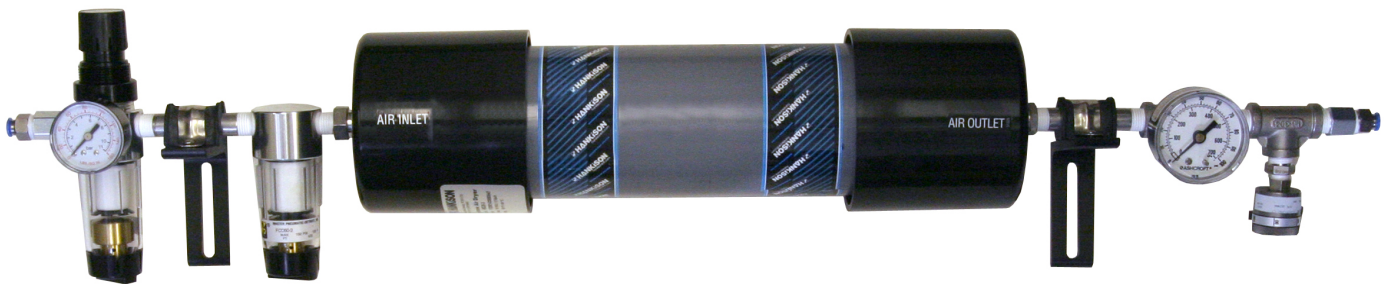




ABF Hardware Manual

Revision: 1.03.00



Global Technical Support

Go to www.aerotech.com/global-technical-support for information and support about your Aerotech products. The website provides downloadable resources (such as up-to-date software, product manuals, and Help files), training schedules, and PC-to-PC remote technical support. You can also complete Product Return (RMA) forms and get information about repairs and spare or replacement parts. For immediate help, contact a service office or your sales representative. Have your customer order number available before you call or include it in your email.

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Safety Procedures and Warnings

The following statements apply wherever the Warning or Danger symbol appears within this manual. Failure to observe these precautions could result in serious injury to those individuals performing the procedures and/or damage to the equipment.



DANGER: This product contains potentially lethal voltages. To reduce the possibility of electrical shock, bodily injury, or death the following precautions must be followed.

1. Access to the ABF and component parts must be restricted while connected to a power source.
2. Do not connect or disconnect any electrical components or connecting cables while connected to a power source.
3. Disconnect electrical power before servicing equipment.
4. All components must be properly grounded in accordance with local electrical safety requirements.
5. Operator safeguarding requirements must be addressed during final integration of the product.



WARNING: To minimize the possibility of electrical shock, bodily injury or death the following precautions must be followed.

1. Moving parts can cause crushing or shearing injuries. Access to all stage and motor parts must be restricted while connected to a power source.
2. Cables can pose a tripping hazard. Securely mount and position all system cables to avoid potential hazards.
3. Do not expose this product to environments or conditions outside of the listed specifications. Exceeding environmental or operating specifications can cause damage to the equipment.
4. The ABF unit must be mounted securely. Improper mounting can result in injury and damage to the equipment.
5. Use care when moving the ABF unit. Lifting or transporting the ABF unit improperly can result in injury or damage to the ABF.
6. This product is intended for light industrial manufacturing or laboratory use. Use of this product for unintended applications can result in injury and damage to the equipment.
7. If the product is used in a manner not specified by the manufacturer, the protection provided by the product can be impaired and result in damage, shock, injury, or death.
8. Operators must be trained before operating this equipment.
9. All service and maintenance must be performed by qualified personnel.

Chapter 1: Overview

ABF system components have been selected to meet the performance requirements of your stage at the time of purchase. If your stage setup has changed or you would like to use prepared air for other tasks in addition to those specified at the time of purchase, contact Aerotech.

Table 1-1: Model Numbering System

ABF Series Air Filtration unit	
ABF	<p>Air Bearing Filtration unit with filter/regulator, coalescing filter, and membrane dryer. The integral filter/regulator features a 5 µm rated polyethylene filter element and an automatic drain valve.</p> <p>The coalescing filter features a 0.01 µm rated coalescing element to remove carry over compressor oil. This unit is also equipped with an automatic drain valve.</p> <p>The ABF air filtration unit is equipped with a high performance, low maintenance membrane dryer. This unit removes water from the compressed air as a vapor, so there are no drain valves to check or maintain.</p> <p>Components have been carefully selected to ensure that copper will not pose a contamination threat to process air for applications where copper contamination is of concern.</p>
Flow Rate (Required)	
-FL1	Total stage flow rate up to 23.9 SLPM (Standard Liters Per Minute) [0.9 SCFM (Standard Cubic Feet per Minute)]
-FL2	Total stage flow rate up to 168.3 SLPM (Standard Liters Per Minute) [6.2 SCFM (Standard Cubic Feet per Minute)]
Inlet Side (Required)	
-IN1	Left side inlet
-IN2	Right side inlet
Fitting Type (Required)	
-OT1	English one-touch fitting (1/4 in tube O.D.)
-OT2	Metric one-touch fitting (6 mm tube O.D.)
Pressure Switch (Required)	
-PC1	Pressure switch with 26-pin high density D connector
-PC2	Pressure switch with flying leads
-PC3	Pressure switch with flying leads for an ML or MP drive
-PC4	Pressure switch for an Npaq MR or Epaq MR
-PC5	Pressure switch for an Npaq
Cable Length (Required)	
-xx	Cable for ABF pressure sensor option (50 dm maximum)
Power Supply (Optional, for use with -PC2)	
-PS1	24V power supply
Breakout Block (Optional, for use with -PC2)	
-BB1	15-pin D breakout block, 7.6 dm length cable
-BB2	25-pin D breakout block, 9.1 dm length cable
-BB3	26-pin HD breakout block, 7.6 dm length cable

1.1. Environmental Specifications

The environmental specifications are listed in the table below.

Table 1-2: Environmental Specifications

Ambient Temperature	Operating: 10° to 35° C (50° to 95° F) The optimal operating temperature is 20° C \pm 2° C (68° F \pm 4° F). If at any time the operating temperature deviates from 20° C degradation in performance could occur. Contact Aerotech for information regarding your specific application and environment.
	Storage: 0° to 40° C (32° to 104° F) in original shipping packaging
Humidity	Operating: 40 percent to 60 percent RH The optimal operating humidity is 50 percent RH.
	Storage: 30 percent to 60 percent RH, non-condensing in original packaging
Altitude	Operating: 0 to 2,000 m (0 to 6,562 ft) above sea level Contact Aerotech if your specific application involves use above 2,000 m or below sea level.
Vibration	Use the system in a low vibration environment. Contact Aerotech for information regarding your specific application.
Use	Indoor use only



WARNING: Do not expose this product to environments or conditions outside of the listed specifications. Exceeding environmental or operating specifications can cause damage to the equipment.

Chapter 2: Installation



WARNING: ABF installation must be in accordance to instructions provided by this manual and any accompanying documentation. Failure to follow these instructions could result in injury or damage to the equipment.

2.1. Unpacking and Handling the System

If the ABF unit was not shipped installed to your stage base plate, granite, or weldment carefully remove the system from its shipping container.

NOTE: If any damage has occurred during shipping, report it immediately.



WARNING: Make sure that all moving parts are secure before moving the ABF. Unsecured moving parts may shift and cause bodily injury.



WARNING: Improper handling could adversely affect the performance of the ABF. Use care when moving the ABF.

2.2. Dimensions

The drawings in this section show a few representative views of the ABF. If you require more detail, you can download a configurable solid model from www.aerotech.com.

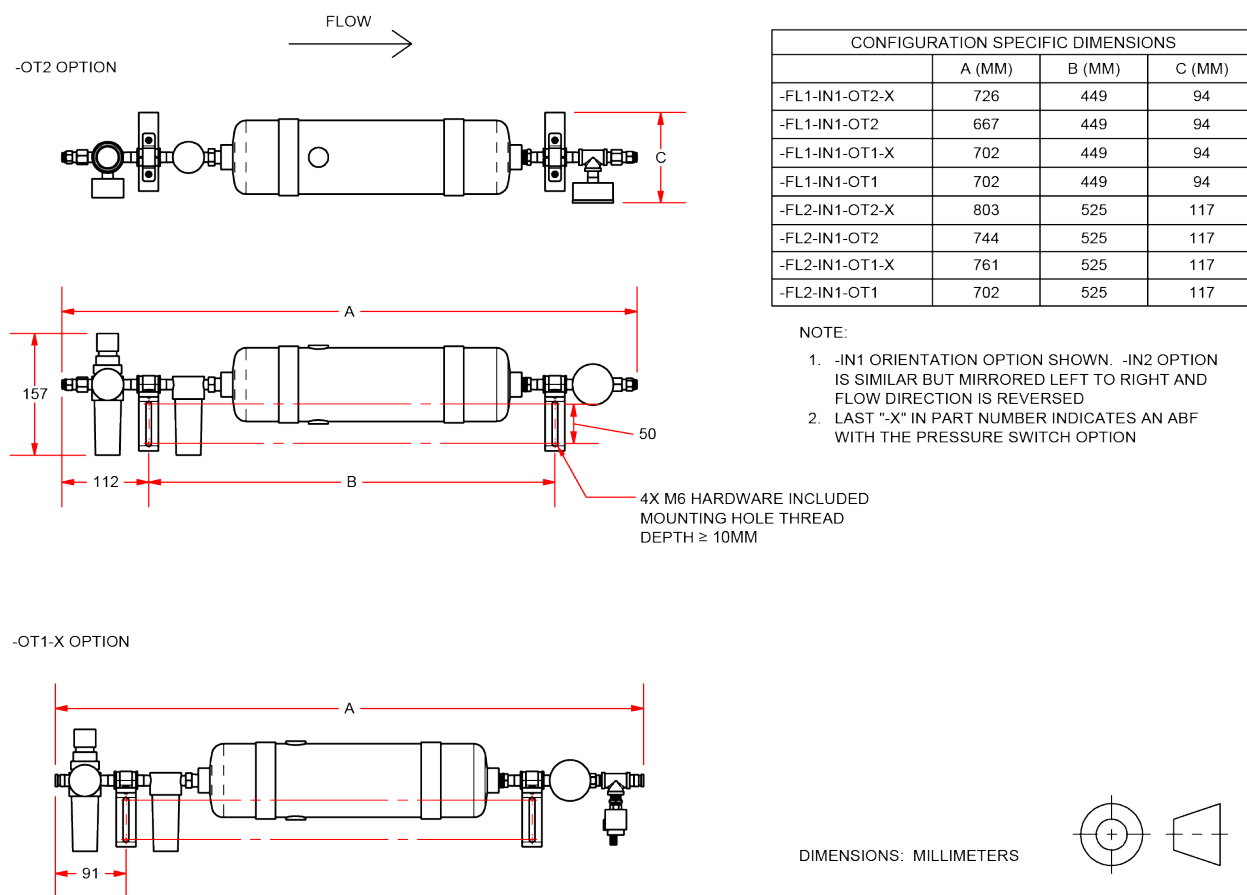


Figure 2-1: ABF Dimensions

2.3. Mounting the System

If the ABF unit was not mounted to a stage base plate, granite, or weldment prior to shipping, you can mount it to any flat surface via the supplied mounting brackets and included M6x1 hardware. The ABF unit must be installed with the filter/regulator and coalescing filter oriented vertically with the drain valve located closest to the ground. Mounting the ABF unit in any other manner can cause the automatic drain feature to function improperly and can cause damage to the air bearing stage. If such a mounting arrangement can not be accommodated, please consult with Aerotech to ensure that an acceptable method can be identified.



Figure 2-2: Proper Mounting Orientation

2.4. Attaching Air Lines to the System

To connect airlines to the system, ensure the line you are connecting is not pressurized and simply push the tubing into the fitting by hand. Ensure that you use the appropriate tubing for your unit. The -OT1 (English) unit uses 1/4" OD plastic tubing while the -OT2 (metric) unit uses 6 mm OD plastic tubing.

Connect inlet air to the inlet port of the filter/regulator unit. Connect the outlet of the ABF unit to the stage air inlet with a section of tubing for the prepared air line. Compatible tubing materials include polyurethane, polyethylene, and polyamide.

2.5. Air Requirements

Air supplied to the ABF unit should be relatively clean and liquid water should not be present. Aerotech's air bearing stages are designed and tuned to run on an air supply at 80 psig (552 kPa), so an inlet pressure of at least 100 psig (690 kPa) is recommended. Due to limitations of the filter/regulator, inlet pressure should not exceed 150 psig (1.03 MPa).

2.6. Adjusting Air Pressure

Air pressure to the air bearing stage can be set by turning the adjustment knob on the filter/regulator. Turning the knob clockwise increases pressure downstream of the filter/regulator and turning the knob counter-clockwise decreases downstream pressure. The working pressure of the air bearing should be read from the second pressure gauge, located near the outlet of the ABF unit. Reading pressure from this point in the system ensures the inlet pressure to the air bearing stage is being set to the desired value and losses through the coalescing filter and membrane dryer are accounted for. To lock the adjustment knob in place, simply press down on the adjustment knob on the filter/regulator.

2.7. Manual Draining - Filter/Regulator and Coalescing Filter

The automatic drain feature requires a periodic pressure differential inside each unit equipped with an automatic drain in order to operate. The pressure differential causes the drain valve to temporarily open, expelling condensed liquids to the environment. Under certain operating conditions, an appropriate pressure differential is never be met and the filter bowls will need to be drained manually. These units should be monitored regularly to ensure damage to the air bearing does not occur. If the units are not draining on their own, they will need to be drained manually. To drain the units manually, press up on the drain knob located on the bottom of each unit.

2.8. Low Pressure Shut-off Switch

A low pressure shut-off switch is recommended to prevent damage to the air bearing stage in the event of a loss of suitable air pressure for air bearing operation.

Table 2-1: Pre-Wired Air-Pressure Switch

Code	Description
-PC1	Pressure switch with 26-pin high density D connector
-PC2	Pressure switch with flying leads
-PC3	Pressure switch with flying leads for an ML or MP drive
-PC4	Pressure switch for an Npaq MR or Epaq MR
-PC5	Pressure switch for an Npaq

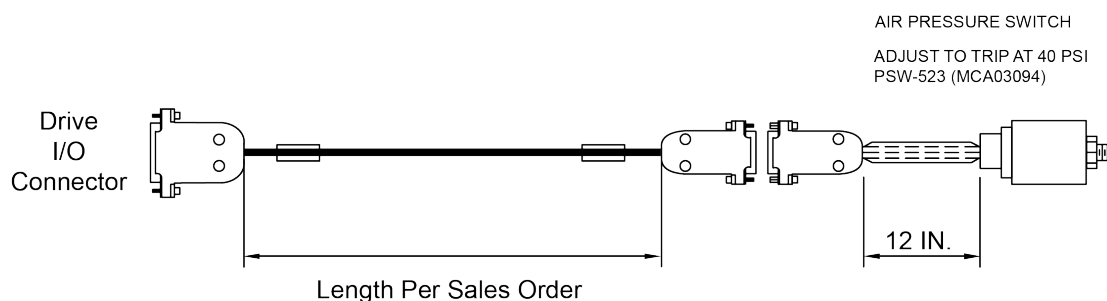


Figure 2-3: -PC1, -PC4, and -PC5 Air Pressure Switch Connection

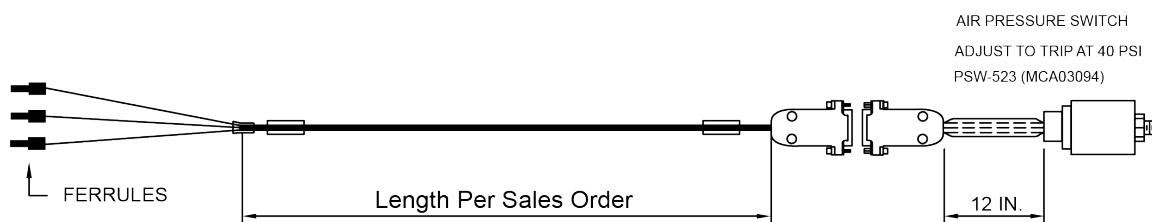


Figure 2-4: -PC2 Air Pressure Switch Connection

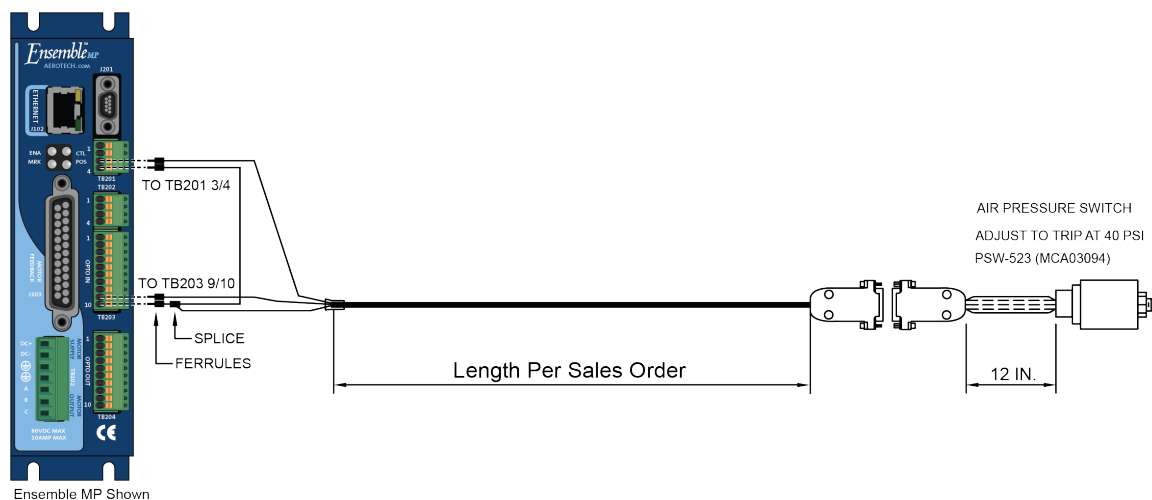


Figure 2-5: -PC3 Air Pressure Switch Connection (MP shown)

-PC2 (Flying Lead) Options

The breakout block options (-BB1, -BB2, and -BB3) and the power supply option (-PS1) can be purchased to use with the flying lead pressure switch (-PC2). You can use -BBx options to connect additional signals into the connector on the Npaq, Npaq MR or Epaq MR, or standalone drive to which the pressure switch is connected. You can use -PS1 to allow the pressure switch to be operated from 24 VDC instead of the drive's internal 5 VDC power. The -PS1 option also includes a DIN-rail to mount the power supply and break-out module.

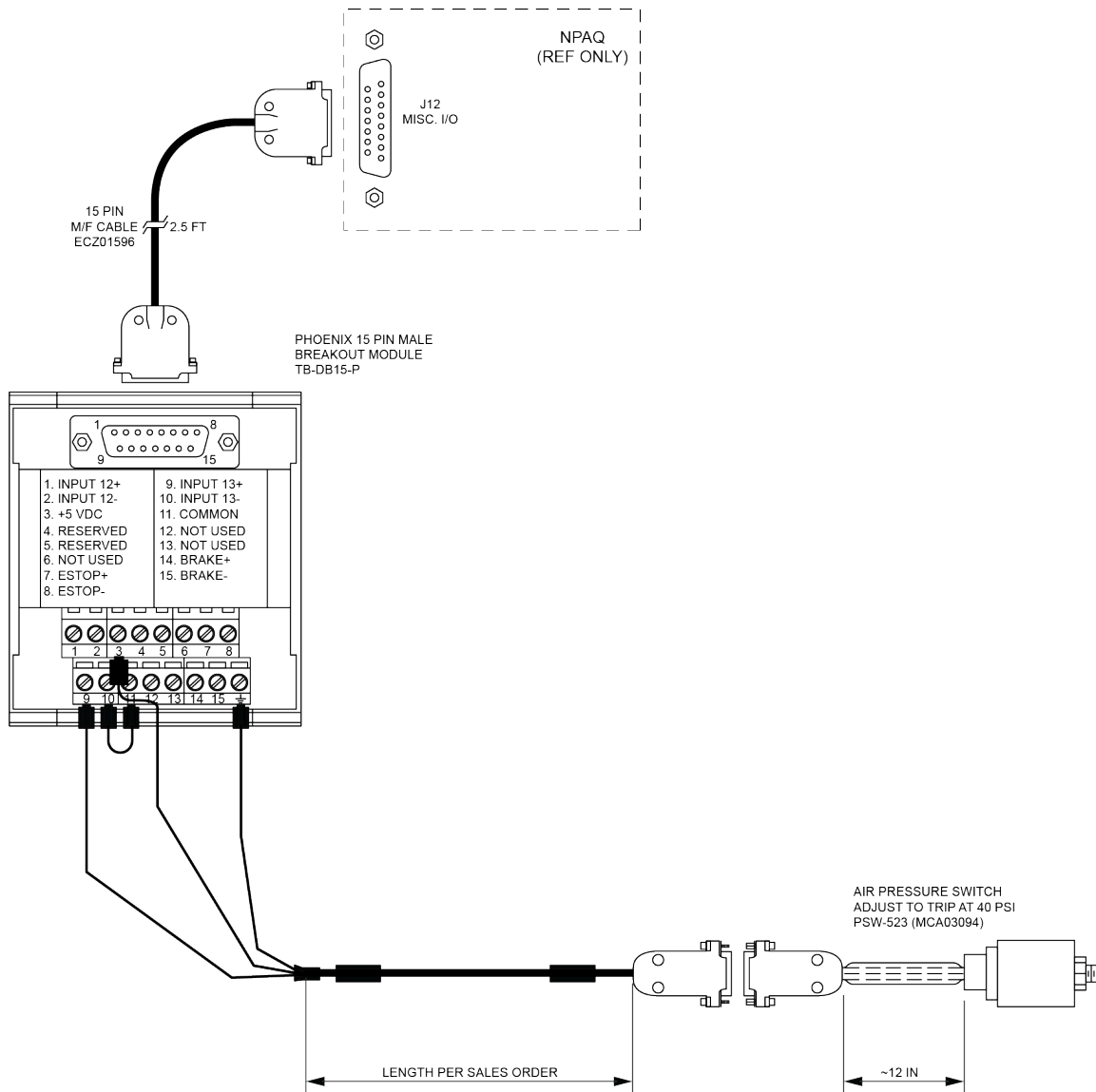


Figure 2-6: Flying Leads with -BB1 Breakout Block

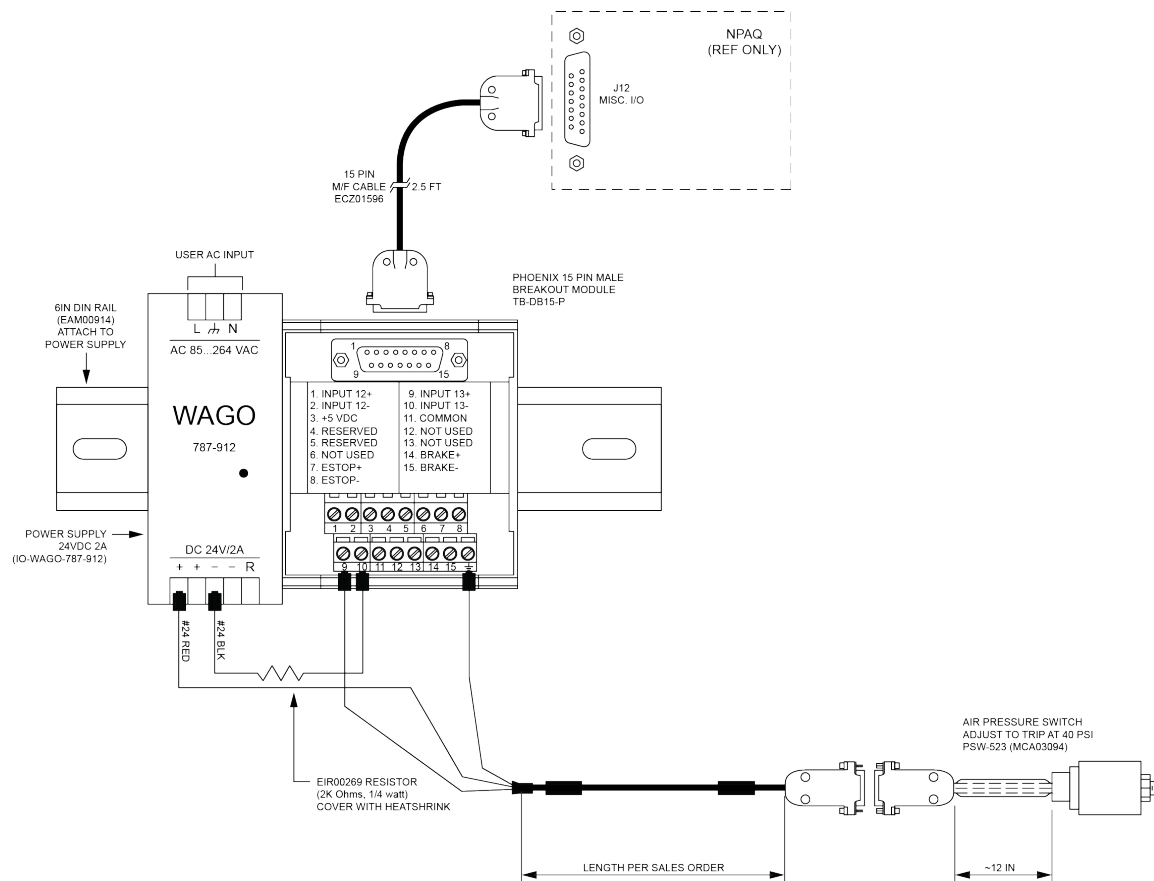


Figure 2-7: Flying Leads with -BB1 Breakout Block and 24 VDC Power Supply

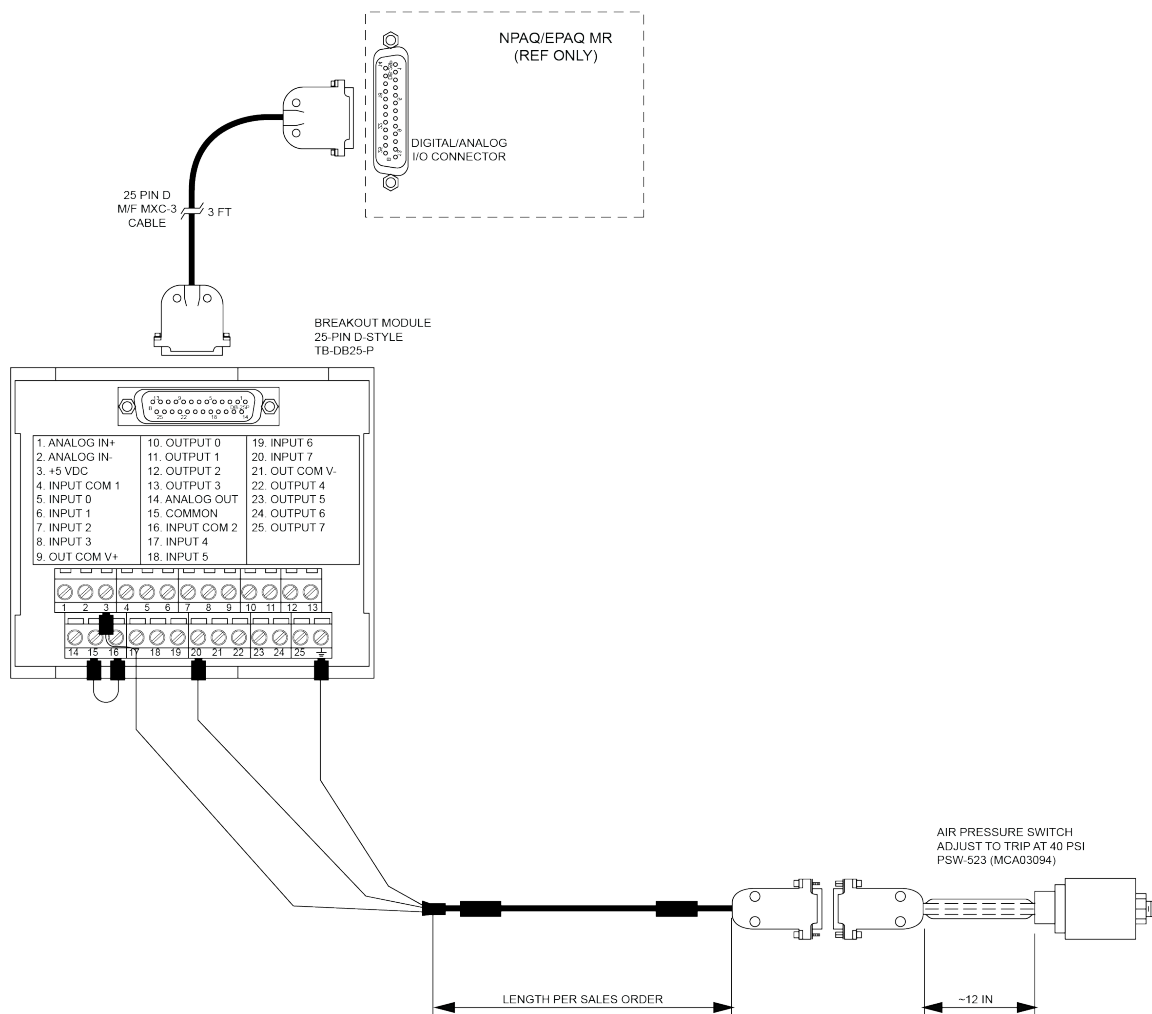


Figure 2-8: Flying Leads with -BB2 Breakout Block

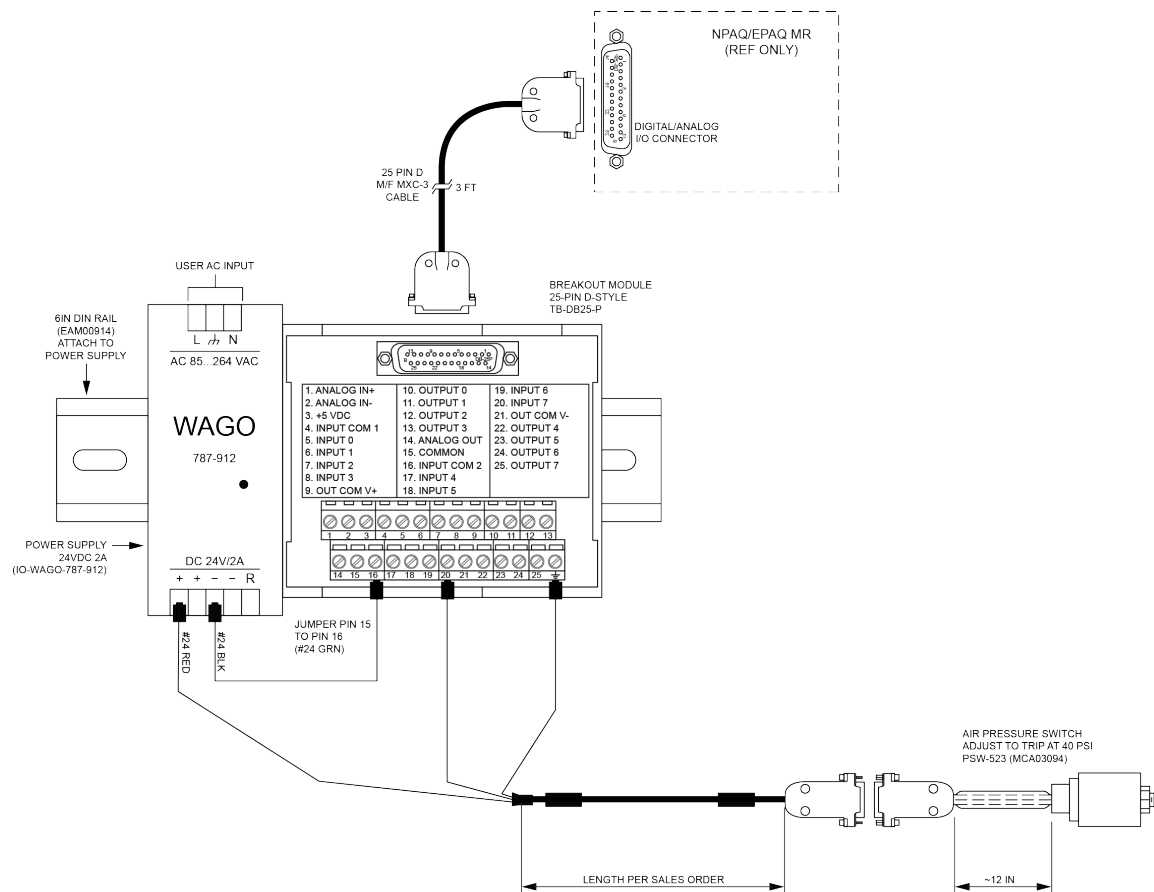


Figure 2-9: Flying Leads with -BB2 Breakout Block and 24 VDC Power Supply

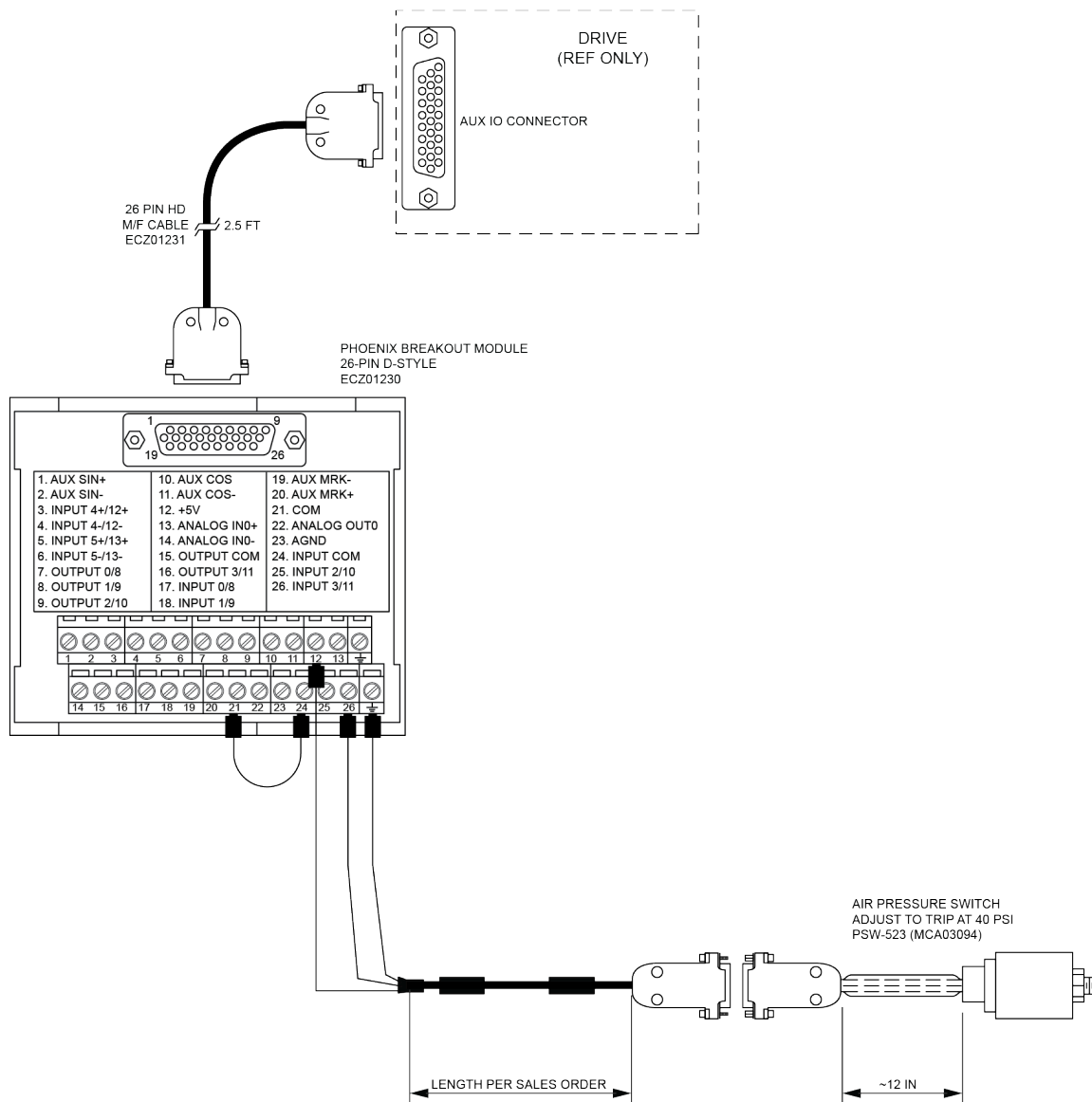


Figure 2-10: Flying Leads with -BB3 Breakout Block

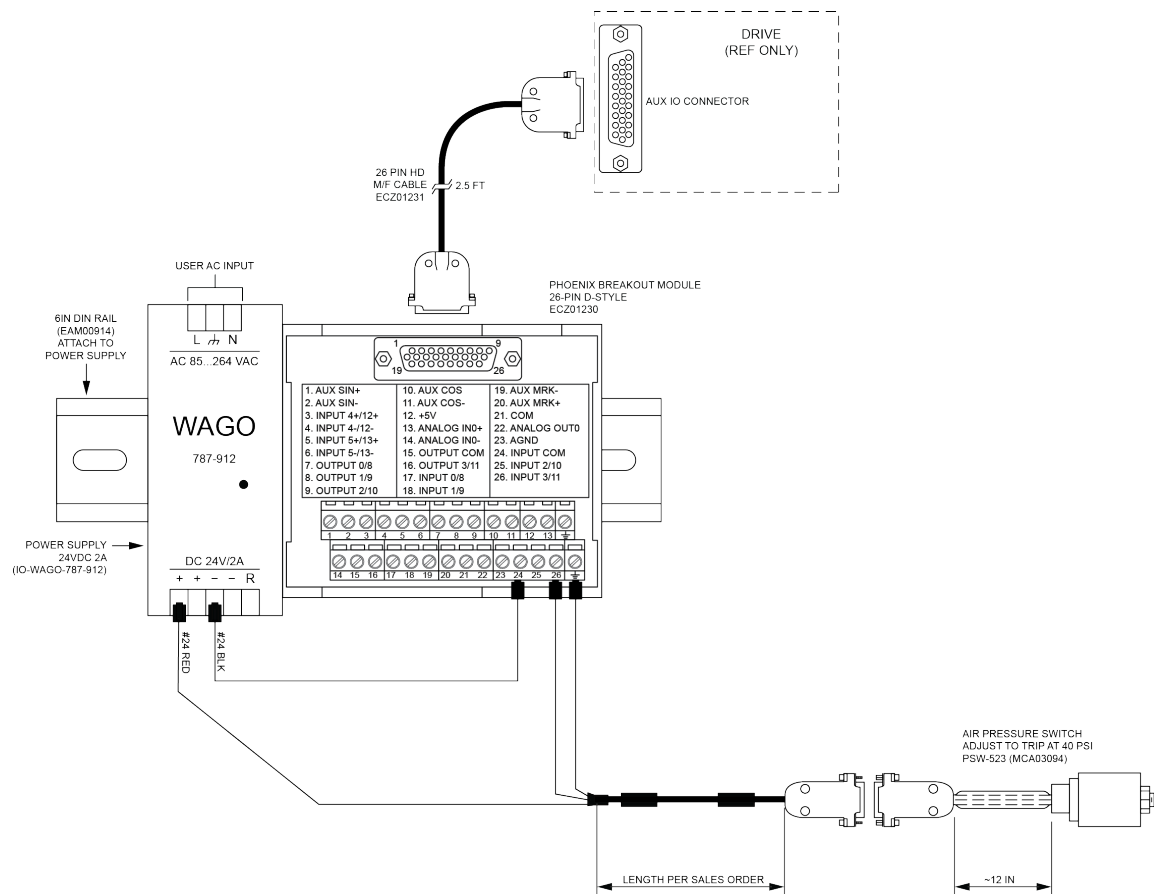


Figure 2-11: Flying Leads with -BB3 Breakout Block and 24 VDC Power Supply

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Chapter 3: Electrical Specifications and Installation



DANGER: Remove power before connecting or disconnecting electrical components or cables. Failure to do so may cause electric shock.



WARNING: Applications requiring access to the stage while it is energized will require additional grounding and safeguards. The System Integrator or qualified installer is responsible for determining and meeting all safety and compliance requirements necessary for the integration of this stage into the final application.



WARNING: Operator access to the base and tabletop must be restricted while connected to a power source. Failure to do so may cause electric shock.



WARNING: Electrical installation must be performed by properly qualified personnel.

Aerotech motion control systems are adjusted at the factory for optimum performance. When the ABF is part of a complete Aerotech motion control system, setup usually involves connecting the ABF to the appropriate drive chassis with the cables provided. Labels on the system components usually indicate the appropriate connections.

If system level integration was purchased, an electrical drawing showing system interconnects has been supplied with the system (separate from this documentation).

The electrical wiring from the motor and encoder are integrated at the factory. Refer to the following sections for standard motor wiring and connector pin assignments.

The drive I/O input used for the air pressure switch depends on the type of drive you are using. [Table 3-1](#) lists the inputs used by Aerotech drives.

Table 3-1: I/O Inputs for Air Pressure Switch

Family	Controller	Input #
A3200	Npaq	13
	Npaq MR	7
	Ndrive HLe, HPe, CP, CL	11
	Ndrive MP	7
Ensemble	Epaq MR	Port 1, Bit 7
	HLe, HPe, CP, CL	Port 0, Bit 3
	MP	Port 1, Bit 7
Soloist	HLe, HPe, CP, CL	Port 0, Bit 3
	MP	Port 1, Bit 7

In addition to making the electrical connections, you must configure the fault parameters of your drive to use the correct input number and allow external faults. See your Aerotech software help file for more information.

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Chapter 4: Maintenance

4.1. Inspecting and Draining

The filter/regulator and coalescing filter units should be checked regularly to ensure excessive moisture is not building up in their collection bowls. Depending on the conditions of stage usage, it is possible that the automatic drain feature will not be executed. Collection bowls can be manually emptied by pressing up on the drain knob located on the bottom of the bowl.

4.2. Replacing Filter Elements

Do not clean the filter elements within each filter unit; instead replace them when they have reached the end of their service life.

Visually assess the status of the filter element in the filter/regulator. If the filter appears soiled or discolored, it is time to replace the filter element.

For a more objective way to identify filter performance, the filter can be tested offline from the air bearing system. Ensure stage motion has been stopped and all axes have been disabled. Turn off supply air pressure to the ABF unit. Disconnect the air line connecting the ABF outlet to the stage air inlet. Measure the pressure drop across the filter/regulator by setting the filter/regulator wide open with a pressure gauge installed just upstream of the filter/regulator. If the difference in pressure across the filter/regulator is greater than 10 psi (69 kPa), replace the filter element. Contact Aerotech to order a replacement filter element (P/N: MCA01639-1).

The status of the filter element in the coalescing filter can be measured without removing the filter unit or shutting down the air bearing stage. If the pressure difference between the filter/regulator pressure gauge and the ABF outlet pressure gauge is greater than 8 psi (55 kPa), replace the filter element. Contact Aerotech to order a replacement filter element (P/N: MCA03847).

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Appendix A: Warranty and Field Service

Aerotech, Inc. warrants its products to be free from harmful defects caused by faulty materials or poor workmanship for a minimum period of one year from date of shipment from Aerotech. Aerotech's liability is limited to replacing, repairing or issuing credit, at its option, for any products that are returned by the original purchaser during the warranty period. Aerotech makes no warranty that its products are fit for the use or purpose to which they may be put by the buyer, whether or not such use or purpose has been disclosed to Aerotech in specifications or drawings previously or subsequently provided, or whether or not Aerotech's products are specifically designed and/or manufactured for buyer's use or purpose. Aerotech's liability on any claim for loss or damage arising out of the sale, resale, or use of any of its products shall in no event exceed the selling price of the unit.

THE EXPRESS WARRANTY SET FORTH HEREIN IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE. IN NO EVENT SHALL AEROTECH BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

Return Products Procedure

Claims for shipment damage (evident or concealed) must be filed with the carrier by the buyer. Aerotech must be notified within thirty (30) days of shipment of incorrect material. No product may be returned, whether in warranty or out of warranty, without first obtaining approval from Aerotech. No credit will be given nor repairs made for products returned without such approval. A "Return Materials Authorization (RMA)" number must accompany any returned product(s). The RMA number may be obtained by calling an Aerotech service center or by submitting the appropriate request available on our website (www.aerotech.com). Products must be returned, prepaid, to an Aerotech service center (no C.O.D. or Collect Freight accepted). The status of any product returned later than thirty (30) days after the issuance of a return authorization number will be subject to review.

Visit <https://www.aerotech.com/global-technical-support.aspx> for the location of your nearest Aerotech Service center.

Returned Product Warranty Determination

After Aerotech's examination, warranty or out-of-warranty status will be determined. If upon Aerotech's examination a warranted defect exists, then the product(s) will be repaired at no charge and shipped, prepaid, back to the buyer. If the buyer desires an expedited method of return, the product(s) will be shipped collect. Warranty repairs do not extend the original warranty period.

Fixed Fee Repairs - Products having fixed-fee pricing will require a valid purchase order or credit card particulars before any service work can begin.

All Other Repairs - After Aerotech's evaluation, the buyer shall be notified of the repair cost. At such time the buyer must issue a valid purchase order to cover the cost of the repair and freight, or authorize the product(s) to be shipped back as is, at the buyer's expense. Failure to obtain a purchase order number or approval within thirty (30) days of notification will result in the product(s) being returned as is, at the buyer's expense.

Repair work is warranted for ninety (90) days from date of shipment. Replacement components are warranted for one year from date of shipment.

Rush Service

At times, the buyer may desire to expedite a repair. Regardless of warranty or out-of-warranty status, the buyer must issue a valid purchase order to cover the added rush service cost. Rush service is subject to Aerotech's approval.

On-site Warranty Repair

If an Aerotech product cannot be made functional by telephone assistance or by sending and having the customer install replacement parts, and cannot be returned to the Aerotech service center for repair, and if Aerotech determines the problem could be warranty-related, then the following policy applies:

Aerotech will provide an on-site Field Service Representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs. For warranty field repairs, the customer will not be charged for the cost of labor and material. If service is rendered at times other than normal work periods, then special rates apply.

If during the on-site repair it is determined the problem is not warranty related, then the terms and conditions stated in the following "On-Site Non-Warranty Repair" section apply.

On-site Non-Warranty Repair

If any Aerotech product cannot be made functional by telephone assistance or purchased replacement parts, and cannot be returned to the Aerotech service center for repair, then the following field service policy applies:

Aerotech will provide an on-site Field Service Representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs and the prevailing labor cost, including travel time, necessary to complete the repair.

Service Locations

<http://www.aerotech.com/contact-sales.aspx?mapState=showMap>

USA, CANADA, MEXICO	CHINA	GERMANY
Aerotech, Inc. Global Headquarters Phone: +1-412-967-6440 Fax: +1-412-967-6870	Aerotech China Full-Service Subsidiary Phone: +86 (21) 3319 7715	Aerotech Germany Full-Service Subsidiary Phone: +49 (0)911 967 9370 Fax: +49 (0)911 967 93720
JAPAN	TAIWAN	UNITED KINGDOM
Aerotech Japan Full-Service Subsidiary Phone: +81 (0)50 5830 6814 Fax: +81 (0)43 306 3773	Aerotech Taiwan Full-Service Subsidiary Phone: +886 (0)2 8751 6690	Aerotech United Kingdom Full-Service Subsidiary Phone: +44 (0)1256 855055 Fax: +44 (0)1256 855649

Have your customer order number ready before calling.

Appendix B: Revision History

Revision	General Information
1.03.00	<ul style="list-style-type: none">• Updated product part number information• Updated Safety information• Added MP connection information: Section 2.8.
1.02.00	Revision changes have been archived. If you need a copy of this revision, contact Aerotech Global Technical Support.
1.01.00	
1.00.00	

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