensions on [page 11](#) for these dimensions. Stainless steel mounting fasteners are preferred.

The installation must comply with all local regulations. The installer also must use equipment and installation practices that promote electromagnetic compatibility and safety.



ATTENTION: Unmounted IDM units, disconnected mechanical couplings, loose shaft keys, and disconnected cables are dangerous, if power is applied. Appropriately identify (tag-out) disassembled equipment and restrict access to (lock-out) electrical power. Before applying power, remove the shaft key and other mechanical couplings that could be thrown from the shaft.

Cable Shielding

Signal integrity is very important for successful operation of an IDM system, and proper signal grounding is necessary to achieve this. The hybrid and network cables that connect one IDM to another IDM are properly grounded through the daisy-chain connection to the Kinetix drive system.



ATTENTION: High voltage can build up on hybrid cable shields, if the shield is not grounded. Verify there is a connection to ground for all hybrid cable shields.

IMPORTANT IDM system wiring differs from common PWM servo system wiring configurations; as hybrid and network cables can be tie-wrapped together and occupy the same cable run. Hybrid and network cables do not require physical segregation as a result of more effective wire shielding and improved grounding techniques.

This exception applies to only the hybrid and network cables that connect to an IPIM module or between IDM units, and does not apply to cabling elsewhere in a Kinetix drive system. Refer to the drive user manuals listed in Additional Resources on [page 23](#), and the System Design for Control of Electrical Noise Reference Manual, publication [GMC-RM001](#), for more information.

National Electrical Code, local electrical codes, special operating temperature, duty cycles, or system configurations take precedence over the information presented above and the values and methods provided in the documents referenced above.

Mount and Connect the IDM Unit

To install an IDM unit, follow these procedures and recommendations.



ATTENTION: The IDM unit connects to an IDM power interface module (IPIM) that stores residual voltage for an extended period of time. Do not connect an IDM to an IPIM module immediately after removing power to the IPIM module. Allow the residual power stored in the IPIM module to dissipate for 60 seconds after power is removed from the IDM system. This extended discharge period is needed for the system power to return to a nominal voltage that is acceptable for reconfiguration of the system.



ATTENTION: Integrated drive-motor units are not intended for direct connection to an AC power line. The IDM unit is designed for connection to an IPIM module that controls the application of power.



ATTENTION: To avoid damage to the bearings and feedback device, do not apply sharp impact to the shaft during the installation or removal of couplings, pulleys, or shaft key.

1. Allow sufficient clearance around the IDM unit for it to stay within its specified operating temperature range.



BURN HAZARD: Outer surfaces of the IDM unit can reach high temperatures, 125 °C (275 °F), during operation. Take precautions to prevent accidental contact with hot surfaces on the IDM unit. Consider the surface temperature of the equipment when selecting equipment and cables for connection.

- Refer to Specifications on [page 21](#) for the operating temperature range and clearances.
 - Obtain the specified thermal rating by mounting the IDM unit on a surface with heat dissipation equivalent to a 304.8 x 304.8 x 12.7 mm (12 x 12 x 0.5 in.) aluminum heatsink.
 - Do not install the IDM unit in an area with restricted airflow, and keep other heat producing devices away from the IDM unit.
2. Refer to Load Force Ratings on [page 13](#) to determine the radial and axial shaft load limitations of the unit.
 3. If sufficient mounting clearance is provided, rotate the hybrid cable connectors into position prior to installing. If the mounting clearance is restricted, rotate after installing.



ATTENTION: Connectors are designed to be rotated into a fixed position during installation and remain in that position without further adjustment. Strictly limit the applied forces and the number of times the connector is rotated to make sure that connectors meet the specified IP ratings. Apply force to only the connector and cable plug. Do not apply force to the cable extending from the cable plug. Do not use tools, for example pliers or vise-grips, to assist with the rotation of the connector.

4. Position the IDM unit on the machine in any position.

IMPORTANT IDM units with a brake (MDF-5BxxxP-QJ84B-S) can require the use of a manual brake-release cable to release the brake prior to rotating the shaft so the IDM unit aligns with the machine mounts. Refer to the Manual Brake Release Cable Installation Instructions, publication [2090-IN037](#), for more information.

5. Mount and align the IDM unit by using stainless steel bolts.

Product Dimensions on [page 11](#) list the mounting hole diameters.

6. Form a drip loop in the cables directly before each cable connects to the IDM unit.

A drip loop is a low spot in the cable that lets liquids gather and drip off the cable rather than flow along the cable to an electrical connection or the IDM unit.



ATTENTION: To avoid arcing or unexpected motion, always remove power to the IDM unit before connecting or disconnecting the hybrid or network cables.

The hybrid cables and network cables are UL Listed with insulation ratings of 1000V and 105° C (221° F) and can be routed in a common wireway.

Refer to the Kinetix 6000M Integrated Drive-Motor System Cable Diagram diagram on [page 5](#) for a visual reference of cable positioning.



ATTENTION: Make sure that installed cables are restrained to prevent uneven tension or flexing at the cable connectors. Provide support at 3 m (10 ft) intervals throughout the cable run. Excessive and uneven lateral force at the cable connectors can result in the connector's environmental seal opening and closing or wires separating at the cable gland as the cable flexes.

7. Connect the network and hybrid cables after the IDM unit is mounted.
-



ATTENTION: Cable connectors must be properly aligned before the connection is secured with the recommended number of turns or torque value. Improper connector alignment is indicated by the need for excessive force, such as the use of tools, to fully seat connectors.

- Torque a network M12 cable connector plug to 0.8...1.2 N•m (7...12 lb•in) to fully seat the contacts and secure the connection.
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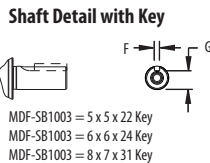
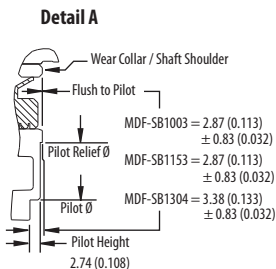
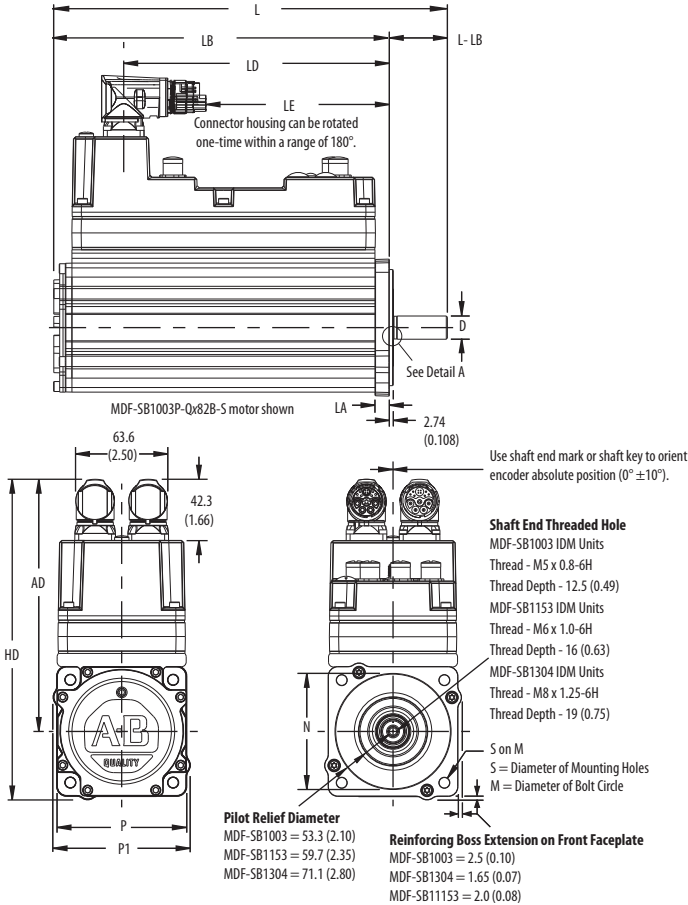
IMPORTANT The internal O-ring is self-conforming and requires a short period between each connect/disconnect cycle to expand to full size. Allow at least one minute for the O-ring expansion to occur before reconnecting a hybrid cable.

- Hand-tighten the knurled collar on the M23 hybrid cable approximately 45° to fully seat and lock the connector.

TIP The colored rings on the hybrid cable connector and the mating cable must match: red-to-red or green-to-green.

Product Dimensions

Refer to the tables on [page 12](#) for the physical dimensions shown in this figure.



Shaft Seal
Refer to [page 19](#)
for Kinetix 6000M
Integrated Drive-Motor
shaft seal kit information.

Dimensions are for non-brake IDM units; footnotes provide tolerances and brake dimensions.

IDM Unit Dimensions

MDF-SB	AD mm (in.)	D ⁽¹⁾ mm (in.)	F mm (in.)	G mm (in.)	HD mm (in.)	L ⁽²⁾ mm (in.)	L-LB ⁽³⁾ mm (in.)	LA mm (in.)
1003	173.8 (6.84)	16.0 (0.629)	5.0 (0.197)	12.95 (0.510)	221.0 (8.70)	271.3 (10.685)	40.0 (1.575)	9.90 (0.39)
1153	178.2 (7.01)	19.0 (0.740)	6.0 (0.236)	15.40 (0.606)	229.0 (9.02)	271.2 (10.675)		10.20 (0.40)
1304	185.8 (7.31)	24.0 (0.945)	8.0 (0.315)	19.82 (0.780)	244.7 (9.63)	310.6 (12.23)	50.0 (1.969)	12.2 (0.48)

- (1) Acceptable range for this dimension is:
 MDF-SB1003 IDM units 15.997...16.008 (0.6298...0.6301).
 MDF-SB1153 IDM units 18.996...19.009 (0.7479...0.7483).
 MDF-SB1304 IDM units 23.996...24.009 (0.9448...0.9451).
- (2) For IDM units with a brake (MDF-SBxxxxxx-Qx84B), adjust dimensions with these values:
 MDF-SB1003 catalog numbers add 34.5 (1.36) to L, LB, LD, and LE.
 MDF-SB1153 catalog numbers add 48.5 (1.91) to L, LB, LD, and LE.
 MDF-SB1304 catalog numbers add 48.5 (1.91) to L, LB, LD, and LE.
- (3) Tolerance for this dimension is ±0.7 (±0.028).

IDM Unit Dimensions (continued)

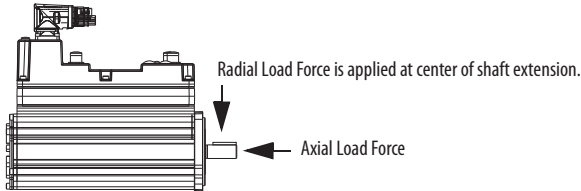
MDF-SB	LB ⁽¹⁾ mm (in.)	LD ⁽²⁾ mm (in.)	LE ⁽³⁾ mm (in.)	M mm (in.)	N ⁽⁴⁾ mm (in.)	P mm (in.)	P1 mm (in.)	S ⁽⁵⁾ mm (in.)
1003	231.3 (9.11)	183.0 (7.21)	126.3 (4.97)	100.0 (3.937)	80.0 (3.15)	89.4 (3.52)	94.4 (3.72)	7.0 (0.283)
1153	231.2 (9.10)	183.3 (7.22)	126.5 (4.98)	115.0 (4.528)	95.0 (3.74)	98.3 (3.87)	101.6 (4.0)	10.0 (0.401)
1304	260.6 (10.26)	212.0 (8.35)	155.2 (6.11)	130.0 (5.118)	110.0 (4.331)	113.7 (4.48)	117.7 (4.63)	

- (1) For units with a brake (MDF-SBxxxxxx-Qx84B), adjust dimensions with these values:
 MDF-SB1003 catalog numbers add 34.5 (1.36) to L, LB, LD, and LE.
 MDF-SB1153 catalog numbers add 48.5 (1.91) to L, LB, LD, and LE.
 MDF-SB1304 catalog numbers add 48.5 (1.91) to L, LB, LD, and LE.
- (2) Dimension is to the rotation point of either connector.
- (3) Dimension is to front of the male connector.
- (4) Tolerance for MDF-SB1003 IDM Units = Ø 79.993...80.012 (3.1493...3.1501)
 Tolerance for MDF-SB1153 IDM Units = Ø 94.991...95.013 (3.7398...3.7407)
 Tolerance for MDF-SB1304 IDM Units = Ø 109.991...110.013 (4.3303...4.3312)
- (5) Tolerance is +0.36 (±0.007).

Load Force Ratings

An IDM unit can operate with a sustained shaft load. The figure shows radial and axial load force locations, and the tables provide maximum values for each force.

Load Forces on the Shaft



The tables represent 20,000 hour L_{10} bearing fatigue life at various loads and speeds. The 20,000 hour life does not account for possible application-specific life reduction that can occur due to bearing grease contamination from external sources.

Loads are measured in pounds; kilograms are mathematical conversions.

Radial Load Force Ratings

Cat. No.	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	5000 rpm kg (lb)
MDF-SB1003	–	74 (163)	59 (129)	–	49 (107)	43 (95)
MDF-SB1153	106 (233)	84 (185)	67 (147)	–	55 (121)	–
MDF-SB1304	140 (309)	111(245)	89 (195)	77 (170)	–	–

Axial Load Force Ratings with Maximum Radial Load

Cat. No.	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	5000 rpm kg (lb)
MDF-SB1003	–	27 (59)	20 (44)	–	16 (35)	13 (29)
MDF-SB1153	52 (114)	39 (86)	29 (64)	–	22 (48)	–
MDF-SB1304	49 (107)	36 (80)	27 (59)	22 (49)	–	–

Axial Load Force Ratings with Zero Radial Load

Cat. No.	500 rpm kg (lb)	1000 rpm kg (lb)	2000 rpm kg (lb)	3000 rpm kg (lb)	3500 rpm kg (lb)	5000 rpm kg (lb)
MDF-SB1003	–	36 (80)	27 (59)	–	21 (47)	18 (40)
MDF-SB1153	69 (152)	51(112)	38 (87)	–	30 (66)	–
MDF-SB1304	69 (152)	51 (112)	38 (83)	31 (69)	–	–

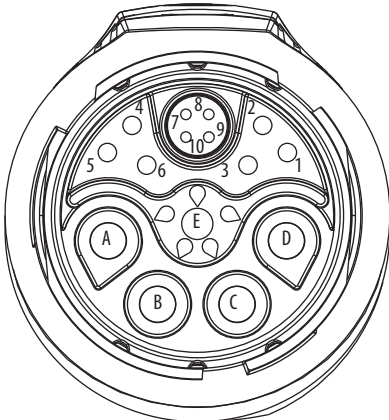
Connector Data

The following tables and illustrations provide connector pinouts for the IDM units. Refer to IDM Unit Connectors and Indicators on [page 6](#) for connector locations.

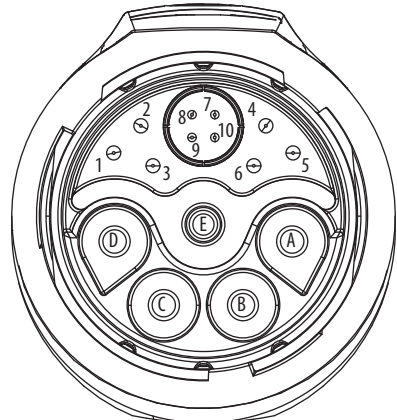
Hybrid Connector Pinout

Hybrid Output Connector	
Pin	Signal Name
A	DC +
B	DC -
C	42V +
D	42V COM
E	⊕ Protective Earth (PE) Ground
1	Reserved
2	
3	
4	Safety Enable 1+
5	Safety Enable -
6	Safety Enable 2+
7	IDM CAN HI
8	IDM CAN LO
9	IDM SYSOKOUT
10	IDM SYSOKRTN

Hybrid Input Connector	
Pin	Signal Name
A	DC +
B	DC -
C	42V +
D	42V COM
E	⊕ Protective Earth (PE) Ground
1	Reserved
2	Brake 24V +
3	Brake 24V COM
4	Safety Enable 1+
5	Safety Enable -
6	Safety Enable 2+
7	IDM CAN HI
8	IDM CAN LO
9	IDM SYSOKIN
10	IDM SYSOKRTN

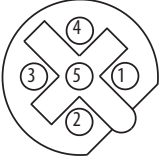
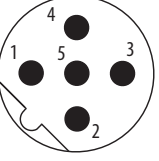


Female Connector



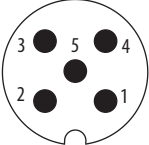
Male Connector

Network Connector Pinout

Network Output Connector			Network Input Connector		
Pin	Signal Name	Female Connector	Pin	Signal Name	Male Connector
1	TX+		1	RX+	
2	RTN RX+		2	RTN TX-	
3	RTN RX-		3	RTN TX+	
4	TX-		4	RX-	
5	REF		5	REF	

Digital Input Connectors

24V digital I/O signals from machine-based sensors interface to the IDM unit through three I/O connectors. Refer to IDM Unit Connectors and Indicators on [page 6](#) for connector locations.

ID	Digital Inputs	Pin	Signal Name ⁽¹⁾	Connector Pinout
1	Overtravel - and Registration 2	1	I/O 24V +	 <p>Female Connector</p>
		2	Overtravel -	
		3	I/O 24V COM	
		4	Registration 2	
		5	Shield/Chassis Ground	
2	Overtravel + and Registration 1	1	I/O 24V +	
		2	Overtravel +	
		3	I/O 24V COM	
		4	Registration 1	
		5	Shield/Chassis Ground	
3	Home	1	I/O 24V +	
		2	Reserved	
		3	I/O 24V COM	
		4	Home	
		5	Shield/Chassis Ground	

(1) Detailed information about the digital inputs is available in the Kinetix 6000M Integrated Drive-Motor System User Manual, publication [2094-UM003](#).

Allen-Bradley® Bulletin 889D and 879D micro-style patchcords, splitters, and V-cables are compatible with the M12 digital I/O connectors on the IDM unit. Refer to Cables and Accessory Kits on [page 19](#) for a list of Kinetix 6000M system cable resources.

Node Address Switches

A unique network address for each IDM unit is set on the S1 and S10 rotary address switches. Valid IDM addresses are 01...99. The least significant digit (0...9) is set on switch S1, and switch S10 sets the most significant digit (10...90). Apply 0.6 N•m (5 lb•in) of torque to the switch cover to environmentally seal the opening.

Refer to IDM Unit Connectors and Indicators on [page 6](#) for connector location.



Network and Drive Status Indicators

Two multi-color indicators provide IDM network (N) and drive (D) status. Refer to IDM Unit Connectors and Indicators on [page 6](#) for status indicator locations.

Status Display	Network (N)	Drive (D)
Off	No communication	No power
Alternating green/red	–	Self test
Flashing green ⁽¹⁾	Establishing communication	Standby ⁽²⁾
Fast flashing green ⁽¹⁾	Firmware update in process	–
Slow flashing green ⁽¹⁾	Firmware update in process (on a different IDM unit)	–
Green	Communication ready	Normal operation
Flashing red ⁽¹⁾	–	Recoverable fault ⁽³⁾
Red	Duplicate address	Non-recoverable fault ⁽⁴⁾

- (1) Flashing rate is once per second. The fast flashing rate is twice per second, and the slow flashing rate is once every two seconds. A flash is defined as one complete on/off cycle.
- (2) Drive status is Standby while waiting for the network communication to be established and transition to a Normal operation state.
- (3) A reset or cycling the power can clear a recoverable fault (depending on the state of the IDM unit).
- (4) A non-recoverable fault requires power cycling to clear the fault and/or a hardware configuration modification performed while power is removed.

Remove and Replace Shaft Keys and Shaft Seals

IDM units are available with or without a slot for a shaft key, but a shaft key is recommended. The shaft seal provides environmental sealing for the integrated drive-motor. IDM units are shipped with a PTFE (polytetrafluoroethylene) shaft seal installed.

Remove and Replace Shaft Keys

The IDM unit must be dismantled from a machine to remove or replace the shaft key, and this procedure assumes that task has already been completed.

Shaft keys for IDM units are constructed of stainless steel - 300 series. The design tolerances create an interference fit (slightly larger than the opening) that is a secure and rigid fit for the mating connection.



ATTENTION: Damage can occur to the bearings and the feedback device if sharp impact is applied to the shaft during the installation of couplings and pulleys or when removing the shaft key. Damage to the feedback device can also result by applying leverage to the faceplate to remove devices mounted on the shaft. Do not strike the shaft, key, couplings, or pulleys with tools during installation or removal. Use a wheel puller to apply pressure from the user-end of the shaft to remove any friction fit or stuck device from the shaft.

Perform one of these actions to remove a shaft key:

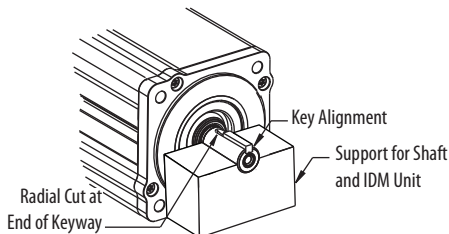
- Lift the key by grasping it with a pliers or similar tool.
- Lever the key with a screwdriver inserted between the key and the slot.

Follow these steps to replace a shaft key.

1. Verify the replacement key matches the keyway in the shaft and the mating mechanical connection (for example, a coupling or pulley) before proceeding.
2. Align the front of the key with the front of the shaft.

This prevents the radial end-of-cut at the body of the IDM unit from interfering with the correct seating of the key.

3. Support the underside of the shaft diameter with a fixture and use a controlled press device to apply a constant force across the top surface, to press the key into the shaft.



Remove and Replace Shaft Seals

Shaft seals must be lubricated by using a food-grade polyurea base grease. Shaft seals are typically replaced at 12-month intervals. Lubricant is supplied in the kit.



ATTENTION: Damage to the shaft surface where the seal makes contact can cause excessive wear and early failure of the shaft seal. Use care to prevent scratching or damage to the mounting surface or to the IDM shaft.

TIP Remove the shaft key, if the IDM unit is so equipped, before removing or replacing the shaft seal. Refer to Remove and Replace Shaft Keys on [page 17](#).

Refer to Shaft Seal Kits on [page 19](#) for shaft seal catalog numbers.

Remove the Shaft Seal

The shaft seal can be safely removed by grasping an edge of the shaft seal with a needle-nose pliers or similar tool. Lift and slightly rotate the seal while pulling it parallel to the shaft and away from the body of the IDM unit.

Replace the Shaft Seal

No tools are required to install the replacement shaft seal.

1. Apply the lubricant (provided with the kit) to the inner ring of the shaft seal and the IDM wear sleeve.
2. Center the seal on the shaft with the seal oriented with the sealing lip positioned and slanting outward, and slide the seal along the shaft toward the mounting surface of the IDM unit.
3. Press the shaft seal into the seal recess by applying pressure with your fingertips in a circular fashion that slowly seats the shaft seal.

IMPORTANT Do not bottom out the shaft seal. Proper seating of the shaft seal to a specific depth is critical to prolonging the life of your motor.

Insert the shaft seal so the outer diameter of the seal is 1.0 mm (0.04 in.) beneath the front surface of the motor.

4. Verify the outer and inner circumference of the shaft seal is fully seated into position.

TIP You can verify the proper shaft-seal seating by running your fingertip around the seal-to-IDM joint to feel for irregularities in the shaft seal or an uneven alignment where the shaft seal contacts the IDM mounting surface.

Cables and Accessory Kits

Factory manufactured cables are available in standard cable lengths. They provide the required shielding and signal termination.

For more cable information, contact your nearest Rockwell Automation sales office.

Resource	Description
Kinetix Motion Accessories Specifications Technical Data, publication GMC-TD004	Provides cable catalog numbers and descriptions specifically for Kinetix 6000M IDM systems.
Connection Systems Quick Selection Guide, publication CNSYS-BR001	Provides catalog numbers and descriptions for the most popular Allen-Bradley patchcord specifications.
On-Machine™ Connectivity Catalog, publication M117-CA001	Provides complete information for Allen-Bradley patchcord specifications.

Shaft Seal Kits

IDM Unit Cat. No.	Shaft Seal Cat. No.
MDF-SB1003	MPF-SST-A3B3
MDF-SB1153	MPF-SST-A4B4
MDF-SB1304	MPF-SST-A45B45

Shaft seals require a PTFE lubricant to reduce wear. The lubricant is provided in the kit.

Positive Air-pressure Accessory Kit

A positive air-pressure kit (catalog number MPS-AIR-PURGE) is available for field installation. The kit provides a quick-release female air fitting. Positive air pressure applied to the IDM unit creates an additional level of protection against the ingress of foreign substances and moisture.

Positive Air-pressure Kit Guidelines

You must supply these items, to connect to the sealing plug:

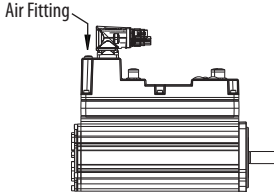
- Plastic air tubing must be 4 mm (5/32 in.) OD Teflon FEP tubing.
- Air supplied to an IDM unit must not exceed 0.1 bar (1.45 psi).



ATTENTION: Air supplied to the IDM unit must be clean, dry, and of instrument quality. Maximum air pressure is 0.1 bar (1.45 psi). Excessive air pressure or improper filtering of air can result in damage to the IDM unit.

Positive Air-pressure Kit Installation

1. Remove the 5 mm (0.20 in.) sealing plug with a Phillips screwdriver.



2. Inspect the air fitting and the opening to verify the surface area is undamaged and the contact area is clean.
3. Install the air tubing by using a 2.5 mm hex bit and torque the air fitting to 1.1...1.2 N•m (10...12 lb•in).
4. Visually inspect the circumference of the connection for proper seating.

IMPORTANT Be careful while rotating the hybrid connectors when a sealing air fitting is installed. The minimal clearance between the air fitting and the connectors can result in a pinch point.

Specifications

Attribute	Value
Mounting clearance ⁽¹⁾	100 mm (3.9 in.)
Temperature, operating	0...40 °C (32...104 °F)
Temperature, storage	-30...70 °C (-2...158 °F)
Relative humidity	5...95% noncondensing
Atmosphere	Noncorrosive
Paint	USDA-compliant food grade
IP rating ^{(2) (3)}	Bulletin MDF housings are rated IP66 (dust tight, powerful water jets) ⁽⁴⁾ with a shaft seal installed ⁽⁵⁾
Connector, install torque/rotation <ul style="list-style-type: none"> • Digital I/O - M12 • Hybrid - M23 • Network - M12 • Sealing air fitting 	0.8...1.2 N·m (7...12 lb·in) 45° rotation, self-locking 0.8...1.2 N·m (7...12 lb·in) 1.1...1.2 N·m (10...12 lb·in)
Cover screw, sealing torque <ul style="list-style-type: none"> • Digital I/O (1, 2, 3) • Node address (S1, S10) 	0.6 N·m (5 lb·in) 0.6 N·m (5 lb·in)

(1) Mounting clearance is the physical separation in any direction between the IDM unit and other components that produce heat.

(2) The following are the IPx6 water spray test conditions.

- General conditions are three minutes of operation, at all angles from a distance of 2.5...3.0 m (98...118 in.).
- Spray conditions are 100 liters per minute (26.4 gpm) through a 12.5 mm (0.5 in.) nozzle, with ~1 bar (14.5 psi) at the nozzle.
- The spray is water, at room temperature. Chemical or cleaning solutions are excluded.

(3) Ingress rating of IP66 is similar to a NEMA 35 (dust tight, drip tight).

(4) The integrated drive-motors are ingress protection rated (IP rating) as a measure of their environmental protection.

The IP rating excludes any reduction in the rating resulting from cables or their plugs.

(5) Refer to Shaft Seal Kits on [page 19](#) for installation instructions.

Additional specifications for interconnect cables and accessories are available in the Kinetix Motion Control Accessories Technical Data, publication [GMC-TD004](#).

Motor Overload Protection

This servo drive uses solid-state motor overload protection that operates in accordance with UL 508C. Motor overload protection is provided by algorithms (thermal memory) that predict actual motor temperature based on operating conditions as long as control power is continuously applied. However, when control power is removed, thermal memory is not retained.

In addition to thermal memory protection, this drive provides an input for an external temperature sensor/thermistor device, embedded in the motor, to support the UL requirement for motor overload protection.

Some motors supported by this drive do not contain temperature sensors/thermistors; therefore, motor overload protection against excessive consecutive motor overloads with power cycling is not supported.

This servo drive meets the following UL 508C requirements for solid-state overload protection.

Motor Overload Protection Trip Point	Value
Ultimately	100% overload
Within 8 minutes	200% overload
Within 20 seconds	600% overload



ATTENTION: To avoid damage to your motor due to overheating caused by excessive, successive motor overload trips, follow the wiring diagram provided in the user manual for your motor and drive combination.

Refer to your servo drive user manual for the interconnect diagram that illustrates the wiring between your motor and drive.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Kinetix IPIM to IDM Hybrid Cable Installation Instructions, publication 2090-IN031	Information on the installation of components and accessories compatible with Kinetix 6000M integrated drive-motor systems.
Kinetix 6000 Multi-axis Servo Drive User Manual, publication 2094-UM001	
Kinetix 6200 and Kinetix 6500 Multi-axis Servo Drive User Manual, publication 2094-UM002	
Kinetix IPIM to IDM Hybrid Cable Installation Instructions, publication 2090-IN031	
Kinetix Hybrid Cable Installation Instructions, publication 2090-IN032	
Kinetix Network Cable Installation Instructions, publication 2090-IN034	
Kinetix Hybrid Terminator Installation Instructions, publication 2090-IN035	
Kinetix Network Terminator Installation Instructions, publication 2090-IN036	
Kinetix Brake Override Cable Installation Instructions, publication 2090-IN037	
Kinetix 6000M Bulkhead Cable Adapter Kit Installation Instructions, publication 2090-IN039	
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	How to minimize and control system-level electrical noise.

You can view or download publications at <http://www.rockwellautomation.com/literature>. To order copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview_page , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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