# SERIES 1860

## INTELLIGENT ABSOLUTE RESOLVER ENCODER MODULE

# USER'S MANUAL

Catalog Number 1860-C91M

ADVANCED
MICRO CONTROLS INC.

## IMPORTANT USER INFORMATION

The products and application data described in this manual are useful in a wide variety of different applications. Therefore, the user and others responsible for applying these products described herein are responsible for determining the acceptability for each application. While efforts have been made to provide accurate information within this manual, AMCI assumes no responsibility for the application or the completeness or usefulness of the information contained herein.

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## 24 HOUR TECHNICAL SUPPORT NUMBER

For technical support call (203) 583-7271.

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## 1.0 OBJECTIVE

The objective of this manual is to explain the installation, operation, programming, and servicing of the Series 1860 Encoder Modules for the Modicon Series 800 I/O Chassis. It is strongly recommended that the user read the following instructions. If there are any unanswered questions after reading this manual, contact the factory. An applications engineer will be available to assist you.

## 2.0 INTRODUCTION

The Series 1860 Absolute Encoder Modules are single or dual-axis, resolver based, absolute multi-turn encoders that plug directly into any Modicon Series 800 I/O Chassis. Each module occupies only one slot in the chassis. Since the Absolute Encoder Module resides in the Chassis, no external wiring is needed to interface the module to the Processor.

On the front panel, a six digit LED display and sealed keyboard allows the monitoring of transducer position and speed. The Number of Turns, Full Scale Count, Offsets, and Position Decimal Point are programmable from the keyboard. Each module is equipped with hardware fault and broken wire diagnostics. Position and Tachometer information for each of the module's axes as well as fault diagnostic data is available to the Processor.

## 3.0 SERIES 1800 FAMILY

The following table lists the model numbers of the ten different Absolute Encoder Modules presently available in the Series 1800 Family as well as a brief description of each module.

| | |
|---|---|
| 1831 | 10 bit, one axis, single turn encoder |
| 1832 | 10 bit, two axis, single turn encoder |
| 1833 | 10 bit, three axis, single turn encoder |
| 1834 | 10 bit, four axis, single turn encoder |
| 1841 | 13 bit, one axis, single turn encoder |
| 1842 | 13 bit, two axis, single turn encoder |
| 1843 | 13 bit, three axis, single turn encoder |
| 1844 | 13 bit, four axis, single turn encoder |
| 1861 | 18 bit, one axis, multi-turn encoder |
| 1862 | 18 bit, two axis, multi-turn encoder |

This manual will deal with the programming and operation of the two 1860 modules. For instructions on the other modules, refer to the Series 1800 User's Manual.

# 4.0 INSTALLATION

## 4.1 POWER REQUIREMENTS

A Series 1860 Absolute Encoder Module draws it's systems power from the I/O chassis backplane. The power that is drawn from the I/O chassis backplane is **900 mAmps from the +5 Vdc Supply** (4.50 W total). Add this to the power requirements of all other cards in the rack to avoid exceeding backplane or supply capacity.

## 4.2 INSTALLING THE MODULE

**WARNING: Remove the system power before removing or installing a module in the I/O chassis. Failure to observe this warning can result in damage to the module's circuitry and/or undesired operation with possible injury to personnel.**

To insert a module into the I/O chassis:

1. Remove power from the I/O chassis before inserting the module.

2. Insert the module into the designated slot.

3. Firmly press on the front of the module to seat the module into the backplane connector. **CAUTION:** Do not force the module into the backplane connector. If you cannot seat it with firm pressure, check the alignment. You can damage the connector or the module if you force the module into the connector.

4. Secure the module with the module's thumb screws.

To remove the module, do the following:

1. Remove power from the I/O chassis before removing the module.

2. Loosen the module's thumb screws so that they are not securing the module to the chassis.

3. Remove the module from the chassis by pulling it from the center.

## 4.0 INSTALLATION (cont'd)

### 4.3 INSTALLING THE TRANSDUCER CABLE

The transducer cable consists of twisted pairs of individually shielded wire. The recommended type of cable is Belden 9731 or equivalent. Advanced Micro Controls Inc. supplies Transducer cables with the following part numbers:

CTT - xx for the 1861 Module.
C2TT - xx for the 1862 Module.
- xx is the length of the cable in feet.

The user must route the cable as far as possible from any power cables to minimize the effect of the EMI generated by them. In addition, it is recommend that all Power Switching Devices residing in the same control panel as the 800 I/O Chassis have surge-suppressing devices installed at their terminals.

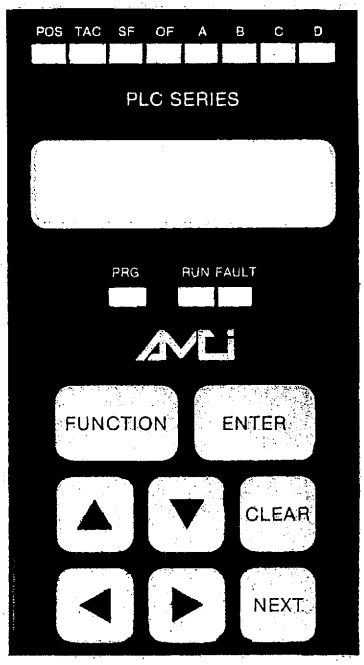
## 5.0 FUNCTIONAL DESCRIPTION

The following sections describe the functions and programmable parameters available on the Series 1860 Modules. For information on programming the parameters, please refer to Section 8.0 "PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE".

### 5.1 FRONT PANEL DESCRIPTION:

STATUS DISPLAY

The three LEDs show the status of the module including:
PROGRAM Mode.
RUN Mode.
FAULT Indication.




FUNCTION DISPLAY

The eight LEDs above The display are the FUNCTION INDICATORS. A blinking digit on the display denotes the CURSOR.

KEYBOARD

Used to display or modify the 1760 functions and parameters.

## 5.0 FUNCTIONAL DESCRIPTION

### 5.2 FUNCTION INDICATORS:

Above the digital display are eight LED indicators that define the function or parameter showing on the display. The Function Indicators shown below are for the first transducer. With the 1762, the "D" LED is also "ON" for the functions and parameters of the second transducer.

| | LEDs ON | FUNCTION |
|---|---|---|
| # | POS | Transducer's Shaft Position Function. |
| # | TAC | Tachometer Function. (speed of rotation) |
| * | C | Transducer Type. (100 or 180 turn) |
| * | SF + A | Full Scale Number of Turns Parameter |
| * | SF + B | Full Scale Count Parameter (Maximum = Number of Turns * 1024 ) |
| | SF + C | Calculated Counts per Turn (Full scale Counts / Number of Turns) |
| * | O + A | Circular Position Offset Parameter |
| * | O + B | Linear Position Offset Parameter |
| * | A | Decimal Point Parameter. Effects the DISPLAY only, not the Processor data. |

# The Position and Tachometer data is available to the Processor.
* These are programmable parameters that effect the Position Function.

### 5.3 FUNCTION AND PARAMETER DESCRIPTIONS

This section describes the functions and programmable parameters available with the 1860 Modules. For programming information, refer to Section 8.0: "PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE".

#### 5.3.1 POSITION FUNCTION:

This display shows the current position of the transducer's shaft. This function is affected by four programmable parameters, the Scale Factor parameters, (Number of Turns and Full Scale Count), the Circular Offset parameter, and the Linear Offset parameter. The Position data is available to the Processor.

## 5.0 FUNCTIONAL DESCRIPTION (cont'd)

### 5.3 FUNCTION AND PARAMETER DESCRIPTIONS (cont'd)

#### 5.3.2 TACHOMETER FUNCTION:

The Tachometer Display shows the operator the speed of rotation of the transducer's shaft in RPM, Revolutions Per Minute. The tachometer response time is set to 32 mSecs. The response time is the time it takes to determine a new speed and show it on the display. The Tachometer Data is available to the Processor.

#### 5.3.3 TRANSDUCER TYPE PARAMETER:

This parameter allows the module to be configured to use an HTT-20-100 One hundred turn transducer or an HTT-20-180 One hundred eighty turn transducer. This parameter also effects the Scale Factor parameters.

#### 5.3.4 SCALE FACTOR PARAMETERS:

SF+A Full Scale Number of Turns parameter.

This parameter sets the number of turns of the transducers shaft needed to achieve the Full Scale Count. The allowable values that can be programmed into this parameter depend on the type of transducer used. For a 100 turn transducer the allowable values are 1, 2, 4, 5, 10, 20, 25, 50, or 100 turns. For a 180 turn transducer the allowable values are 1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 30, 36, 45, 60, 90, or 180 turns.

SF+B Full Scale Count Parameter.

This parameter sets the number of Counts over the specified number of turns. When a new number of turns is entered, this parameter defaults to its maximum value of 1024 Counts per turn (10 bit resolution per turn).

SF+C Calculated Counts per Turn.

This display shows the calculated number of Counts per Turn and is shown for reference only. To change the number of counts per turn, the Number of Turns and/or the Full Scale Count parameters must be changed.

When the user enters new values for the Scale Factor parameters, the Circular Offset, and Linear Offset, and Decimal Point parameters are reset to zero.

## 5.0 FUNCTIONAL DESCRIPTION (cont'd)

### 5.3 FUNCTION AND PARAMETER DESCRIPTIONS (cont'd)

#### 5.3.5 CIRCULAR OFFSET PARAMETER

The Circular Offset parameter allows the user to change the displayed position of the transducer's shaft without changing the RANGE of values that the unit displays and sends to the Processor. This offset is most commonly used to force the position to the correct count after the machine has been aligned. For example: A Module, configured to use an HTT-20-100, has a Full Scale Count of 50,000 over 50 turns. When the machine is aligned the position function should have a value of 25,000. However, the position reads 37,050. An Offset parameter must be programmed to force the position to 25,000. The formula for determining the Offset is:

| Full Scale Count | - | Actual Position | + | Desired Position | = | OFFSET |
|---|---|---|---|---|---|---|
| 50,000 | - | 37,050 | + | 25,000 | = | 37,950 |

The maximum value of this Offset is: (Full Scale Count - 1).

If the Calculated Offset is greater than the Full Scale Counts, The Actual Offset equals (Calculated Offset - Full Scale Counts).

If the user wishes to force the position to zero, the user can use the AUTO ZERO function. This function performs all the calculations needed to determine the correct Circular Offset and stores this value in EEPROM memory. To use the AUTO ZERO Function, the user must be displaying the Position function (POS LED on) and in PROGRAM Mode. When the user presses the [CLEAR] key the unit calculates and stores the required offset. The calculated Circular Offset can then be shown on the Circular Offset display.

When the user enters new values for the Scale Factor parameters, the Circular Offset parameter is reset to zero.

#### 5.3.6 LINEAR OFFSET PARAMETER

The Linear Offset parameter is used to change the RANGE of position values that the unit displays and sends to the Processor. For example: If the Full Scale Count equals 50,000 over 50 turns and the Linear Offset Parameter equals 0, the range of position values will be 0 to 50,000. If the Linear Offset is changed to 10,000 the range of position values will be 10,000 to 60,000. The maximum value for the Linear Offset parameter is equal to the programmed Full Scale Counts.

When the user enters new values for the Scale Factor parameters, the Circular Offset parameter is reset to zero.

## 5.3 FUNCTION AND PARAMETER DESCRIPTIONS (cont'd)

### 5.3.7 DECIMAL POINT PARAMETER

This parameter will force the display to show a decimal point when displaying the Position Function. The value of the Decimal Point parameter sets to the number of digits to the right of the decimal point. For example, if the Decimal Point parameter is set to 3, and the position data equals 25000, it will be shown as 25.000 on the Function Display. This parameter is set to zero when the Scale Factor parameters are changed. This parameter does not affect the position data that is transmitted to the Processor.

## 5.4 FAULT DIAGNOSTICS

Three single LED indicators below the digital display are used for Status Indicators.

RUN: A blinking green LED indicates that the module is powered and functioning. A steadily lit green LED indicates that there is error-free communication between the Module and the Processor.

FAULT: A red LED lights when one of the following faults is detected:

Broken Wire Fault is indicated by "Err.1_?" on the digital display, if the selected function is POS or TAC. There are up to three different "Err.1_?" displays based on the exact error. An improperly wired or broken transducer cable, or a non-compatible or faulty transducer will cause this fault. Another potential cause of this fault is excessive amounts of EMI Noise that is induced into the transducer cable by an external source.

A flashing "Err.1_?" message on the digital display indicates that the fault can be cleared by using the [CLEAR] key on the keyboard.

The three different "Err.1_" messages are:

"Err.1_1" Error on the first axis of the module.
"Err.1_2" Error on the second axis of the module.
"Err.1_b" Error on both axes of a two axis module.

"Err.1_2" and "Err.1_b" are only available on the 1862 two axis module.

5.4 FAULT DIAGNOSTICS (cont'd)

PROGRAM Memory Fault is indicated by "Err2" on the digital display. This message is displayed regardless of the function selected. This fault means that the programmed parameters may be incorrect. The user can recover from this fault by pressing the [CLEAR] key. All parameters will be set to their default values. An "Err.2" message remaining on the display after the [CLEAR] Key has been pressed indicates a parameter storage failure and the module must be returned for repairs.

PRG: A lit yellow LED indicates that the module is in Program Mode. While in Program Mode, all of the functions and programmable parameters can be inspected and altered.

## 6.0 PROGRAM MODE

WARNING: Remove the system power before removing or installing a module in the I/O chassis. Failure to observe this warning can result in damage to the module's circuitry and/or undesired operation with possible injury to personnel. Please refer to Section 4.0 INSTALLATION for additional information.

A slide switch (SW1) is located on the upper part of the module's PC Board behind the display. Placing the switch in the "ON" position, (pushed towards the back of the unit), will put the 1860 Module in Program Mode and light the yellow LED. While in Program Mode, all of the programmable parameters can be changed.

The Programmable Parameters are:

Transducer Type
Full Scale Number of Turns
Full Scale Count
Circular Position Offset
Linear Position Offset
Decimal Point

The uses of these functions and the keystrokes needed to program these functions are explained in Section 8.0 "PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE".

## 7.0 KEYBOARD DESCRIPTION

### 7.1 DISPLAY MODE of operation:

The Program Mode Switch (SW1) in the "off" position.
(Pushed towards the front of the unit.)

This Mode of operation allows the user to inspect all of the present values of the parameters but does not allow the user to change the programmed values.

| KEY | COMMENTS |
|---|---|
| [FUNCTION], [◀], [▶] | These keys are used to select the function shown on the digital display. The function displayed is determined by the Function Indicators. See Section 5.2 |
| [NEXT] | This key is used to switch between axes on the 1862 multi-axis module. |
| [CLEAR] | This key is used to recover from fault conditions. The nature of the error is determined by the message on the display See Section 5.4 DIAGNOSTICS. |
| [ENTER], [▲], [▼] | These keys are not used in Display Mode. |

## 7.0 KEYBOARD DESCRIPTION (cont'd)

### 7.2 PROGRAM MODE of operation:

The Program Mode Switch, SW1, in the "on" position. (Pushed towards the back of the unit.)

This mode of operation allows the user to inspect and change all of the programmable parameters.

| KEY | COMMENTS |
|---|---|
| [FUNCTION] | This key is used to select the function shown on the digital display. The function displayed is determined by the Function Indicators. See Section 5.2 |
| [CLEAR] | 1) This key is used to recover from fault conditions. See Section 5.4 DIAGNOSTICS<br>2) If the POS function is displayed, pressing this Key will AUTO ZERO the transducer. The unit will automatically calculate and store the required Circular Offset to make the Position value equal to zero |
| [ENTER] | When pressed, this key will store the displayed data in User Program Memory. Only data that is displayed with a blinking cursor can be stored. |
| [▲], [▼] | These keys are used to increment, [▲], or decrement, [▼], the number under the blinking cursor. |
| [◀], [▶] | 1) If the blinking cursor is active, these keys move the blinking cursor to the left or the right of the display.<br>2) If the blinking cursor is not active, pressing these keys selects a new function. |

## 8.0 PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE

The following steps explain the programming of the Series 1860 Absolute Encoder Modules. In all of the following examples the Module must be in the Program Mode before the keystrokes can be entered in the given sequence. Please refer to Section 6.0 PROGRAM MODE for more information.

The following conventions are used when describing the Keystrokes used to program the different functions.

[KEY]: Used to show the key pressed on the module. The key's name will be inside the brackets. If an asterisk appears before a key, (Example: *[FUNCTION]), the key must be pressed until the display is showing the proper parameter. If a "X" and a number follow a key, (Example: [▲]X3), the key must be pressed the shown number of times. (In this example, the [▲] key would be pressed 3 times.

"Display": Information shown on the 6 digit display. A blinking cursor is shown by a underline.

IND. LEDS: Indicator LEDs that indicate the function being programmed or displayed.

The following keystroke examples use the least number of keystrokes. However, any series of keystrokes is valid as long as the data is correct before the [ENTER] key is pressed.

The following programming examples use the parameters for the first axis only. The examples are equally valid for the second axis of a 1862 Module. The only change is that the [NEXT] key must first be pressed to switch to the second axis. The first and second axes of the 1862 are distinguished by the "D" Indicator Light. This light is ON when the displayed functions and parameters are for the second axis.

### 8.1 TRANSDUCER TYPE PARAMETER:

The user wishes to use the HTT-20-100 One hundred turn Transducer with the Module. The Module is presently configured for the HTT-20-180 One hundred eighty turn Transducer.

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | C | " 180 " | 180 turn Transducer Type |
| [▲] | C | " 100 " | 100 turn Transducer Type |
| [ENTER] | C | " 100 " | New Transducer Type entered. |

## 8.0 PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE (cont'd)

### 8.2 SCALE FACTOR PARAMETERS:

The user wishes to program a Full Scale Number of Turns of 50 and a Full Scale count of 50,000. Presently, the Full Scale Number of Turns is programmed to 100.

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | SF + A | " 100" | Present Number of Turns. |
| [▼], [▶] [▲]X5, | SF + A | " 050" | Desired Number of Turns. |
| [ENTER] | SF + A | " 050" | Value stored in EEPROM Blinking cursor removed. |
| [FUNCTION] | SF + B | "051200" | Default Full Scale Count. (50 * 1024 = 51200) |
| [▶]X2, [▼], [▶], [▼]X2, [ENTER] | SF + B | "050000" | Programmed Full Scale Count. |
| [NEXT] | SF + C | "1000.00" | Calculated counts per Turn. |

### 8.3 CIRCULAR OFFSET PARAMETER:

The user wishes to program in a Circular Offset of 700 counts. The default value of 000000 is presently in memory.

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | OF + A | "000000" | Present Offset. |
| [▶]X3, [▼]X3 | OF + A | "000700" | Desired Offset. |
| [ENTER] | OF + A | "000700" | Value stored in EEPROM Blinking cursor removed. |

## 8.0 PROGRAMMING THE 1860 ABSOLUTE ENCODER MODULE (cont'd)

### 8.4 AUTO ZERO:

The machine is at mechanical zero. The user wishes to preset the transducers position to 000000. Instead of calculating the required offset, the operator uses the Auto Zero function.

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | POS | "xxxxxx" | xxxxxx = Present Position. |
| [CLEAR] | POS | "000000" | Position reset to zero. |
| *[FUNCTION] | OF + A | "yyyyyy" | yyyyyy = Calculated Offset. |

### 8.5 LINEAR OFFSET PARAMETER:

The user wishes to program in a Linear Offset of 1000 counts The default value of 000000 is presently in memory.

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | OF + B | "000000" | Default Linear Offset |
| [▶]X2, [▲] [ENTER] | F + B | "001000" | Value Stored in EEPROM. Blinking Cursor removed. |

### 8.6 DECIMAL POINT PARAMETER:

The user wishes to program a decimal point so that the last three digits are after it. The parameter presently has its default setting of 0 (no decimal point).

| PRESS | IND. LEDS | DISPLAY | COMMENTS |
|---|---|---|---|
| *[FUNCTION] | POS | "012345" | Present Position |
| | A | "dP 0" | No Decimal Point on the Position Display |
| [▲]X3, [ENTER] | A | "dP 3" | Programmed value. |
| *[FUNCTION] | POS | "012.345" | Three digits to right of Decimal Point |

## 9.0 SERIES 1800 MODULE TO MODICON PROCESSOR DATA TRANSFER

Knowledge of the operation and programming of the Modicon programmable controllers is assumed and essential.

The table below is that of a Modicon 190 Programmer display showing an example of setting the Traffic Cop on an 884 Programmable controller system for an eight-circuit configuration.

| SLOT | MODULE TYPE | REFERENCE NUMBER | DATA TYPE | MODULE DESCRIPTION |
|---|---|---|---|---|
| 101 | P8xx | n/a | n/a | Power Supply |
| 102 | 884A | n/a | n/a | Mainframe CPU |
| 103 | 884A | n/a | n/a | Mainframe CPU |
| 104 | B863 | 30001 - 30004 | BINARY | Reg. Input (4CH) |
| 105 | B865 | 30005 - 30012 | BINARY | Reg. Input (8CH) |
| 106 | B804 | 00001 - 00016 | Disc | 115 Vac 16 Output |
| 107 | B805 | 10001 - 10017 | Disc | 115 Vac 16 Input |

The Series 1800 Modules are recognized by the Traffic Cop as Register Input Modules B863 (4CH) or B865 (8CH).

| AMCI MODULE | MODICON MODULE TYPE |
|---|---|
| 1831 | B863 Register Input, 4 Channel |
| 1832 | B863 Register Input, 4 Channel |
| 1833 | B865 Register Input, 8 Channel |
| 1834 | B865 Register Input, 8 Channel |
| 1841 | B863 Register Input, 4 Channel |
| 1842 | B863 Register Input, 4 Channel |
| 1843 | B865 Register Input, 8 Channel |
| 1844 | B865 Register Input, 8 Channel |
| 1861 | B863 Register Input, 4 Channel |
| 1862 | B865 Register Input, 8 Channel |

The Traffic Cop Data Type for the Series 1800 Modules is BINARY.

## 9.0 SERIES 1800 MODULE TO MODICON PROCESSOR DATA TRANSFER (cont'd)

The data sent to the Processor by the Series 1800 Modules is made up of four or eight 16 bit Binary Words. Assuming that the starting address is 30001, the data is distributed within the registers as follows.

| REGISTERS | 1831/41 | 1832/42 | 1833/43 | 1834/44 | 1861 | 1862 |
|---|---|---|---|---|---|---|
| 30001 | POS 1 | POS 1 | POS 1 | POS 1 | POS 1 H | POS 1 H |
| 30002 | TAC 1 | TAC 1 | TAC 1 | TAC 1 | POS 1 L | POS 1 L |
| 30003 | 0000 | POS 2 | POS 2 | POS 2 | TAC 1 | TAC 1 |
| 30004 | 0000 | TAC 2 | TAC 2 | TAC 2 | 0000 | POS 2 H |
| 30005 | n/a | n/a | POS 3 | POS 3 | n/a | POS 2 L |
| 30006 | n/a | n/a | TAC 3 | TAC 3 | n/a | TAC 2 |
| 30007 | n/a | n/a | 0000 | POS 4 | n/a | 0000 |
| 30008 | n/a | n/a | 0000 | TAC 4 | n/a | 0000 |

1800 Series Modules:

POS (x) is the Position Data of Transducer (x).

TAC (x) is the Tachometer Data of Transducer (x) in RPM.

If the Series 1800 Module senses a broken wire fault on any axis, it will transmit a hexadecimal value of 8000 to the Processor for that transducers POS and TAC registers.

1860 Series Modules:

POS (x) H is the upper three digits of Position Data for Transducer (x).

POS (x) L is the lower three digits of Position Data for Transducer (x).

TAC (x) is the Tachometer Data of Transducer (x) in RPM.

If the Series 1800 Module senses a broken wire fault on any axis, it will transmit a hexadecimal value of 8000 to the Processor for that transducers POS H and TAC registers.

**Module Location**
Any Modicon 800 series I/O housing, occupies one slot

**Position Transducer**
AMCI Brushless Resolver

**Transducer Input**
Transformer Isolated

**Position Resolution**
183x: Programmable to 1 part in 1024
184x: Programmable to 1 part in 8192
1861/2: Programmable to 1 part in 1024 per turn
1863: Programmable to 1 part in 1024 per turn (10,000,000 Counts max.)

**New Position Throughput time**
400 uSec: 1831, 32, 41, 42, 61
800 uSec: 1833, 34, 43, 44, 62, 63

**Programmable Parameters**
Scale Factor (Full Scale Counts)
Number of Turns (186x only)
Decimal Point Position (186x only)
Circular Offset
Linear Offset
Tachometer Response time (183x/4x only)
Tachometer Resolution (183x/4x only)

**Number of Turns (186x only)**
1861/2:
100 Turn Transducer:
1, 2, 4, 5, 10, 20, 25, 50, or 100 turns
180 Turn Transducer:
1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 30, 36, 45, 60, 90, or 180 turns
1863:
10,000 Turn Transducer:
200, 400, 500, 1000, 2000, 2500, 5000, or 10000 turns

**Position Offset**
Circular Offset Programmable from 0 to Full Scale Count
Linear Offset Programmable from 0 to:
(9999 - Full Scale Count) 183x, 184x
(999999 - Full Scale Count) 1861/2
(9999999 - Full Scale Count) 1863

**Programmable Tachometer Response Time**
32, 60, 120, or 240 mSec: (183x/4x only)
Set to 32 mSec: (186x)

**Tachometer Resolution**
1 RPM at 32, 60, or 120 mSec response times
Programmable to 1 RPM or 0.1 RPM at 240 mSec response time

**Tachometer Range**
1 to 2000 RPM at 32, 60, or 120 mSec response time
1 to 1000 or 0.1 to 999.9 RPM at 240 mSec response time

**Data Available to Processor**
Transducer's Shaft Position, Shaft Velocity, and Fault Diagnostics

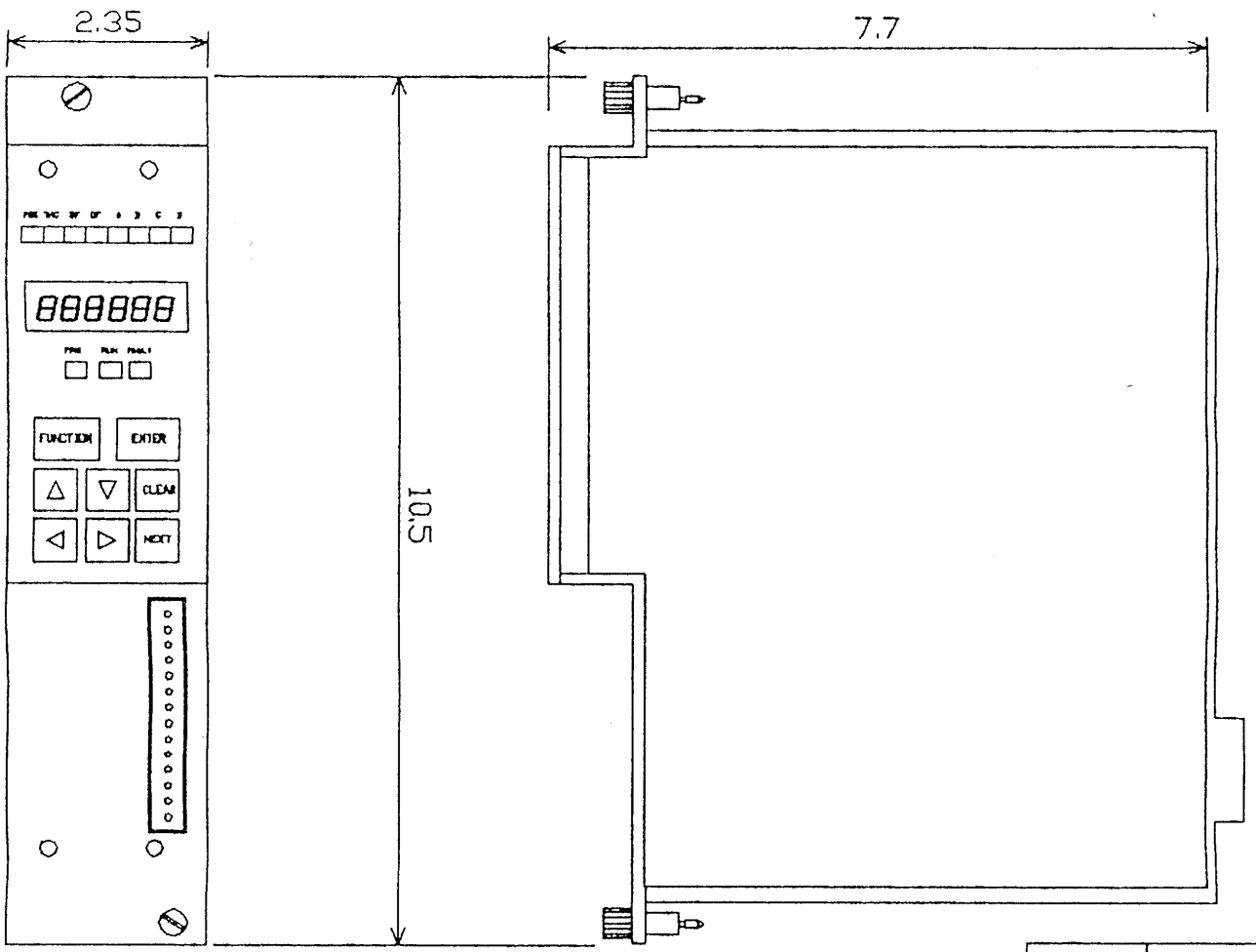
**Program Input**
Module's self-contained keyboard and display

**Program Storage**
EEPROM Memory

**DC Supply Voltage from Backplane**
+5 Volts @ 0.90A max. (4 axis module)

**Module's +5V DC Supply Fuse**
1.5A Fast Blow (Littelfuse 22501.5)

**Environmental Conditions**
Operating Temperature: 0 to 60° C.
Relative Humidity: 5 to 95% (without condensation)
Storage Temperature: -40 to 85° C.

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|---|---|---|---|
| | ADVANCED MICRO CONTROLS, INC. | | |
| | SERIES 1800 | SCALE | DRAWN BY DWM |
| | TITLE: OUTLINE DRAWING | | |
| | DATE: 4/25/90 | DRAWING NUMBER: B1112 | |

| DATE | SYM | REVISION RECORD | AUTH. | DR. | CK. |
|---|---|---|---|---|---|
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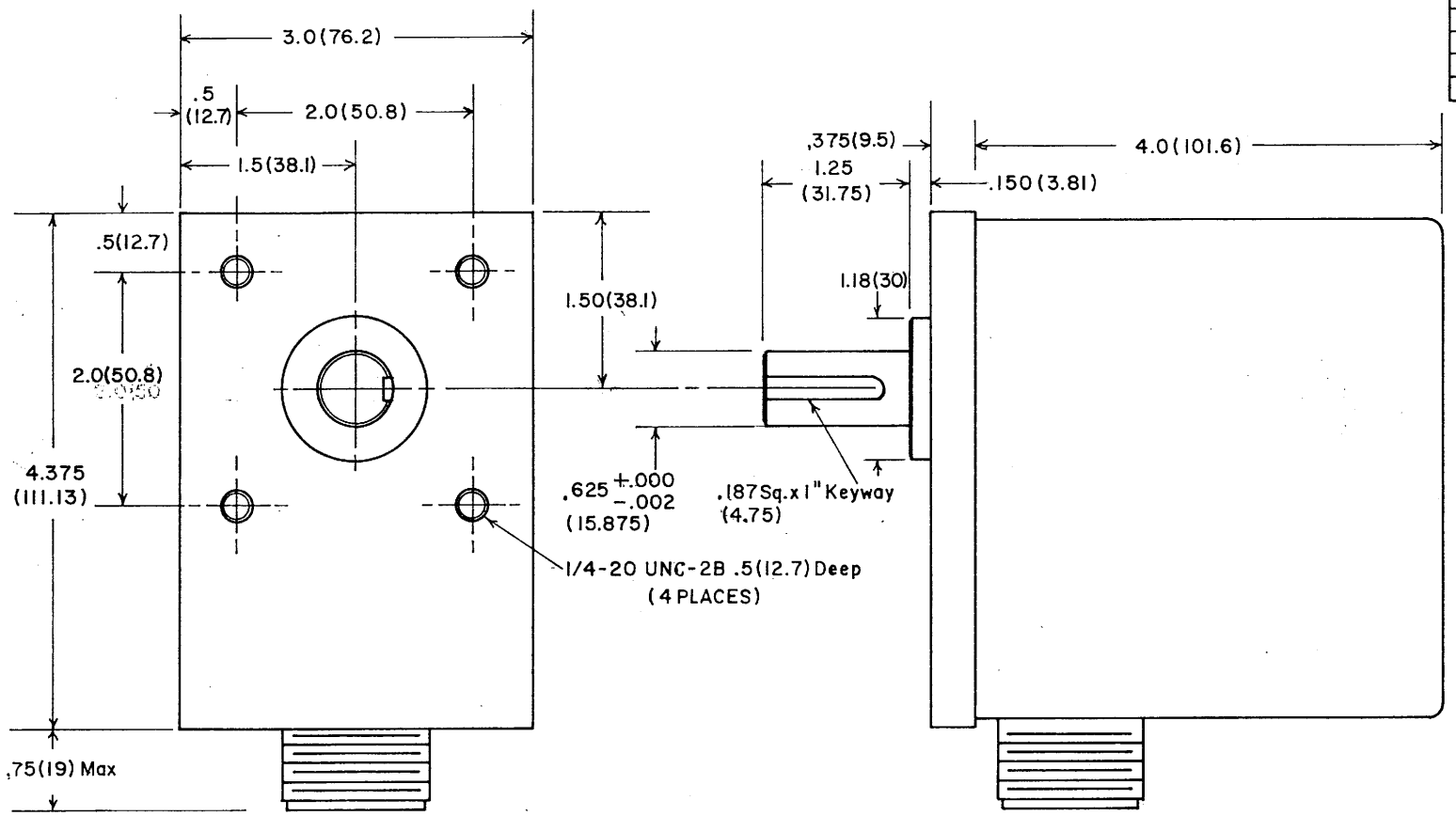


MS3102E20-27P Connector

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | AMCI | | |
| DECIMAL ± | HTT-20-(X)<br>(X)- Full Scale Turns | SCALE | DRAWN BY JR<br>APPROVED BY WXE |
| FRACTIONAL ± | TITLE<br>OUTLINE DRAWING | | |
| ANGULAR ± | DATE 6/1/87 | DRAWING NUMBER B1016 | |

| DATE | SYM | REVISION RECORD | AUTH. | DR. | CK. |
|---|---|---|---|---|---|
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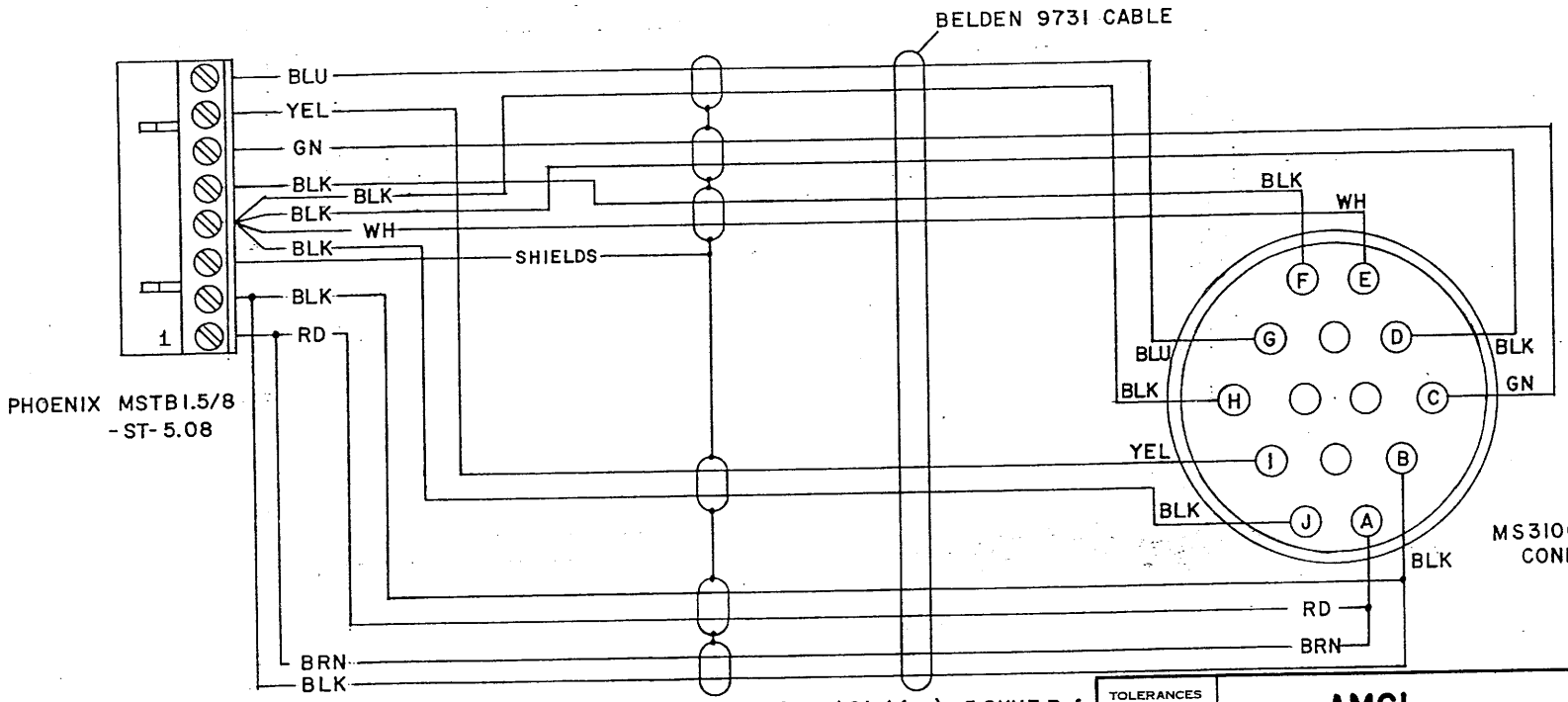
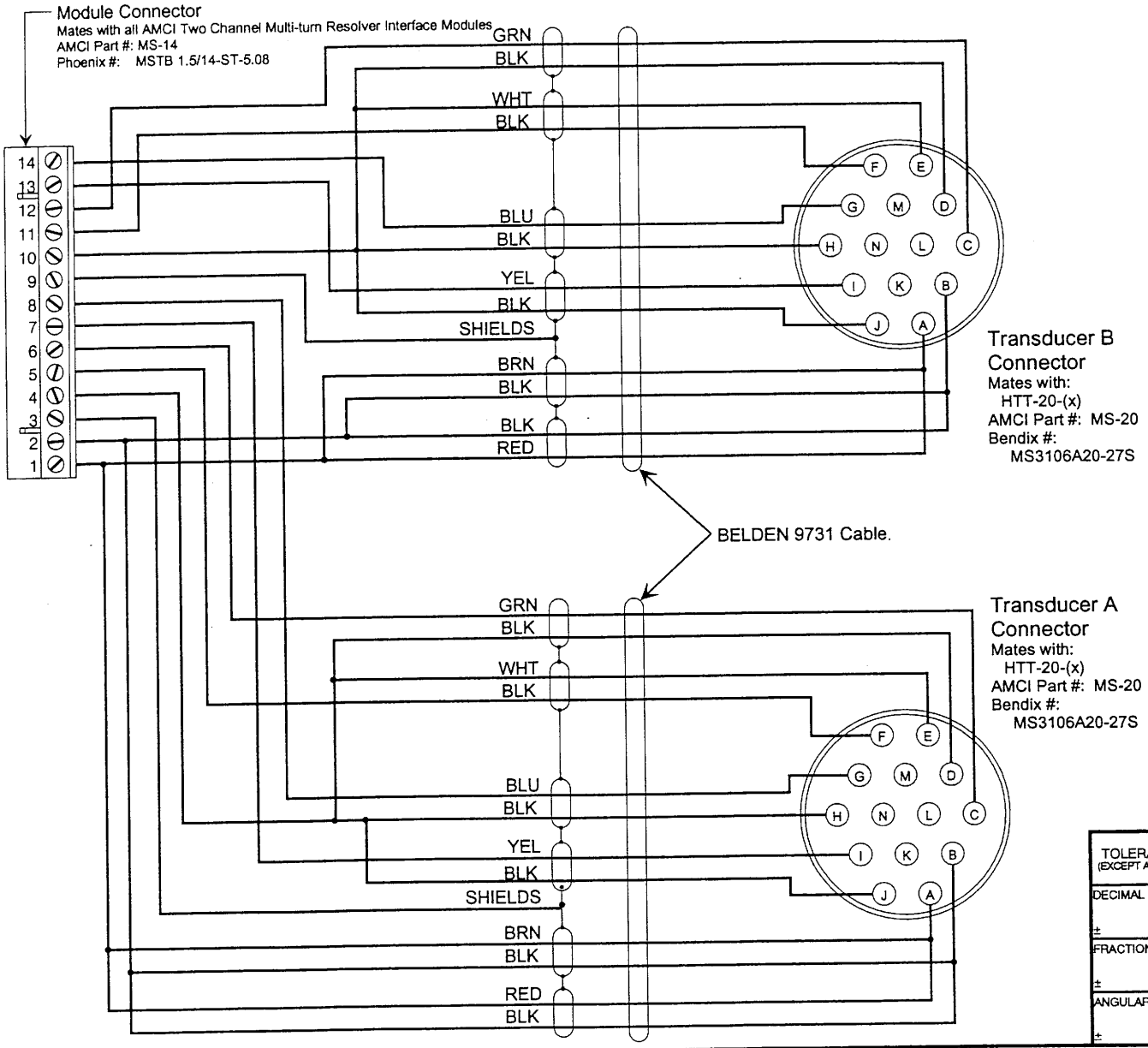



FOR CABLE RUNS: LESS THAN 300FT. (91.44 m) - 5.0KHZ Ref.
" " 600FT. (182.88 m) - 2.5KHZ Ref.

CONNECTIONS ARE FOR CW INCREASING READINGS [LOOKING AT TRANSDUCER SHAFT]. FOR CCW INCREASING READINGS, REVERSE G/H PAIR AND REVERSE C/D PAIR.

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | AMCI | | |
| DECIMAL ± | CTT-(X)<br>(X)-Length in feet | SCALE | DRAWN BY JR<br>APPROVED BY WKE |
| FRACTIONAL ± | TITLE: TRANSDUCER CABLE DRAWING | | |
| ANGULAR ± | DATE: 5/23/86 | DRAWING NUMBER: B1040 | |

MADE IN U.S.A.




| DATE | SYM | REVISION RECORD | AUTH | DR | CK |
|---|---|---|---|---|---|
| 9/89 | A | Added Transducer Letters | DJS | | |
| 10/93 | B | Added to: Mod. and Trans. Connect | | | |
| | | Added : 14/1900 Note | | | |
| | | Deleted: 2.5/5 KHz Reference | DWN | | |
| 10/94 | C | Corrected A/B Connections, Trans B | DWN | | |

## Connections are shown for CW increasing readings

For CCW increasing readings, reverse GRN/BLK Pair (Pins C&D), and BLU/BLK Pair (Pins G&H).

## 14/1900 Users:

Pin 1 of the Transducer Input Connector is located towards the top of the module, NOT the bottom as this drawing may imply. Reversing the wires on the Module Connector will not harm the module or the transudcer, but the transducer will not operate.

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | ADVANCED MICRO CONTROLS INC. | | |
| DECIMAL ± | C2TT-(x) (x) = Length in Feet | SCALE N/A | DRAWN BY DWN<br>APPROVED BY JRS |
| FRACTIONAL ± | TITLE Transducer Cable Drawing | | |
| ANGULAR ± | DATE 8/21/89 | DRAWING NUMBER B1091 REV. C | |

ADVANCED
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