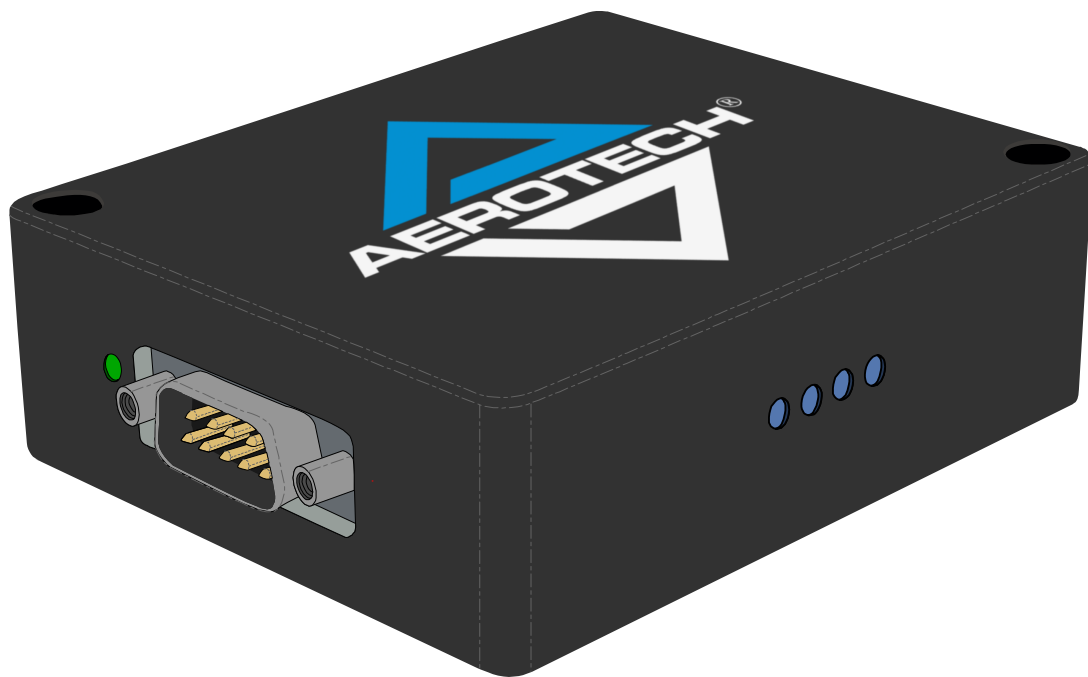# Enhanced Throughput Module (ETM) Hardware Manual

Revision: 1.02.00

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.

United States (World Headquarters)	
Phone: +1-412-967-6440 Fax: +1-412-967-6870 Email: service@aerotech.com	101 Zeta Drive Pittsburgh, PA 15238-2897 www.aerotech.com
United Kingdom	Japan
Phone: +44 (0)1256 855055 Fax: +44 (0)1256 855649 Email: service@aerotech.co.uk	Phone: +81 (0)50 5830 6814 Fax: +81 (0)43 306 3773 Email: service@aerotechkk.com.jp
Germany	China
Phone: +49 (0)911 967 9370 Fax: +49 (0)911 967 93720 Email: service@aerotechgmbh.de	Phone: +86 (21) 3319 7715 Email: saleschina@aerotech.com
France	Taiwan
Phone: +33 1 64 93 58 67 Email: sales@aerotech.co.uk	Phone: +886 (0)2 8751 6690 Email: service@aerotech.tw

Aerotech Worldwide

United States ▪ France ▪ Germany ▪ United Kingdom
China ▪ Japan ▪ Taiwan

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EC Declaration of Conformity
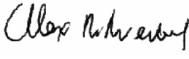
Manufacturer	Aerotech, Inc.
Address	101 Zeta Drive
	Pittsburgh, PA 15238-2897
	USA
Product	Enhanced Throughput Module
Model/Types	All

This is to certify that the aforementioned product is in accordance with the applicable requirements of the following Directive(s):

2006/95/EC	Low Voltage Directive
2011/65/EU	RoHS 2 Directive

and has been designed to be in conformity with the applicable requirements of the following documents when installed and used in accordance with the manufacturer's supplied installation instructions.

EN 61010-1	Safety requirements for electrical equipment

Name	/ Alex Weibel
Position	Engineer Verifying Compliance
Location	Pittsburgh, PA
Date	June 28, 2015

Chapter 1: Enhanced Throughput Module

The Enhanced Throughput Module (ETM) is a high resolution sensor to be used in conjunction with the ETM software option on the Soloist, Ensemble, and A3200 controllers. The ETM module provides a significant improvement in productivity by reducing move and settle times for point to point applications. It also reduces dynamic position errors for high speed contouring applications providing improved part accuracy and quality.

The ETM module is offered in two versions: the -SD for standard resolution systems and the -HD for ultra high resolution applications. The modules share the same electrical connections and mounting footprint, however the -HD version is 10 mm taller than the -SD version.

The ETM module must be securely mounted to the system base in line with the axis of motion being corrected. The ETM module requires an external 5 V power source and outputs a differential analog signal centered at 2.5 V to the controller.
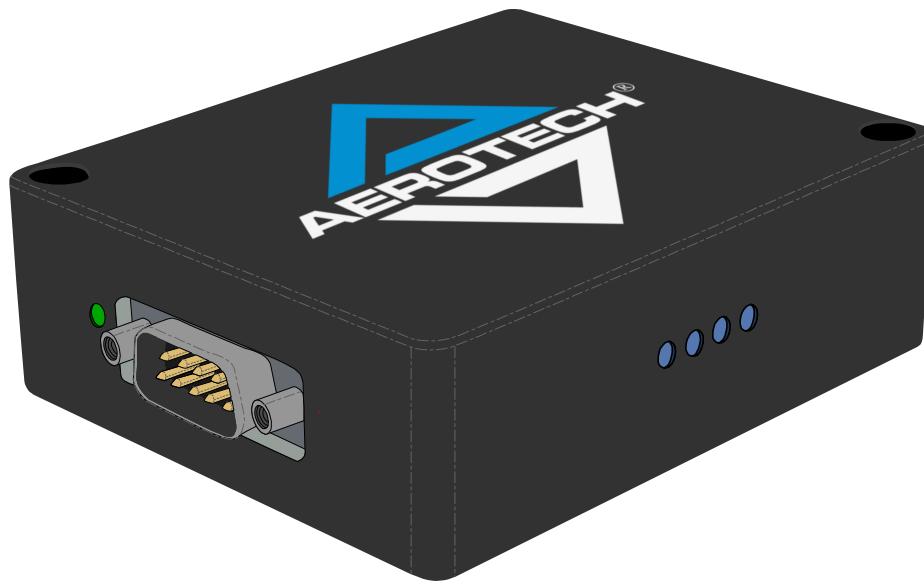

Figure 1-1:   ETM Module

Table 1-1:   Feature Summary

Options	
ETM-SD	Standard solution for higher-performance automation applications
ETM-HD	High-performance solution for the most demanding applications
Cables (refer to Section 1.5. Cable Options for schematics)	
C22501-50	ETM 9D to flying leads; Length 5m
C22502-50	ETM 9D to 26HD for CP/CL/HPe/HLe direct connection to Auxiliary IO connector; Length 5m
C22503-50	ETM 9D to 2x26HD for CP/CL/HPe/HLe direct connection to Auxiliary IO connectors - gantry mode; Length 5m
C22504-50	ETM 9D to 15D Npaq analog IO connector; channel 0; Length 5m
C22505-50	DUAL ETM 9D to 15D Npaq analog IO connector; channels 0/1; 5m
Note: Must be ordered with the "ETM Controller Option" on any Aerotech controller family (A3200/Ensemble/Soloist). Note: IO option is required when using panel-mount drives.	

1.1. Electrical Specifications

The electrical specifications for the ETM are listed below.

Table 1-2:   Electrical Specifications

Description	ETM
Input Voltage	5 V (±10%)
Input Current	100 mA (max)
Output Voltage	0 - 5 V, differential centered at 2.5 V, 1 mA max drive current
Warm Up Time	1 minute

1.2. Electrical Connections

The ETM connector is a 9 pin male D connector.

Table 1-3:   ETM Connector Pin Assignment

Pin	Description	Pin Locations
1	Reserved	
2	Ground	
3	Ground	
4	Reserved	
5	Output +	
6	+5V Input	
7	Ground	
8	Reserved	
9	Output -	

Table 1-4:   ETM Mating Connector

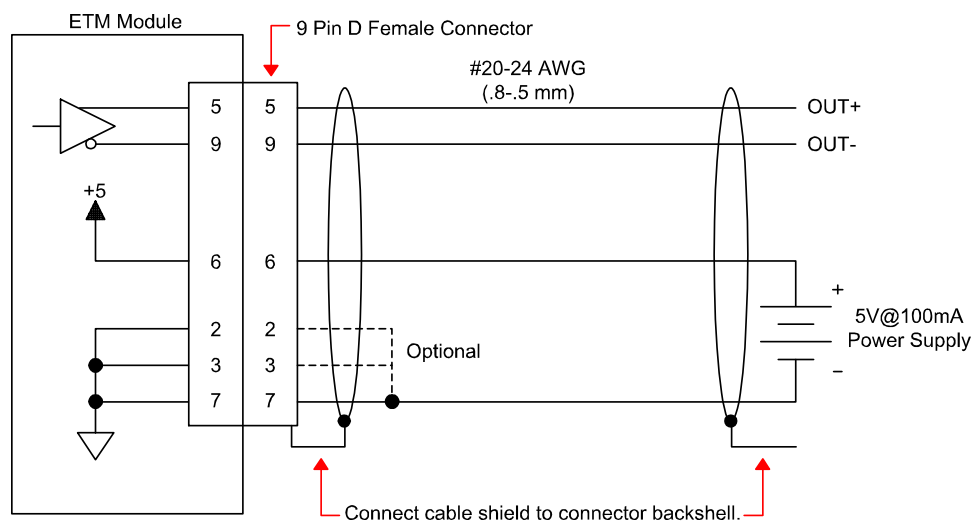| 9 Pin D Female	Aerotech P/N	Third Party P/N
Connector	ECK00781	Tyco/Amp 1-745491-7
Backshell	ECK001021	Amphenol #17-1724-2

Figure 1-2:   ETM Connector

1.3. Sensor Display

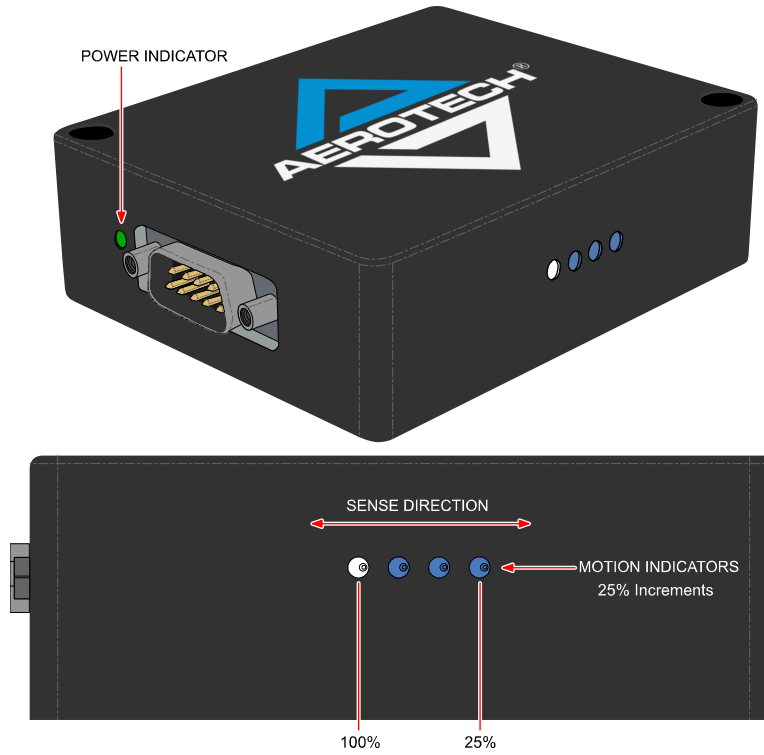The blue LED display is a bar graph display indicating motion in 25% increments from 0-100%.

Figure 1-3:   Sensor Display
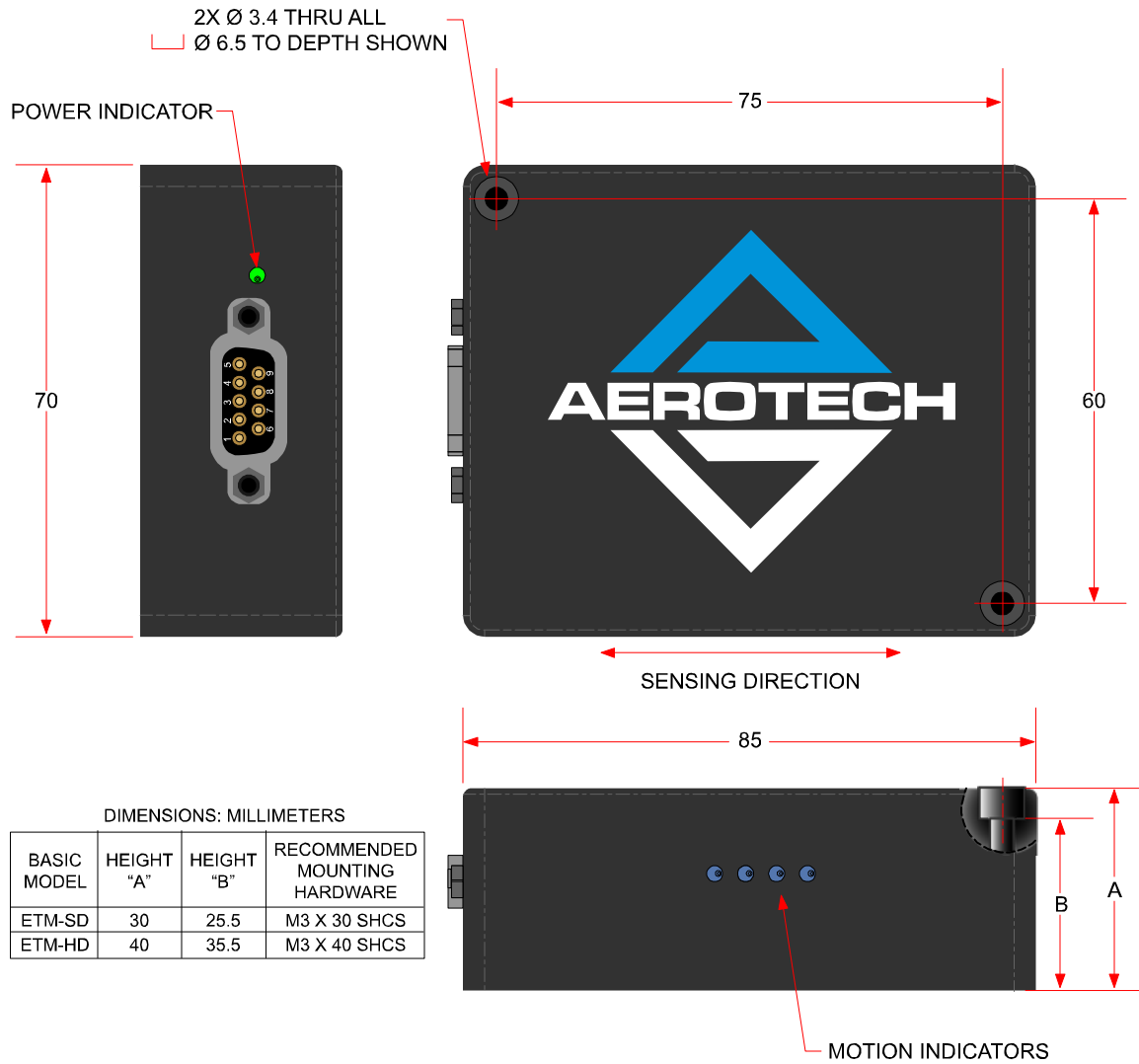
1.4. Mechanical Dimensions

Figure 1-4:   Dimensions

Table 1-5:   Unit Weight

Model	Weight
-SD	.24 kg
-HD	.385 kg

Table 1-6:   Recommended Mounting Hardware

Model	Mounting Hardware	Tightening Torque
-SD	M3 x 30 Socket Head Cap Screws (SHCS)	1.1 N·m
-HD	M3 x 40 Socket Head Cap Screws (SHCS)	1.1 N·m

1.5. Cable Options
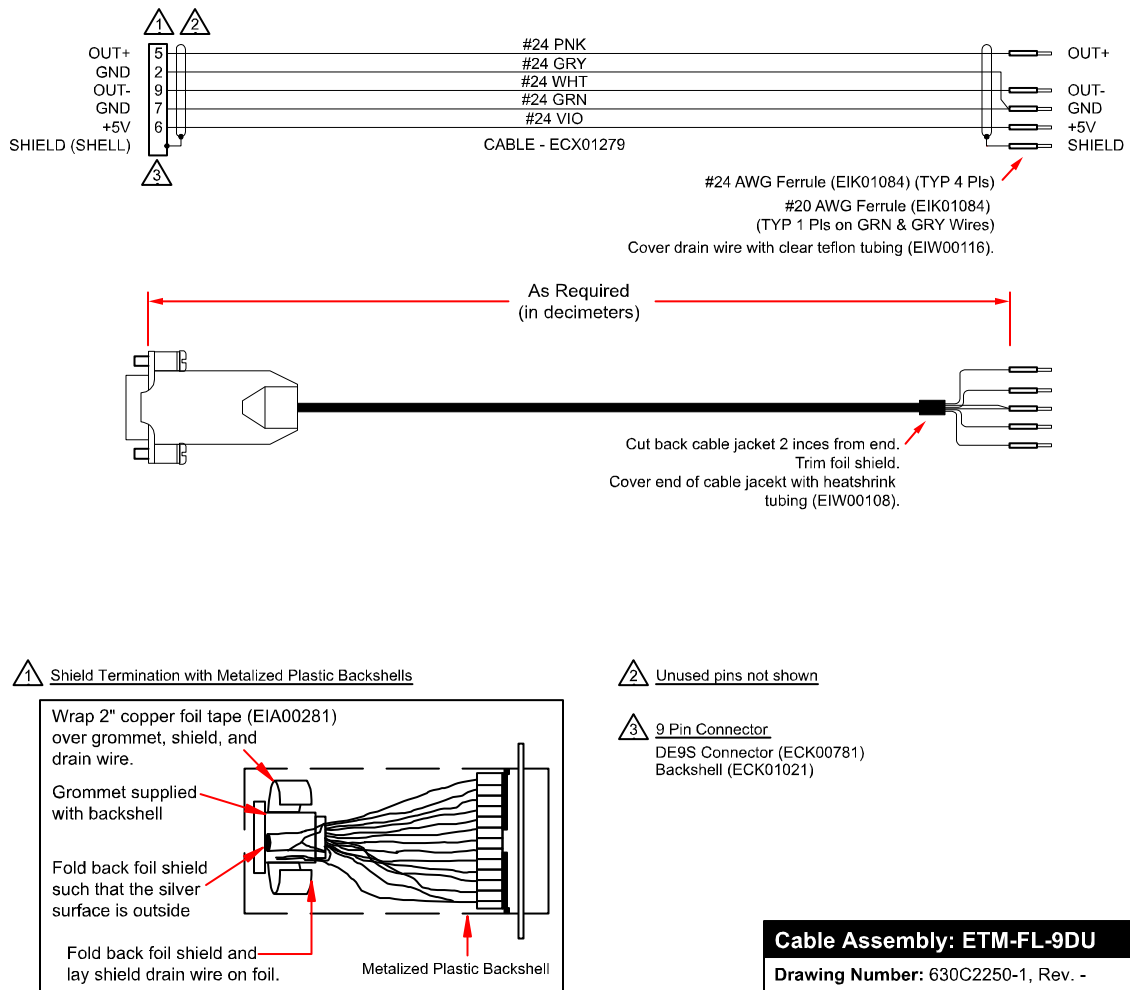
Figure 1-5:   C22501 Cable (ETM-FL-9DU)

Figure 1-6:   C22502 Cable (ETM-26HD-9DU)

Splice, Cover with Heatshrink Tubing (EIW00101)
(Typ 6 Pls)

OUT+   5
OUT-   9
GND   7
+5V   6

#24 PNK
#24 WHT
#24 GRN
#24 VIO
#24 GRY

SHIELD (SHELL)

CABLE - ECX01279

13 IN+
14 IN-
23 GND
12 +5V

SHIELD (SHELL)

#24 GRY
#24 VIO
#24 GRN
#24 WHT
#24 PNK

13 IN+
14 IN-
23 GND

CABLE - ECX01279   SHIELD (SHELL)

As Required
(in decimeters)

This section of cable
to be 2 FT long

1 Shield Termination with Metalized Plastic Backshells

Wrap 2" copper foil tape (EIA00281)
over grommet, shield, and
drain wire.

Grommet supplied
with backshell

Fold back foil shield
such that the silver
surface is outside

Fold back foil shield and
lay shield drain wire on foil.

Metalized Plastic Backshell

2 Unused pins not shown

3 9 Pin Connector
DE9S Connector (ECK00781)
Backshell (ECK01021)

4 26 Pin Connector
26HD Male Connector (ECK01259)
Backshell (ECK01022)

Cable Assembly: ETM-26HD 26HD-9DU
Drawing Number: 630C2250-3, Rev. -
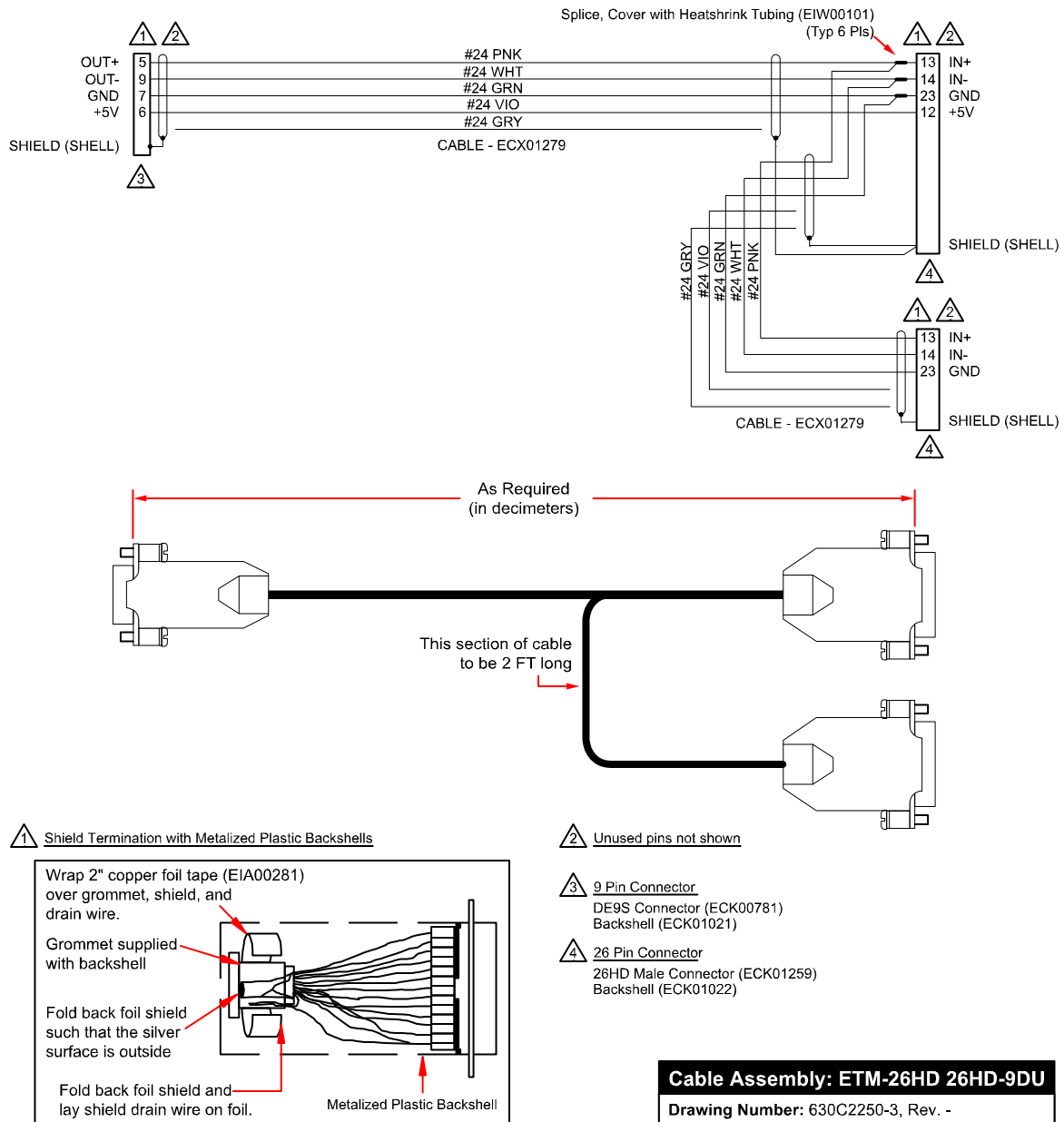
Figure 1-7:   C22503 Cable (ETM-26HD 26HD-9DU)

CABLE - ECX01279

OUT+	5	#24 PNK	1	AIN0+
GND	2	#24 GRY	8	GND
OUT-	9	#24 WHT	9	AIN0-
GND	7	#24 GRN	15	GND
+5V	6	#24 VIO	5	+5V
SHIELD (SHELL)				SHIELD (SHELL)

As Required
(in decimeters)

1 Shield Termination with Metalized Plastic Backshells

Wrap 2" copper foil tape (EIA00281) over grommet, shield, and drain wire.

Grommet supplied with backshell

Fold back foil shield such that the silver surface is outside

Fold back foil shield and lay shield drain wire on foil.

Metalized Plastic Backshell

2 Unused pins not shown

3 9 Pin Connector
DE9S Connector (ECK00781)
Backshell (ECK01021)

4 15 Pin Connector
DB15P Connector (ECK00790)
Backshell (ECK01022)

Cable Assembly: ETM-15DU-9DU
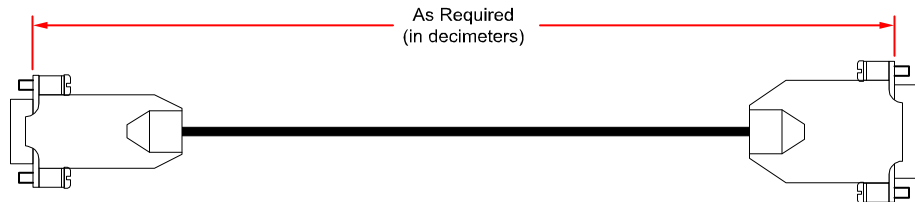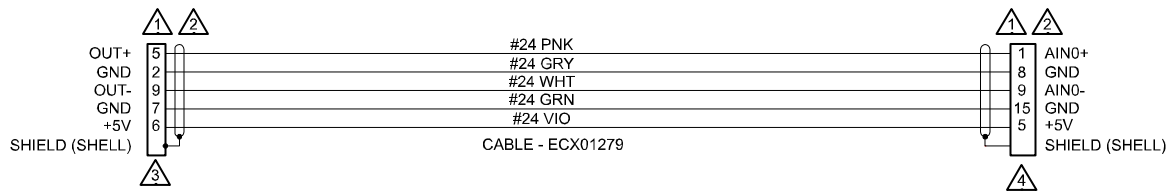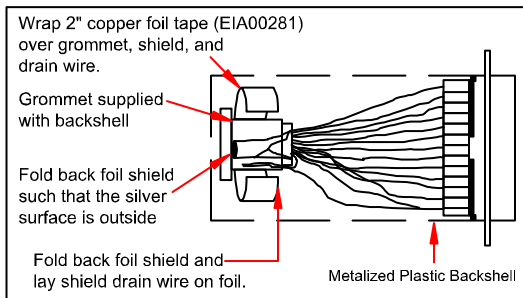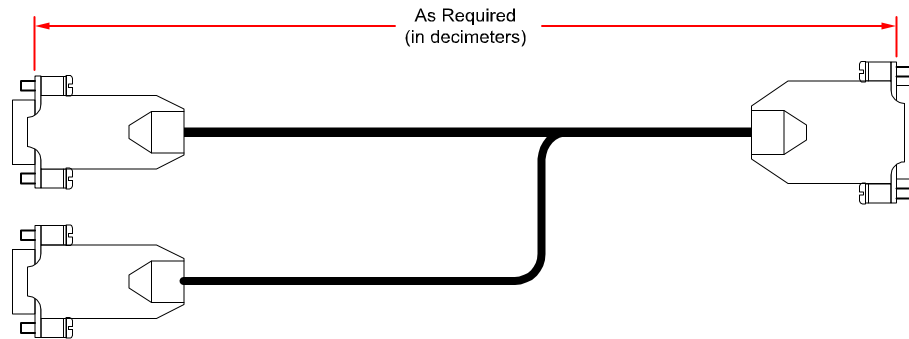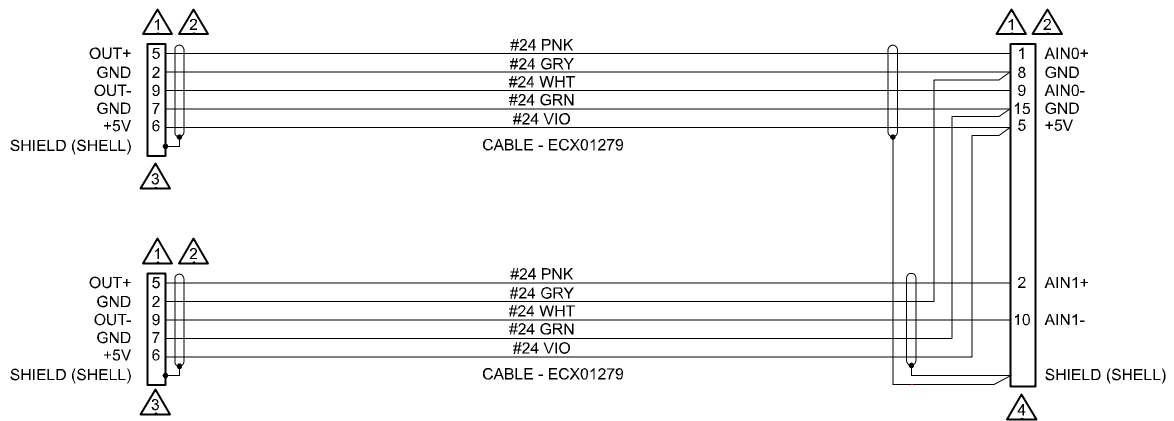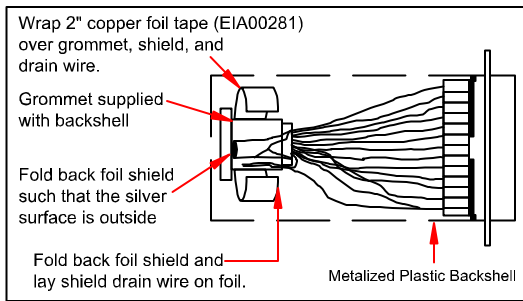**Drawing Number:** 630C2250-4, Rev. -

Figure 1-8:   C22504 Cable (ETM-FL-15DU-9DU)

Figure 1-9:   C22505 Cable (ETM-15DU-9DU 9DU)

1.6. Environmental Specifications

The environmental specifications for the ETM are listed below.

Ambient Temperature	Operating: 0° to 50°C (32° to 122° F)
	Storage: -30° to 85°C (-22° to 185° F)
Humidity	Maximum relative humidity is 80% for temperatures up to 31°C. Decreasing linearly to 50% relative humidity at 40°C. Non condensing.
Altitude	Up to 2000 meters.
Pollution	Pollution degree 2 (normally only non-conductive pollution).
Use	Indoor use only.

1.7. Preventative Maintenance

The ETM does not require regular maintenance under normal operating conditions.

Cleaning

The ETM chassis can be wiped with a clean, dry, soft cloth. The cloth may be slightly moistened if required with water or isopropyl alcohol to aid in cleaning if necessary. In this case, be careful not to allow moisture to enter the ETM or onto the exposed connector. Fluids and sprays are not recommended because of the chance for internal contamination, which may result in electrical shorts and/or corrosion. The electrical power must be disconnected from the ETM while cleaning. Do not allow cleaning substances or other fluids to enter the ETM or to get on to the connector. Avoid cleaning labels to prevent removing the label information.

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 http://www.aerotech.com/service-and-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.	Aerotech China	Aerotech Germany
Global Headquarters	Full-Service Subsidiary	Full-Service Subsidiary
Phone: +1-412-967-6440	Phone: +86 (21) 3319 7715	Phone: +49 (0)911 967 9370
Fax: +1-412-967-6870		Fax: +49 (0)911 967 93720

JAPAN	TAIWAN	UNITED KINGDOM
Aerotech Japan	Aerotech Taiwan	Aerotech United Kingdom
Full-Service Subsidiary	Full-Service Subsidiary	Full-Service Subsidiary
Phone: +81 (0)50 5830 6814	Phone: +886 (0)2 8751 6690	Phone: +44 (0)1256 855055
Fax: +81 (0)43 306 3773		Fax: +44 (0)1256 855649

Appendix B: Revision History

Revision	Date	Description
1.02.00	June 28, 2015	Updated international contact information
1.01.00	March 7, 2011	Added pin number detail to drawings: Section 1.2., Section 1.4.
1.00.00	July 31, 2009	New Manual