

SERIES 1800

INTELLIGENT ABSOLUTE RESOLVER INTERFACE MODULE

USER'S MANUAL

Catalog Number 1800-293M



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24 HOUR TECHNICAL SUPPORT NUMBER

For technical support call (203) 583-7271.

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ABOUT THIS MANUAL

The objective of this manual is to explain the installation, operation, programming, and servicing of the Series 1800 Absolute Resolver Encoder Modules for the Modicon Series 800 I/O. It is strongly recommended that the user read the following instructions. If there are any unanswered questions after reading this manual, call the factory. An applications engineer will be available to assist you.

CHP 1: INTRODUCTION TO THE SERIES 1800 ABSOLUTE RESOLVER ENCODER

The Series 1900 Absolute Resolver Encoder Modules are single or multi-axes modules that plug directly into any Modicon Series 800 I/O Housing. Each module occupies only one slot in the housing. The only wiring necessary for operation is the wiring needed to connect the transducer to the module. No external wiring is needed to interface the module to the processor.

On the front panel, a six digit LED display and sealed keyboard allow you to monitor the transducer's position and speed. Scale Factor, Offsets, and Tachometer Response are programmable from the keyboard. Each module is equipped with hardware fault and broken wire indication. Position and Tachometer data for all of the module's axes is available to the processor.

1800 Family Members

The following table lists the model numbers of the ten different Absolute Resolver Encoder Modules presently available in the Series 1800 Family.

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

This manual will deal with the programming and operation of the 183x and 184x modules. For instructions on the other modules, refer to the Series 1860 User's Manual.

Functions and Parameters

The 1800's perform two operations. These two operations are called FUNCTIONS. These Functions are:

Position Function - Gives you information on the position of the transducer's shaft relative to a zero point.

Tachometer Function - Gives you information on the angular velocity of the transducer's shaft in RPM.

Each Function is defined by one or more inputs. One input is the AMCI resolver based transducer. The other inputs are programmable from the keyboard. These inputs are called PARAMETERS.

Scale Factor - Sets the resolution to which the position of the transducer's shaft is determined.

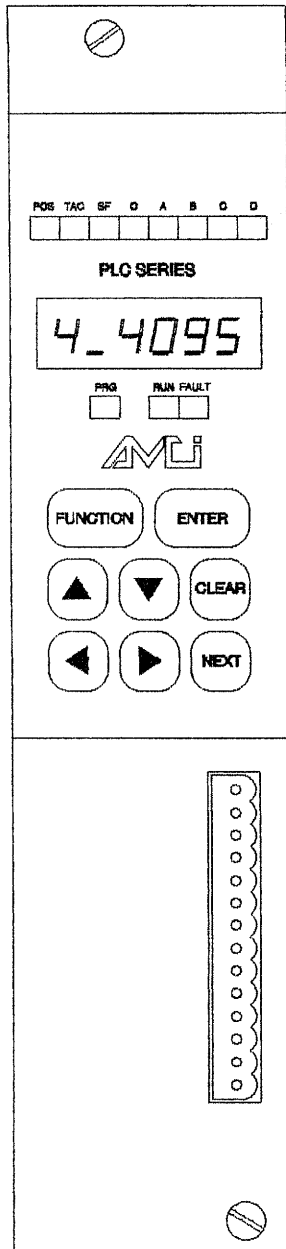
Circular Offset - Changes the value of the Position Function without mechanically rotation the transducer's shaft.

Linear Offset - Adds a fixed number to the value of the Position Function.

Tach Response - Sets the resolution and update time of the built-in tachometer.

Front Panel Description

The following is a description of the features found on the Series 1800 Modules. Separate sections of this chapter describes the parts in detail.



Function Display - Used to show the Functions and Parameters of the 1800 Module. The eight LED indicators designate what is showing on the alpha-numeric display. When you are in Program Mode, a blinking digit on the alpha-numeric display shows the position of the Cursor.

Status Indicators - Indicates the operating condition of the module.

PRG - Yellow light is on when the module is in Program Mode.

RUN - Green light is blinking when the module is operating.

FAULT - Red light is on when there is a fault condition. The nature of the fault is shown on the alpha-numeric display.

Program Switch - Located on the top panel, hidden from view. Used to enable or disable Program Mode. When enabled, the module is programmable from the keyboard.

Keyboard - Used to examine or change the Functions and Parameters of the module.

Transducer Input Connector - Connector for the position sensing AMCI resolver based Transducer.

Fig 2.1 1800 Front Panel

Function and Parameter Displays

The following displays are available on the 1800 Modules. A brief description of each Function or Parameter is given to the right of the display. Unless noted, each of the displays is available on all of the 1800 Modules. Please note that a shaded LED indicator is not lit on the display.

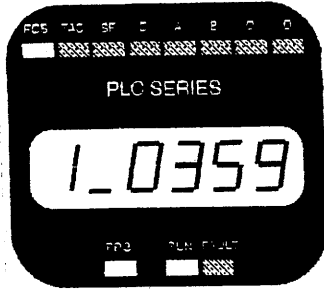


Fig 2.2 Position Display

Position Function - This display shows the current position of the transducer's shaft. It's value varies from (Linear Offset) to (Linear Offset + (Scale Factor - 1)) On multi-axis modules, the Position Function of the additional transducers is sequentially available by pressing the [NEXT] Key. The "1" on the display will be replaced by the number of the transducer being displayed. The Position data is available to the processor.

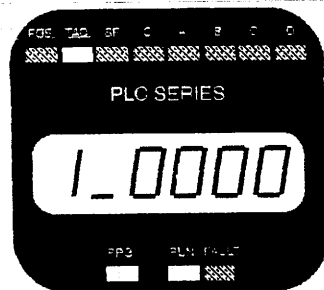


Fig 2.3 Tach Display

Tachometer Function - This display shows the speed of rotation of the transducer's shaft in RPM. The time between updates, which is the time it takes to determine a new speed and show it on the display, and the resolution of the Tachometer are programmable through the Tachometer Response Parameter. On multi-axis modules, the Tachometer Function of the additional transducers is sequentially available by pressing the [NEXT] Key. The Tachometer data is available to the processor.

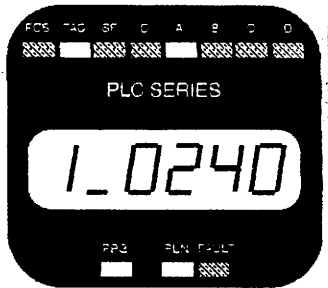


Fig 2.4 Tach Response

Tachometer Response Parameter - The tachometer response can be programmed to any one of four update periods, (time between tachometer updates), and one of two resolutions. This allows you to tailor the tach's response to the systems' needs. The four tachometer update periods are 32 mSecs, 60 mSecs, 120 mSecs, and 240 mSecs. The two resolutions, available with a 240 mSec update time only, are to 1 RPM or to 0.1 RPM. On multi-axis modules, the Tachometer Response Parameter of the additional transducers is sequentially available by pressing the [NEXT] Key.

The maximum speed that can be displayed by the module or sent to the PC depends on the chosen resolution and the update time. When the Tachometer Response is set to 240 mSecs, the maximum speed that can be displayed is 999.9 RPM if the resolution is 0.1 RPM or 1000 RPM if the resolution is set to 1.0 RPM. When the Tachometer Response is set to 120 mSecs or faster, the maximum speed that can be displayed is 2000 RPM. Exceeding these speeds will cause the module to display and send erroneous data to the processor.

Function and Parameter Displays (cont'd)



Fig 2.5 Scale Factor

Scale Factor Parameter - The Scale Factor parameter is used to set the resolution to which the module determines the position of the transducer's shaft. The Scale Factor can be programmed between 2 and 1024 for the 183x modules and between 2 and 8192 for the 184x modules. On multi-axis modules, the Scale Factor Parameter for the additional transducers is sequentially available by pressing the [NEXT] Key.

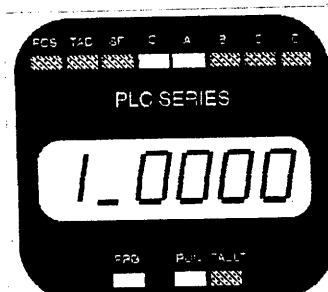


Fig 2.6 Circular Offset

Circular Offset Parameter - The Circular Offset parameter allows you to change the value of the Position Function without rotating the transducers' shaft. This offset is most commonly used to force the position to the correct count after the machine has been aligned. On multi-axis modules, the Circular Offset Parameter of the additional transducers is sequentially available by pressing the [NEXT] Key.

For example: One rotation of the transducer's shaft produces counts between 000 and 720. (SF = 720) When the machine is aligned to mechanical zero the transducers position should equal 000. However, when the machine is aligned, the module reads a position of 695. An Offset must be programmed in to force the position to 000. The formula for determining the Offset is:

$$\begin{array}{rcccccccc} \text{Scale Factor} & - & \text{Present Position} & + & \text{Present Offset} & + & \text{Desired Position} & = & \text{OFFSET} \\ 720 & - & 695 & + & 000 & + & 000 & = & 25 \end{array}$$

The maximum value of the Offset is: (Scale Factor - 1).

If the Calculated Offset is greater than the Scale Factor, the Actual Offset equals (Calculated Offset - Scale Factor).

If you want to force the position to zero, you can use the AUTO ZERO feature. This feature performs all the calculations needed to determine the required offset and stores this value in EEPROM memory. To use the AUTO ZERO feature, you must be displaying the transducers position value (POS LED on). You then press the [CLEAR] key and the unit calculates and stores the required offset. The calculated offset can be displayed with the Circular Offset Parameter.

When you enter a new value for the Scale Factor parameter, the Circular Offset is reset to zero.

Function and Parameter Displays (cont'd)

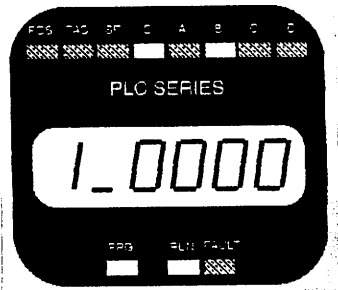


Fig 2.7 Linear Offset

Linear Offset Parameter - The Linear Offset Parameter is used to change the RANGE of values of the Position Function. This offset is most commonly used when the transducer is measuring linear distances such as with palletizing applications. On multi-axis modules, the Linear Offset Parameter of the additional transducers is sequentially available by pressing the [NEXT] Key.

For example: A 1841 is used to measure a total distance of 5.00 meters with a 1 millimeter resolution. This means that the total counts over full scale is 5000, (5.000 meters * 1000 mm / meter), so you program the Scale Factor to this value. The 5.000 meters that the encoder measures is in the range of 2.500 to 7.500 meters on the machine. You can use the Linear Offset to force the module to send its position data to the processor in the correct format instead of using the processor to add an offset to the position value from the module. The formula for the Linear Offset is as follows:

$$\begin{aligned} \text{Minimum Desired Value} * \text{Resolution} &= \text{LINEAR OFFSET.} \\ 2.500 \text{ meters} * 1000 \text{ mm / meter} &= 2500 \end{aligned}$$

The maximum position value that can be displayed is 9999. Therefore the maximum value of the Linear Offset is 9999 - (SF-1).

When you enter a new value for the Scale Factor, the Linear Offset is reset to 0000.

Status Indicators

There are three single LED indicators below the alpha-numeric display that show the operating status of the module.

PRG: This yellow light is on when the module is in Program Mode. While in Program Mode, all of the parameters can be inspected and altered from the keyboard.

RUN: A blinking green light indicates that the module is powered and operational.

FAULT: This red light is on when the module recognizes that a fault condition exists. The type of fault is shown on the alpha-numeric display. The Series 1900 Modules recognize two types of faults.



Fig 2.8 Xducer Fault

Error Class 1:

Transducer Fault - This message is shown only when the module is displaying the Position or Tachometer Functions. The Parameters will be displayed normally. If the message is blinking, press the [CLEAR] Key to clear the fault and display the Position or Tachometer Functions. There are four major causes of this fault.

- Broken Transducer Cable.
- Non-compatible Transducer.
- Improper wiring if the Transducer Cable.
- Faulty Transducer.

On multi-axis modules, the transducer fault may not be on the axis that is being shown on the modules' display. In this case, the fault light will be on but the module will be displaying Position and Tach information. Use the [NEXT] Key to cycle through all of the modules' axes until the fault is found.

Error Class 2:

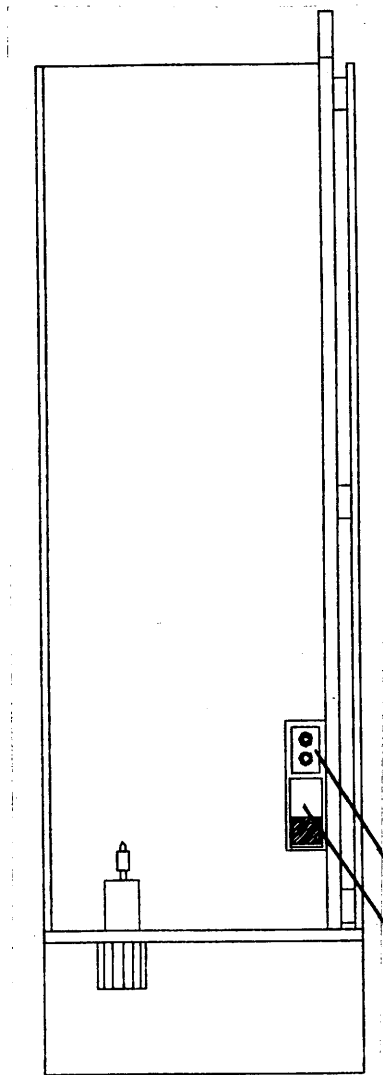
EEPROM Fault - This message is displayed at all times. The module recognizes that the program data (Scale Factor, Offsets, etc.) is incorrect. This error can be cleared by pressing the [CLEAR] Key. If the " Err 2" message remains after pressing the [CLEAR] Key, the EEPROM memory is damaged and the module must be returned for repairs. Please call the factory for assistance.



Fig 2.9 EEPROM Fault

Program Switch

The Program Switch is used to enable or disable programming of the 1800 Module. The module is programmable (Program Mode, PRG light ON) when the switch is pushed towards the back of the module. When in Program Mode, all parameters can be modified. The module is not programmable (Display Mode, PRG light OFF) when the switch is pushed towards the front of the module. When in Display Mode, all parameters can be examined but cannot be modified.



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

The Program Switch can be disabled by removing the jumper on the two pin header next to the switch. Removing this jumper locks the 1800 in Display Mode. It is suggested that this jumper be removed once the system is operational. This will prevent someone from accidentally changing the 1800's parameters while the system is running. The only times that changes to the modules programming should be allowed are during set-up or trouble shooting procedures.

Two Pin Header shown with Jumper installed.







Program Switch shown in Program Mode position.

Fig 2.10 Program Switch

Keyboard Description

The following table describes what the keys do when you are in Display Mode, (PRG light OFF) or Program Mode (PRG light ON).

When in Program Mode, a parameter that you show on the display can be changed if one of the digits on the display is blinking. The blinking digit shows the position of the Cursor.

KEY	DISPLAY MODE	PROGRAM MODE
	Use this key to select the function or parameter you wish to show on the display.	Same as Display Mode.
	Not used in Display Mode.	If a parameter is shown with a Cursor, pressing this key will store the displayed value in EEPROM Memory.
	Use this key to recover from fault conditions. The exact nature of the fault is shown on the display. See 'Status Indicators'.	1) Same as Display Mode. 2) If the Position Function is on the display, press this key to use the AUTO ZERO Feature.
	Used to switch between the additional transducers on a multi-axis module.	Same as Display Mode.
	Not used in Display Mode.	If the Cursor is shown, use these keys to increment [▲] or decrement [▼] the number under the Cursor.
	Use these keys to select the Function or Parameter that you wish to show on the display.	1) Same as Display Mode. 2) If the Cursor is shown, these keys shift the Cursor to the left [◀] or to the right [▶] by one digit.

Transducer Input Connector

The Transducer Input Connector on the 1831, 32, 41, 42 Modules has eight contacts while the Transducer Input Connector on the 1833, 34, 43, 44 Modules has fourteen contacts. The following table lists the AMCI and Phoenix Contact part numbers on the mating connectors:

	1/2 Axis Module Eight Pin Conn.	3/4 Axis Module 14 Pin Connector
AMCI #	MS - 8	MS - 14
Phoenix #	MSTB1.5/8-ST-5.08	MSTB1.5/14-ST-5.08

Fig 2.11 Transducer Input Connector Part Numbers

Fuse Replacement

If the Power Fuse fails, it can be easily replaced. The factory installed fuse is a 1.5 Amp Fast Blow, Littelfuse Part Number 22501.5. Fuse kits are available from AMCI. The AMCI Part # is SKF-3. Each fuse kit contains five fuses.



CAUTION: To insure continued and adequate protection, any replacement fuse must have a rating of 1.5 Amp Fast Blow. Using a higher ampere rating or slow blow fuses may not protect the module from damage if the fault conditions are again applied to the module.



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

Refer to the figure below for the location of the power fuse.

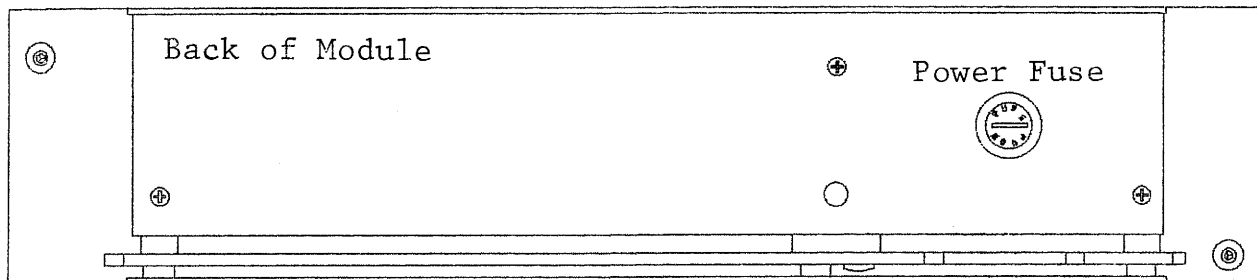


Fig 2.12 Power Fuse

Specifications

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.

Notes:

Power Requirements

A Series 1800 Module draws it's power from the housing's +5 Vdc Supply. The maximum current draw by an 1800 Module is 0.90 Amps (4.50 W Total). Add this to the power requirements of all other cards in the housing to avoid exceeding backplane or supply capacity.

Installing the Module



WARNING: Remove system power before removing or installing a module in the Series 800 Housing. Failure to observe this warning can result in damage to the module's circuitry and/or undesired operation with possible injury to personal.

Insert the P.C. Board into the card guides and gently seat the gold fingers into the Connector in the backplane. DO NOT apply a great amount of pressure to seat the gold fingers into the connector. Applying too much pressure on a mis-aligned connector may damage to the module or backplane.

After the module is seated in the backplane, secure the module to the chassis with the two mounting screws.

Transducer Mounting

All AMCI resolver based rotary position transducers are designed to operate in rough environments and therefore require little attention. However, there are some general rules that should be observed to ensure long life.

- Limit transducer shaft loading to the following maximums:
 - HT-20's with 5/8" diameter shaft:
 - Radial Loads: 100 lbs. (445 N)
 - Axial Loads: 50 lbs. (222.5 N)
 - H25's with 3/8" diameter shafts:
 - Radial Loads: 30 lbs. (133 N)
 - Axial Loads: 15 lbs. (66.5 N)
- Minimize shaft misalignment when direct coupling shafts. Even small misalignments produce large loading effects on front bearings. It is recommended that you use a flexible coupler when ever possible.

The following figures show the dimensions of the HT-20 single turn transducer, the HT-20-(x) multiturn transducer and the H25 Servo and Flange mount transducers.

Transducer Mounting (cont'd)

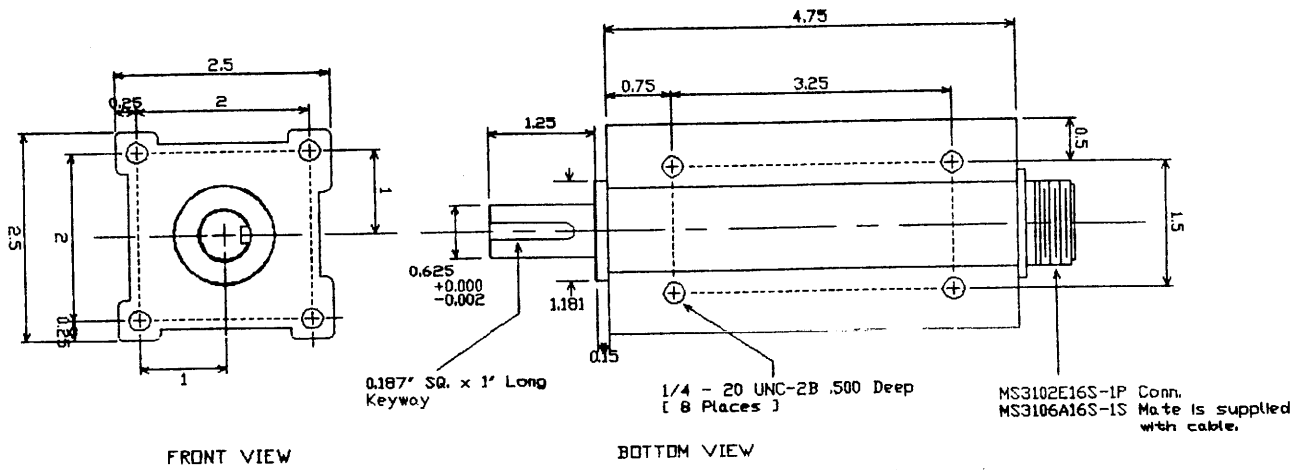


Fig 3.1 HT-20 Outline Drawing

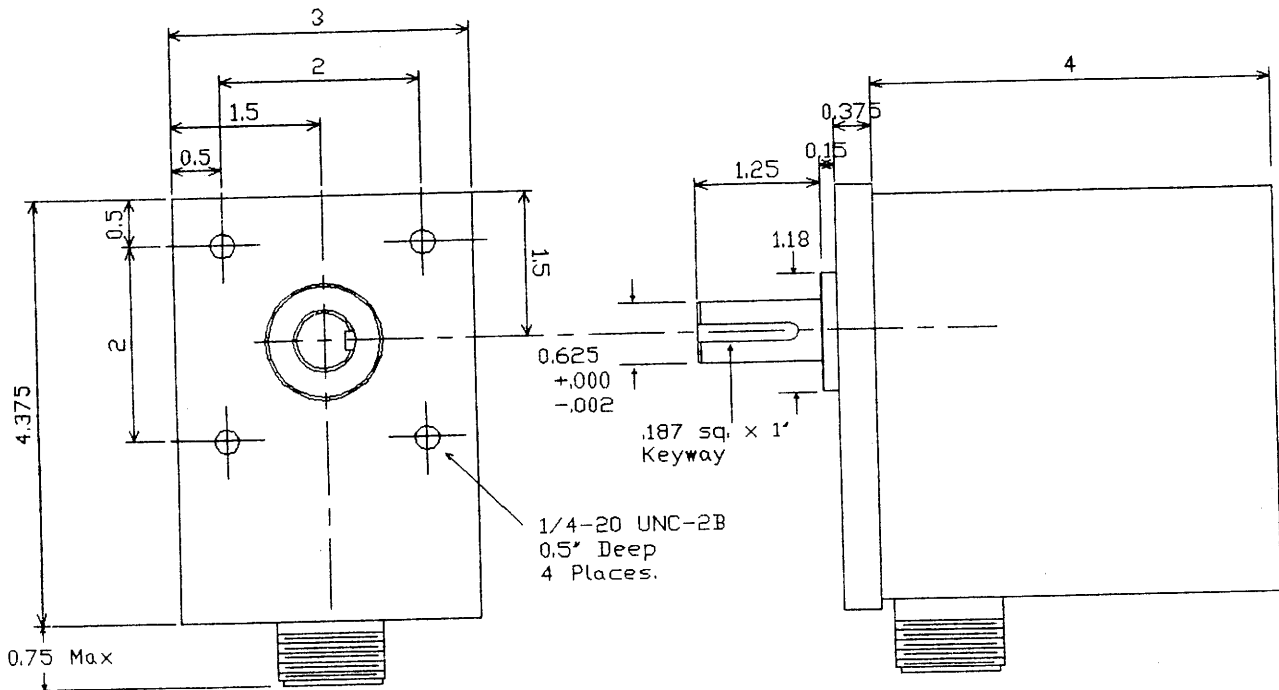


Fig 3.2 HT-20-(x) Outline Drawing

Transducer Mounting (cont'd)

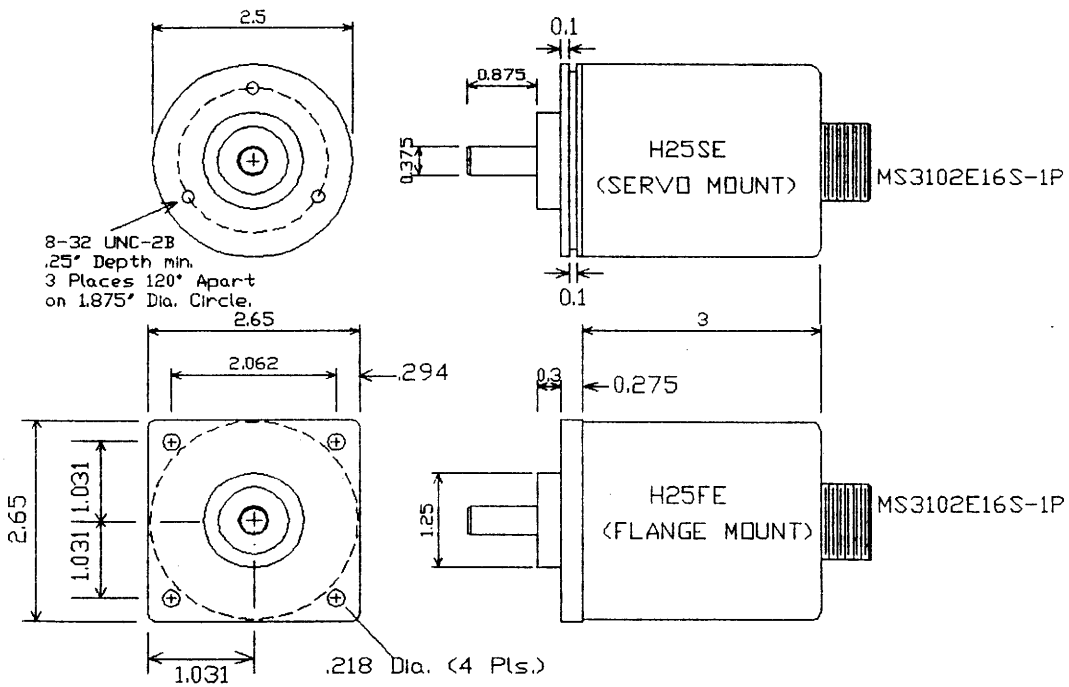


Fig 3.3 H25S/F Outline Drawing

Transducer Cable Installation

Use the table below to determine the correct cable and connectors for your application. Cables that have been assembled and tested are available from AMCI under the given part numbers. If you want to make your own cables, the required cable and connectors can also be ordered from AMCI.

Module	AMCI Cable #	Belden #		Module Conn.	Transducer Conn.
		-100ft	100ft+		
1831/41	C1T - (x)	9873	9730	MS - 8	MS - 16 (1)
1832/42	C2T - (x)	9873	9730	MS - 8	MS - 16 (2)
1833/43	C3T - (x)	9873	9730	MS - 14	MS - 16 (3)
1834/44	C4T - (x)	9873	9730	MS - 14	MS - 16 (4)

Fig 3.4 Transducer Cable Parts

Transducer Cable Installation (cont'd)

The figures shown below and on the following two pages show the cable connections for the 1800 Modules. Engineering Drawings of these cables are also given at the back of this manual. The drawing numbers are B1110 Rev. C, B1046 Rev. B, B1113 Rev. A, and B1052 Rev. B.



CAUTION: Cable Shields must be grounded at the 1800 Module only. The shields must not be connected to the transducer and must be isolated from earth ground in the raceway that the cable is installed in. This practice will eliminate ground loops that may induce EMI noise into the cable or damage the 1800 Module.

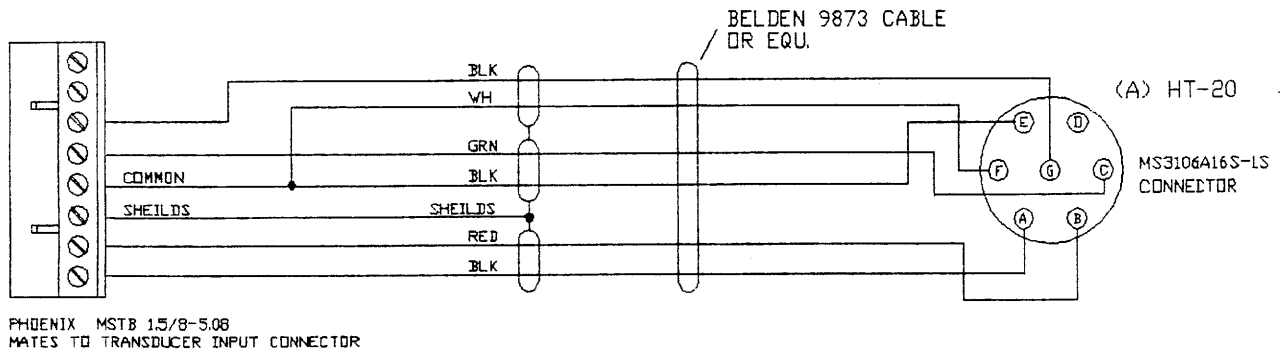


Fig 3.5 C1T-(x) Cable Drawing

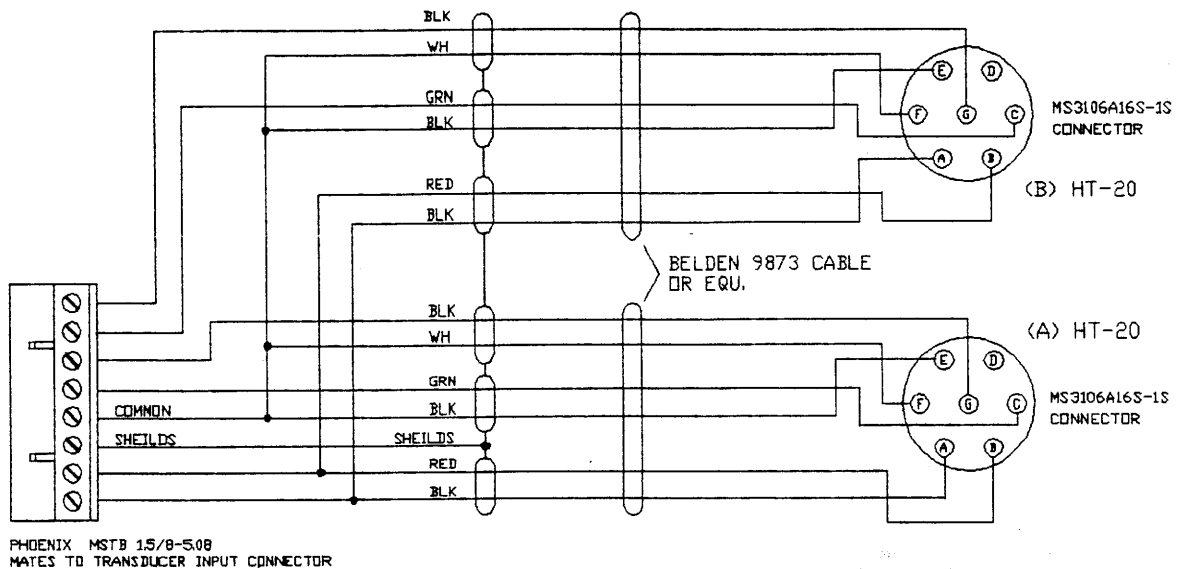


Fig 3.6 C2T-(x) Cable Drawing

Transducer Cable Installation (cont'd)

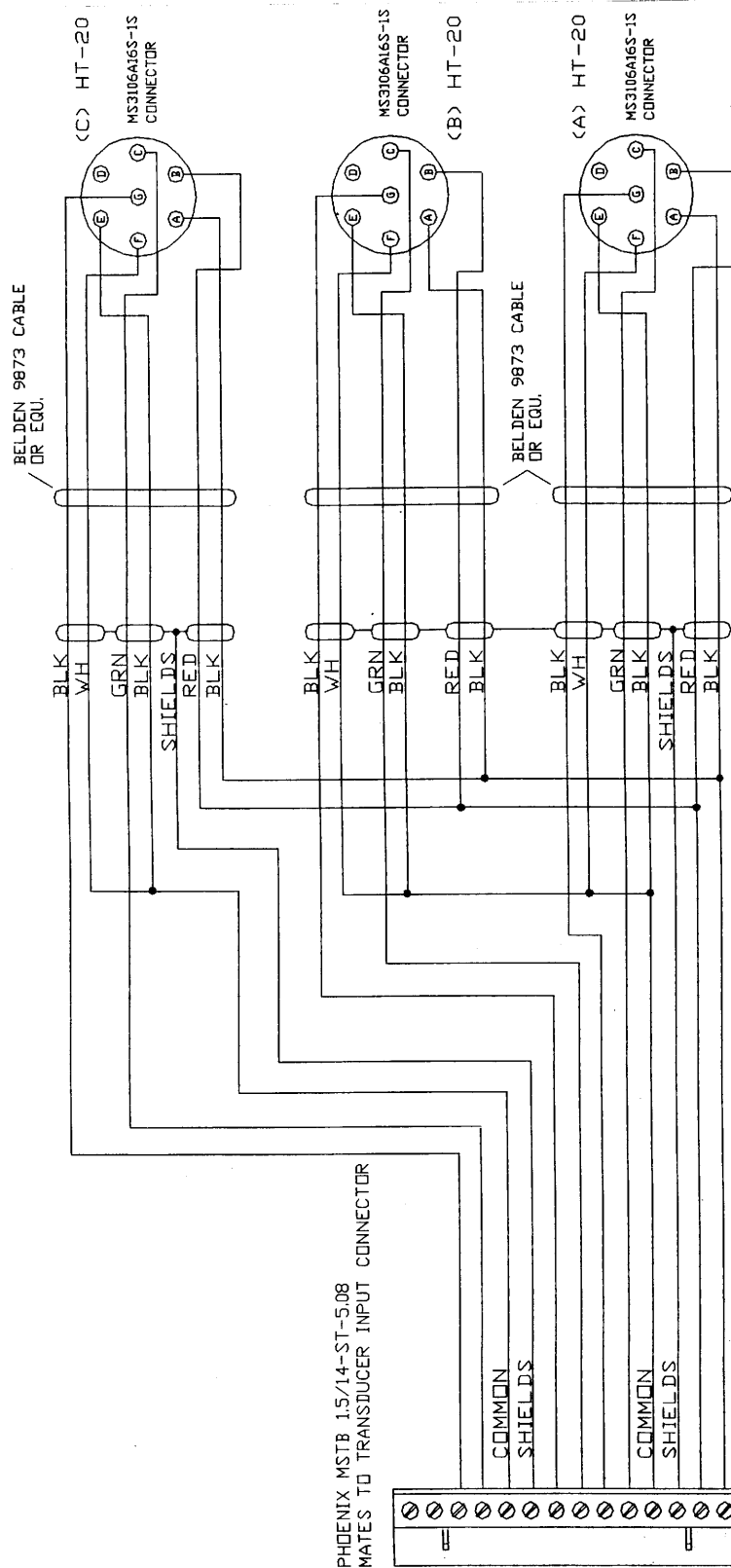


Fig 3.7 C3T-(x) Cable Drawing

Transducer Cable Installation (cont'd)

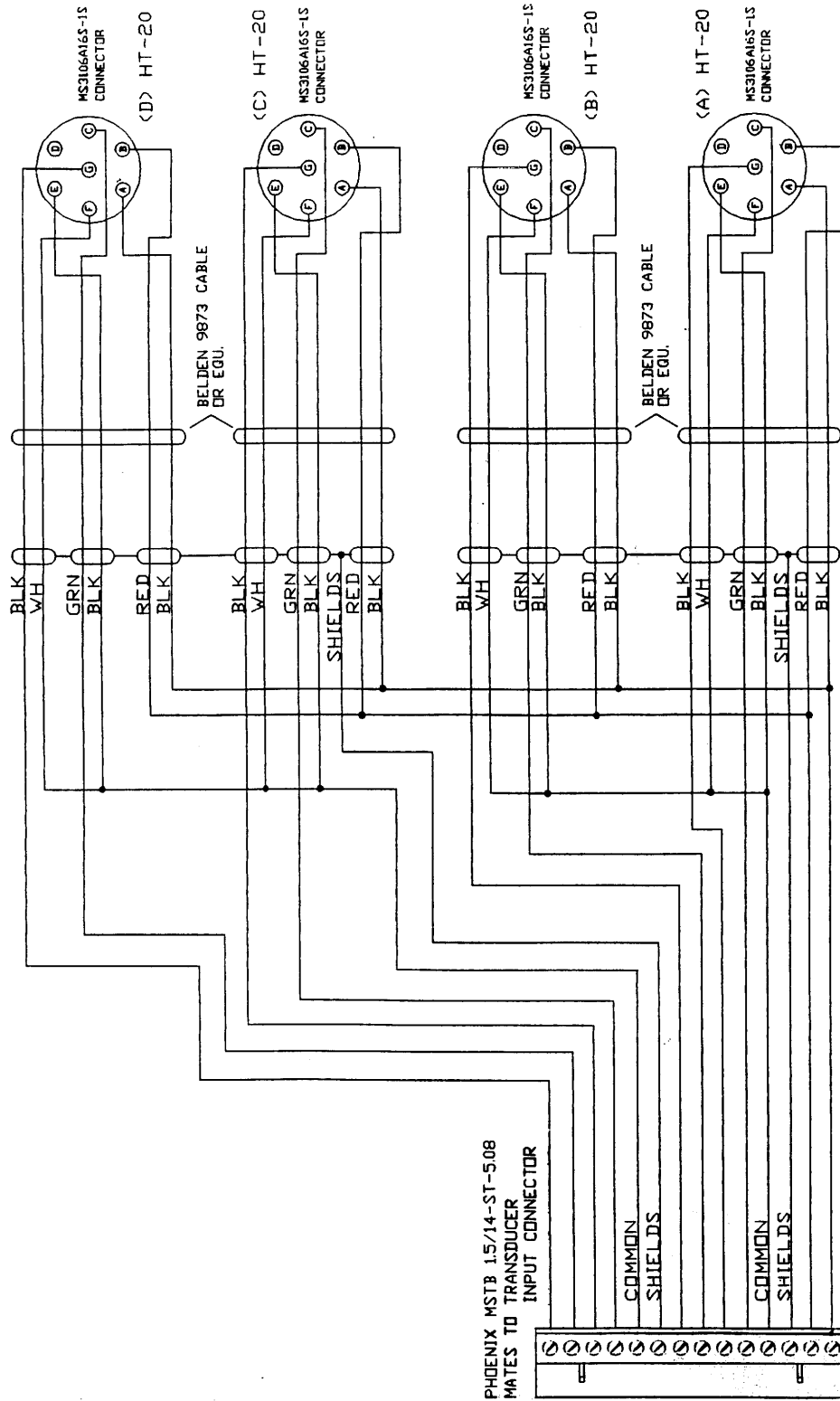


Fig 3.8 C4T-(x) Cable Drawing

CHP 4: 1800 KEYBOARD PROGRAMMING

Before any of the 1800's parameters can be programmed, the module must be in Program Mode. (Program Switch set "ON". See *Program Switch* for more information.) When the module is in this mode, the yellow PRG light on the front panel is lit.

Conventions

The following conventions are used when describing the keystrokes needed to program the different parameters.

[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 matches what is shown in the instructions.

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.)

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

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

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.

Tachometer Response:

You want the tachometer to update every 32 mSecs. The tachometer response is presently at it's default value of 240 mSecs with a 1 RPM resolution.

PRESS	IND. LEDES	DISPLAY	COMMENTS
*[FUNCTION]	TAC + A	"1_0240"	Present Value.
[▲]	TAC + A	"1_240.0"	240 mSec, .1 RPM resolution
[▲]	TAC + A	"1_0032"	Desired Value.
[ENTER]	TAC + A	"1_0032"	Value stored in EEPROM Blinking cursor removed.

Scale Factor:

You wish to program a Scale Factor of 720, which is a resolution of one count per every half of a degree rotation, for the second transducer on a 1833. Presently, the default Scale Factor of 360 is programmed in.

PRESS	IND. LEDS	DISPLAY	COMMENTS
*[FUNCTION]	SF	"1_XXXX"	Transducer 1 Scale Factor
[NEXT]	SF	"2_0360"	Transducer 2 Scale Factor
[▶], [▲]X4 [▶], [▲]X4	SF	"2_0720"	Desired Scale Factor
[ENTER]	SF	"2_0720"	Value stored in EEPROM Blinking cursor removed.

Circular Offset:

You want to program in a Circular Offset of 70 counts. The default value of 0000 is presently in memory.

PRESS	IND. LEDS	DISPLAY	COMMENTS
*[FUNCTION]	OF + A	"1_0000"	Present Offset.
[▶]X2, [▼]X3	OF + A	"1_0070"	Desired Offset.
[ENTER]	OF + A	"1_0070"	Value stored in EEPROM Blinking cursor removed.

Auto Zero:

The machine is at mechanical zero. You want to preset the transducers position to 0000. Instead of calculating the required offset, you can use the Auto Zero feature.

PRESS	IND. LEDS	DISPLAY	COMMENTS
*[FUNCTION]	POS	"1_XXXX"	xxxx = Present Position.
[CLEAR]	POS	"1_0000"	Position reset to zero.
*[FUNCTION]	OF + A	"1_YYYY"	yyyy = Calculated Offset.

Linear Offset:

You want a Linear Offset of 1000 counts on the third transducer of a 1944. The default value of 0000 is presently in memory.

PRESS	IND. LEDS	DISPLAY	COMMENTS
*[FUNCTION]	OF + B	"1_xxxx"	Transducer 1 Linear Offset
[NEXT]	OF + B	"2_zzzz"	Transducer 2 Linear Offset
[NEXT]	OF + B	"3_0000"	Transducer 3 Linear Offset
[▲], [ENTER]	OF + B	"3_1000"	Value Stored in EEPROM. Blinking Cursor removed.

Set-up Sheet

Use this sheet to keep track of different machine set-ups.

MODULE SLOT NUMBER: _____

REGISTER ADDRESSES: _____

NUMBER OF REGISTERS: _____

SET-UP NAME: _____

SCALE FACTOR: _____

TACH RESPONSE: _____

CIR. OFFSET: _____

LINEAR OFFSET: _____

SET-UP NAME: _____

SCALE FACTOR: _____

TACH RESPONSE: _____

CIR. OFFSET: _____

LINEAR OFFSET: _____

SET-UP NAME: _____

SCALE FACTOR: _____

TACH RESPONSE: _____

CIR. OFFSET: _____

LINEAR OFFSET: _____

SET-UP NAME: _____

SCALE FACTOR: _____

TACH RESPONSE: _____

CIR. OFFSET: _____

LINEAR OFFSET: _____

SET-UP NAME: _____

SCALE FACTOR: _____

TACH RESPONSE: _____

CIR. OFFSET: _____

LINEAR OFFSET: _____

CHP 5: ADDRESSING A SERIES 1800 MODULE

This chapter describes how to interface the 1800 Module to the Modicon Processor. Knowledge of the operation and programming of the Modicon Processors is assumed and essential.

Traffic Cop Number

When setting up your system, you must program the processor's Traffic Cop to recognize the 1800 Module. The Traffic Cop will recognize a one or two axes module as module type B863 and the three or four axes modules as module type B865. The data type will appear as BINARY and the module description is either "Register Input (4CH)" or "Register Input (8CH)". Figure 5.1 lists the 1800 Modules and the proper Module Types.

Module Number	Module Type	Module Description
1831/41	B863	Register Input 4 Channel
1832/42	B863	Register Input 4 Channel
1833/43	B865	Register Input 8 Channel
1834/44	B865	Register Input 8 Channel

Fig 5.1 Traffic Cop Module Types

You must also enter the starting address of the block of Input Registers that you will assign to the 1800 Module. Input Registers can have any address from 30000 to 39999. The total number of registers assigned to the module is equal to the number of channels listed in the Traffic Cop's Module description.

Sample Traffic Cop Configuration

Figure 5.2 is a sample configuration of a Traffic Cop. An 1841 is found in slot 104 and an 1834 is in slot 105. Registers 30001 to 30004 store the position and tach information from the 1841 while registers 30005 to 30012 store the information from the 1834.

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

Fig 5.2 Sample Configuration

Notes

CHP 6: SERIES 1800 MODULE DATA FORMAT

Data Format

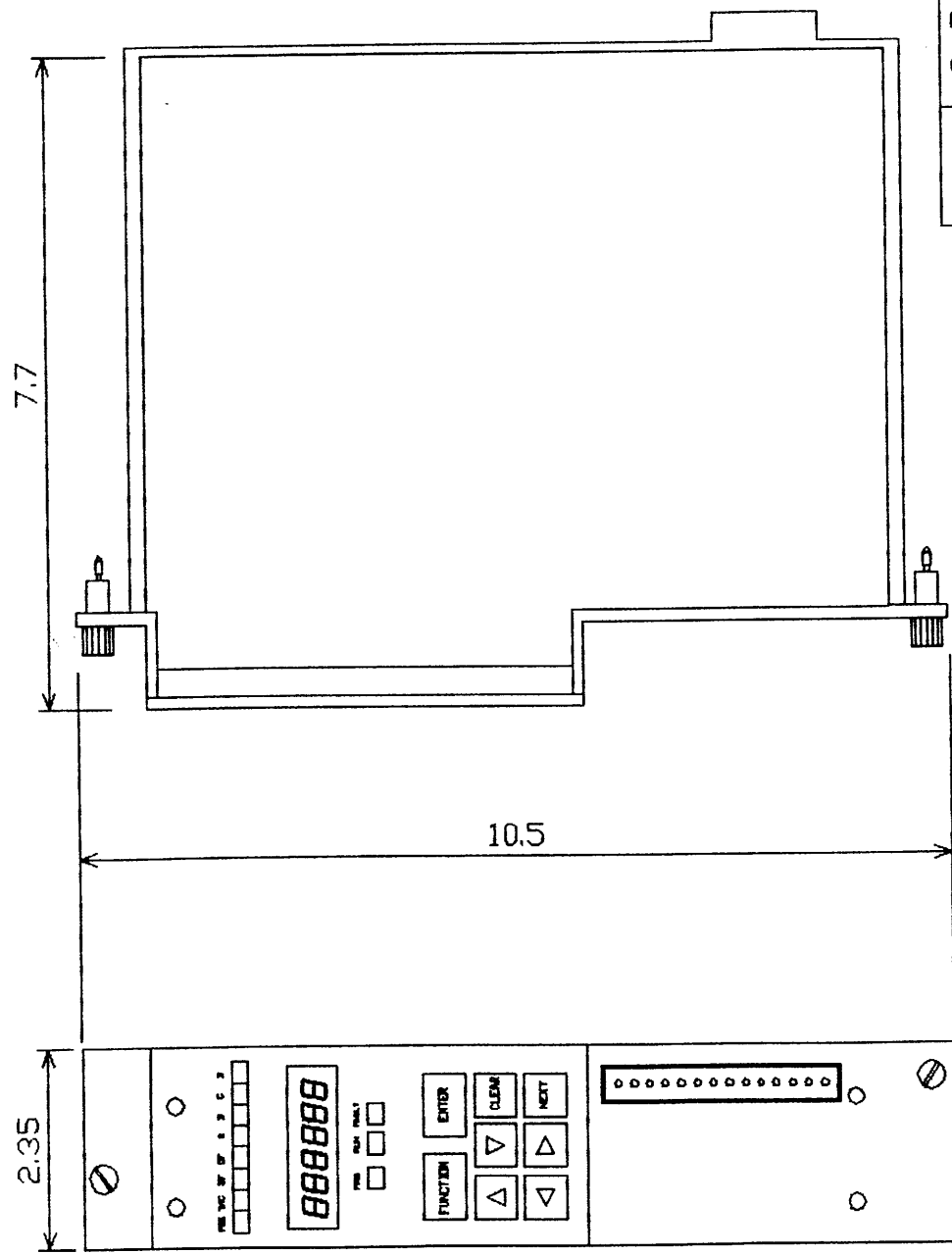
The data sent to the Modicon processor by the 1800 Module consists of two, 16 bit, binary words for every axis on the module. The first word of the pair is the Position value, the second word is the Tachometer Value. Figure 6.1 below shows the registers and the values they contain. For simplicity, register 30001 is assumed to be the first register assigned to the module. However, any register from 30000 to (39999 - (Number of registers used)) can be the first register assigned to the module.


REGISTER	1831/41	1832/42	1833/43	1844/44
30001	POS. 1	POS. 1	POS. 1	POS. 1
30002	TAC. 1	TAC. 1	TAC. 1	TAC. 1
30003	0000	POS. 2	POS. 2	POS. 2
30004	0000	TAC. 2	TAC. 2	TAC. 2
30005	NA	NA	POS. 3	POS. 3
30006	NA	NA	TAC. 3	TAC. 3
30007	NA	NA	0000	POS. 4
30008	NA	NA	0000	TAC. 4

Fig 6.1 Data Format

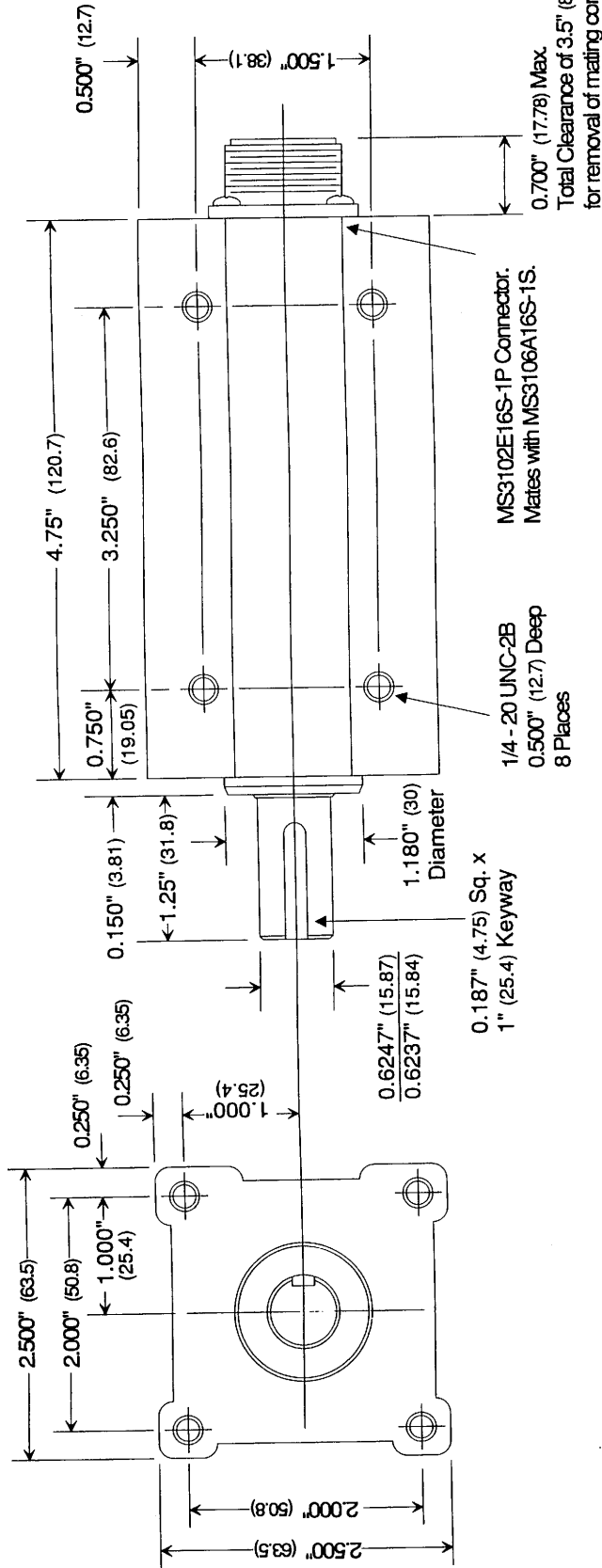
NA = Not Available. 1831,41,32,42 Modules should only have 4 Registers assigned to them.

1. Because the 1831,41,33,43 modules only use 2 of the 4 or 6 of the 8 registers assigned to them, they fill the other two registers with zeros.
2. Because both the Position and Tachometer values are less than 16 bits in length when transmitted in Binary, both have preceding zero's to complete the 16 bit words.
3. When there is a transducer fault condition, the Hexidecimal number 8000, (1000 0000 0000 0000 Binary), is sent to the processor in place of the Position and Tach data values. For more information on the transducer fault condition refer to Chapter 2: *Status Indicators*.



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

DATE	BY	REVISION RECORD	AUTH	DR	CK
1/53	A	Added Connector Removal Dimensions.	DMN		



() = Dimensions in millimeters

MECHANICAL SPECIFICATIONS

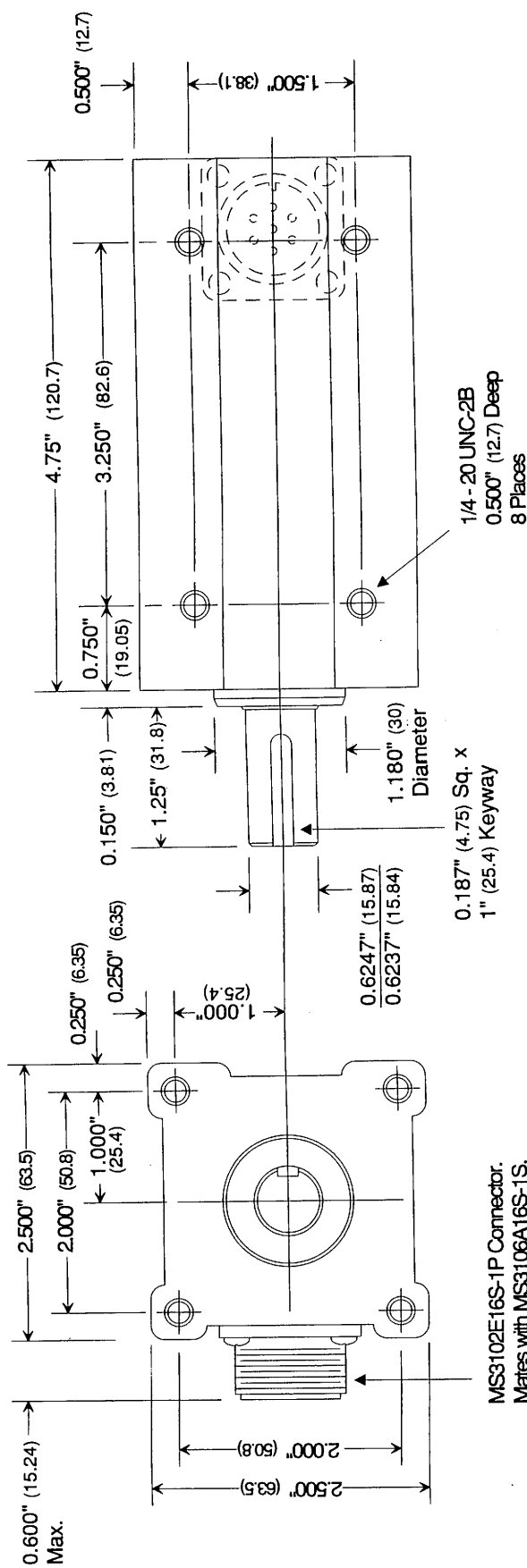
Max. Starting Torque @ 25°C 8 oz.in.
 Moment of Inertia 20 oz-in-sec²
 Max. Shaft Loading:
 Radial 400 lbs.
 Axial 200 lbs.
 Weight 4 lbs.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature -20 to 125°C.
 Shock 50 G's for 11 mSec.
 Vibration 5 to 2000 Hz @ 20 G's
 Nema Flating Nema 13

TOLERANCES (EXCEPT AS NOTED)	AMC ADVANCED MICRO CONTROLS INC.		
DECIMAL	HT-20	SCALE 1:1	DRAWN BY DMN
FRACTIONAL			APPROVED BY WXC
ANGULAR		TITLE	OUTLINE DRAWING
	DATE 3/9/90	DRAWING NUMBER	B1001 REV. A

DATE	BY	REVISION RECORD	AUTH	DR	CK
12/31	A	Added Height Dimension.	D/W/N		
1/93	B	Added Connector Removal Dimensions.	D/M/N		



MS3102E16S-1P Connector.
Mates with MS3106A16S-1S.

Total Clearance of 3.5" (89) needed
for removal of mating connector.

MECHANICAL SPECIFICATIONS

Max. Starting Torque @ 25°C 8 oz.in.
 Moment of Inertia 20 oz-in-sec²
 Max. Shaft Loading:
 Radial 400 lbs.
 Axial 200 lbs.
 Weight 4 lbs.

ENVIRONMENTAL SPECIFICATIONS

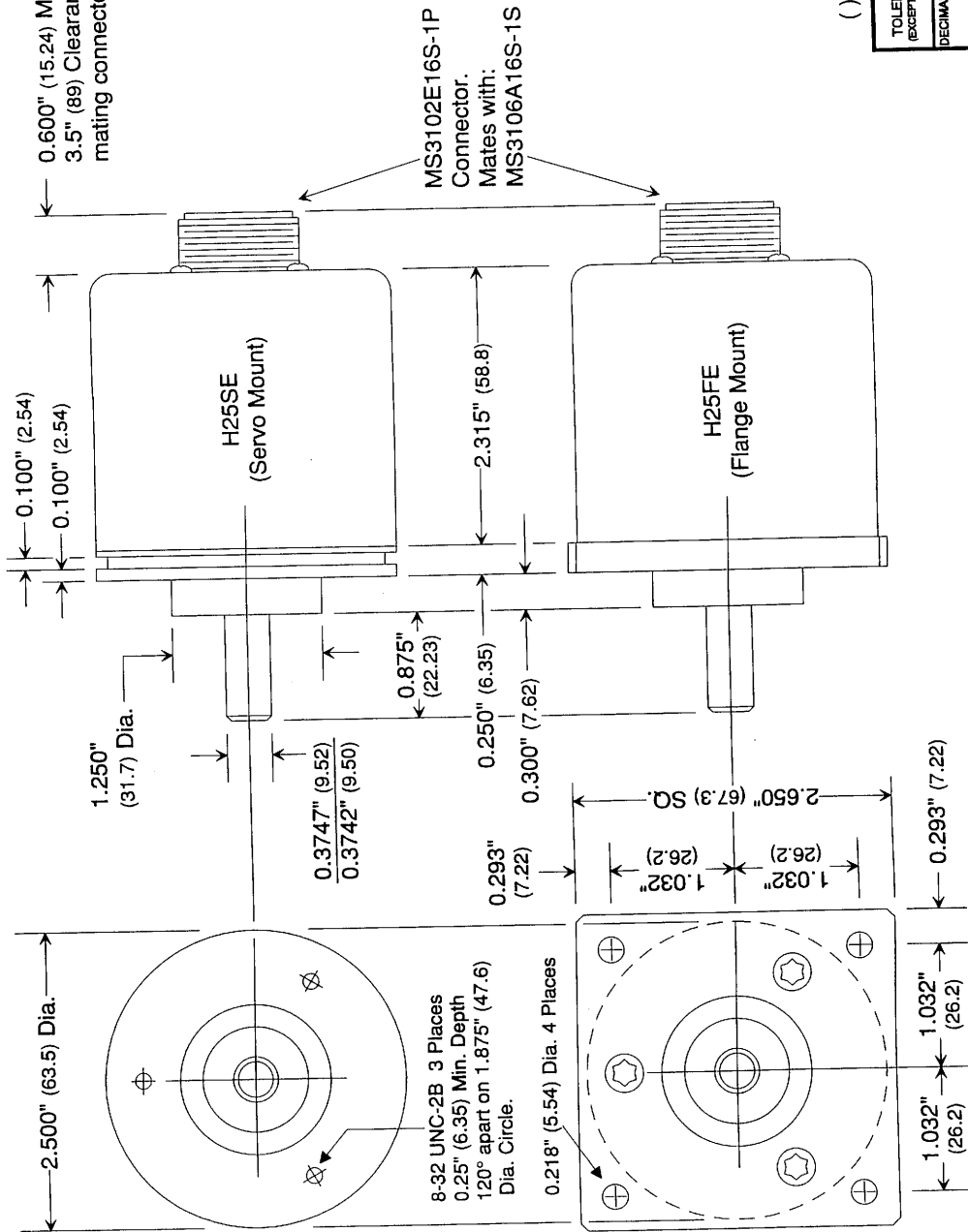
Operating Temperature -20 to 125°C.
 Shock 50 G's for 11 mSec.
 Vibration 5 to 2000 Hz @ 20 G's
 Nema Rating Nema 13

() = Dimensions in millimeters

TOLERANCES (EXCEPT AS NOTED)	AMC ADVANCED MICRO CONTROLS INC.	
DECIMAL	SCALE	DRAWN BY
±	1:1	DMN
FRACTIONAL	APPROVED BY	
±	WJE	
ANGULAR	TITLE	
±	OUTLINE DRAWING	
±	DATE	DRAWING NUMBER
±	5/1/90	B1115 REV. B

DATE	SYM	REVISION RECORD	AUTH	DR	CK
8/91	A	Changed Mounting Holes (SE)	W/XE		
9/91	B	Added 1.875" Circle (SE)	D/W/N		
1/93	C	Changed Can Length, Flange Width, Added Specifications	D/W/N		

0.600" (15.24) Max.
3.5" (89) Clearance needed for mating connector removal.



MECHANICAL SPECIFICATIONS

Max. Starting Torque @ 25°C 1.5 oz.in.
 Moment of Inertia 4 oz-in-sec²
 Max. Shaft Loading:
 Radial 40 lbs.
 Axial 20 lbs.
 Weight 1 lb.

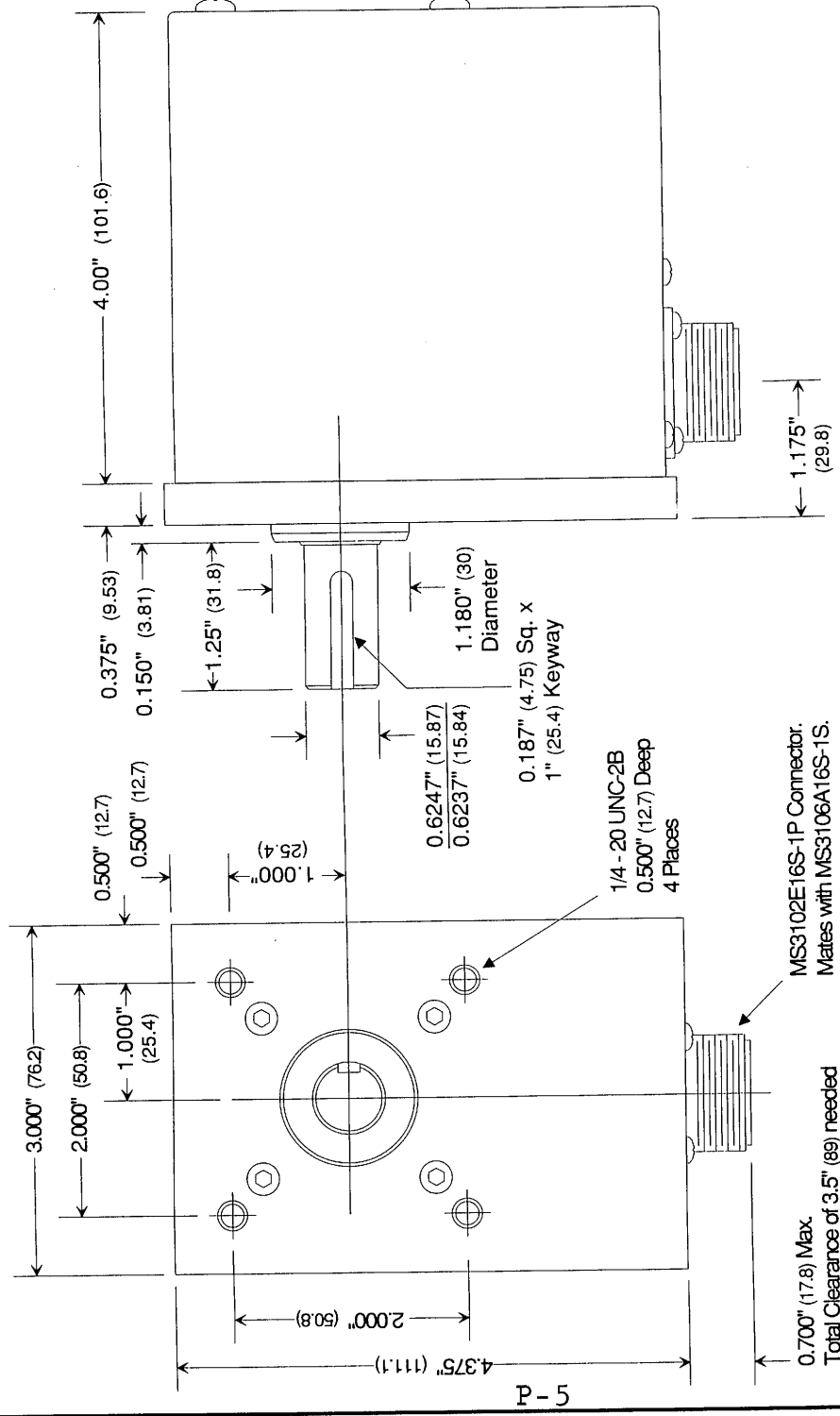
ENVIRONMENTAL SPECIFICATIONS

Operating Temperature -20 to 125°C.
 Shock 50 G's for 11 mSec.
 Vibration 5 to 2000 Hz @ 20 G's
 Nema Rating Nema 13

() = Dimensions in millimeters

TOLERANCES (EXCEPT AS NOTED)		AMC ADVANCED MICRO CONTROLS INC.	
DECIMAL	SCALE	DRAWN BY	D/W/N
#	1:1	APPROVED BY	C.X.E.
FRACTIONAL		TITLE	
#		OUTLINE DRAWING	
ANGULAR		DATE	DRAWING NUMBER
#		1/2/87	B1041 REV. C

DATE	SYM	REVISION RECORD	AUTH	DR	CK
1/83	A	Added Specifications	D/M/N		



MECHANICAL SPECIFICATIONS

Max. Starting Torque @ 25°C 8 oz.in.
 Moment of Inertia 20 oz-in-sec²
 Max. Shaft Loading:
 Radial 400 lbs.
 Axial 200 lbs.
 Weight 3 lbs.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature -20 to 125°C.
 Shock 50 G's for 11 mSec.
 Vibration 5 to 2000 Hz @ 20 G's
 Nema Rating Nema 13

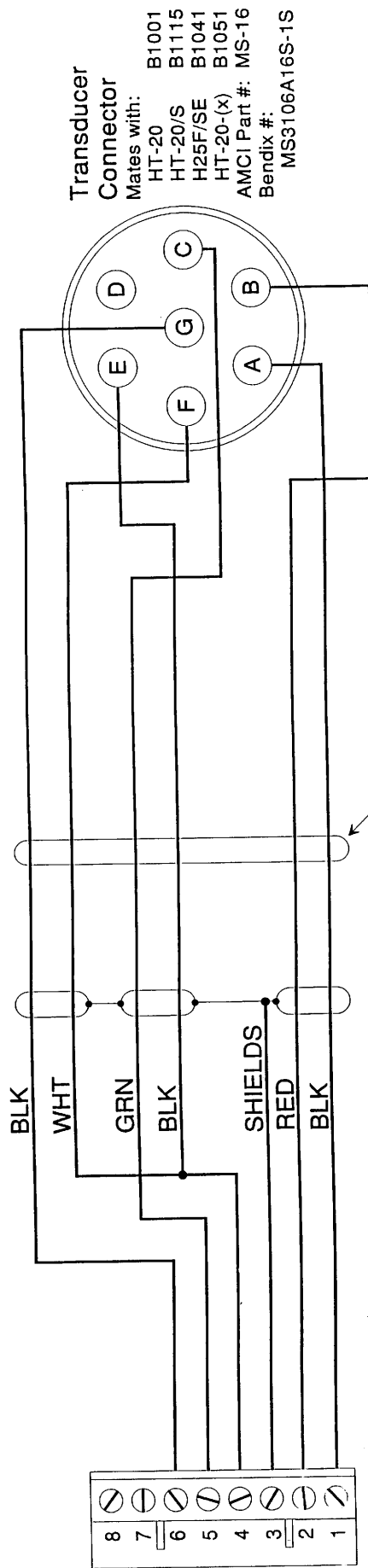
TOLERANCES (EXCEPT AS NOTED)		AMC ADVANCED MICRO CONTROLS INC.	
DECIMAL	SCALE	DRAWN BY	D/M/N
±	1:1	APPROVED BY	W X E
FRACTIONAL	TITLE		
±	HT-20-Ø Ø = Full Scale Turns		
±	DRAWING NUMBER		
±	B1051 REV. A		
±	DATE	TITLE	
±	6/1/87	OUTLINE DRAWING	

() = Dimensions in millimeters

MS3102E16S-1P Connector.
 Mates with MS3106A16S-1S.

0.700" (17.8) Max.
 Total Clearance of 3.5" (89) needed
 for removal of mating connector.

DATE	SYM	REVISION RECORD	AUTH	DR	CK
2/90	A	Added CW/CCW Note	D/W/N		
6/90	B	Changed "Mates to all..."	D/W/N		
8/91	C	Added 9730 Note	D/W/N		
2/92	D	Added 14/24/19/2900 Note	D/W/N		



Transducer Connector
 Mates with:
 HT-20 B1001
 HT-20/S B1115
 H25F/SE B1041
 HT-20-(X) B1051
 AMCI Part #: MS-16
 Bendix #: MS3106A16S-1S

BELDEN 9873 Cable
 For Cable lengths greater than
 100' (30 meters) use BELDEN 9730.

Module Connector
 Mates to all Single Channel Resolver Input and Limit Switch Modules.
 For all iPLC-1 and iPCE-1 Products refer to Print B1013
 AMCI Part #: MS-8
 Phoenix #: MSTB 1.5/8-5.08

Connections are shown for CW increasing readings
 For CCW increasing readings, reverse GRN/BLK Pair. (Pins C&E)

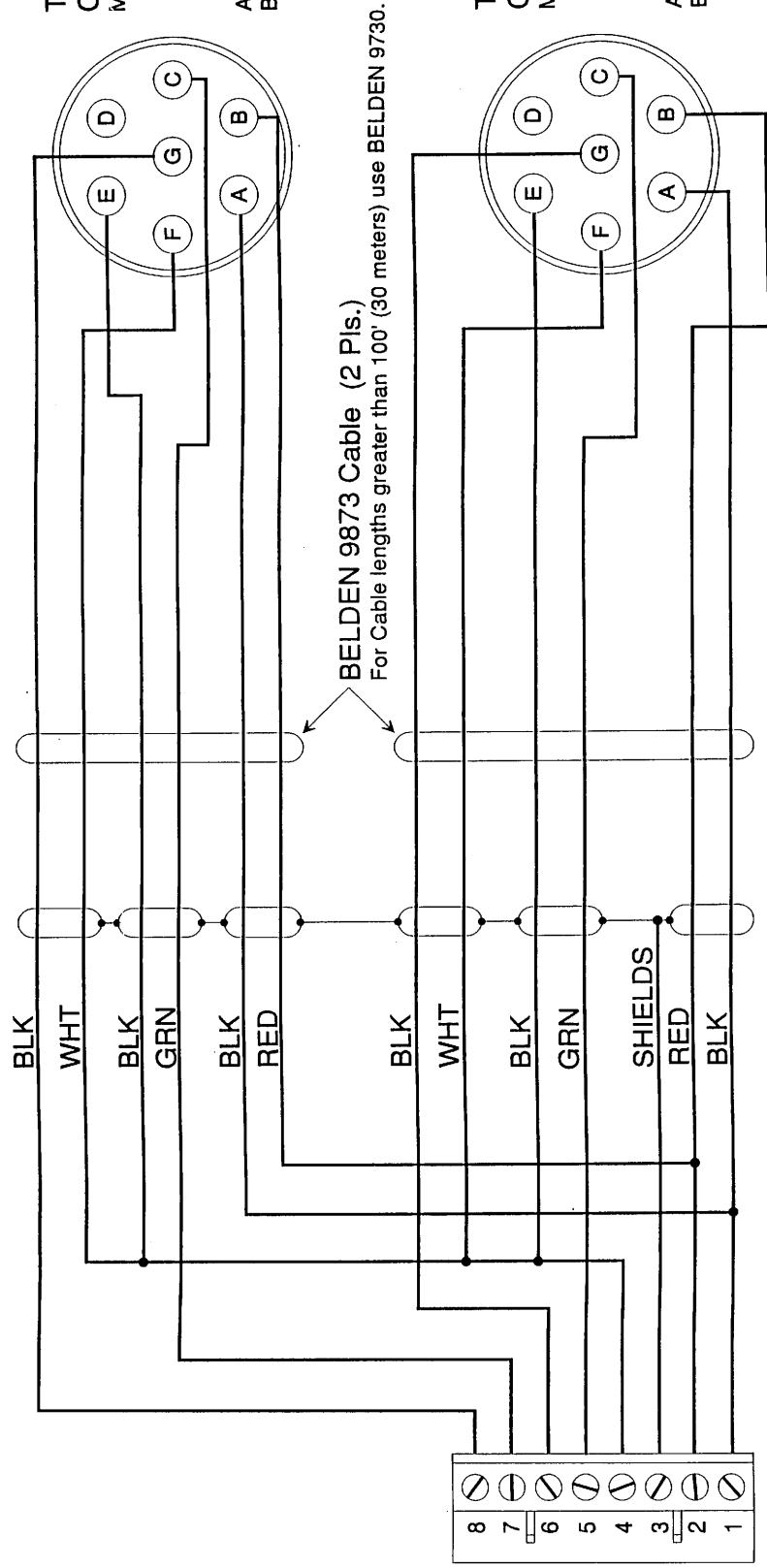
14/24/19/2900 Users:
 Pin 1 of the Transducer Input Connector is located towards the top of the module, NOT the bottom as this drawing may imply. Reversing the wires on the Module Connector will not harm the module or the transducer, but the transducer will not operate.

TOLERANCES (EXCEPT AS NOTED)	AMCI ADVANCED MICRO CONTROLS INC.	
DECIMAL	SCALE	DRAWN BY
±	C1T-(X)	None
FRACTIONAL	(X) = Length in Feet	APPROVED BY
±		LD X S
ANGULAR	TITLE	
±	Transducer Cable Drawing	
	DATE	DRAWING NUMBER
	1/11/90	B1110 REV. D

14/24/19/2900 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 transducer, but the transducer will not operate.

Connections are shown for CW increasing readings
For CCW increasing readings, reverse GRN/BLK Pair. (Pins C&E)



**Transducer B
Connector**
Mates with: B1001
HT-20 B1115
HT-20/S B1041
H25F/SE B1051
HT-20-(x) B1051
AMCI Part #: MS-16
Bendix #: MS3106A16S-1S

**Transducer A
Connector**
Mates with: B1001
HT-20 B1115
HT-20/S B1041
H25F/SE B1051
HT-20-(x) B1051
AMCI Part #: MS-16
Bendix #: MS3106A16S-1S

Module Connector

Mates with:
Two Channel Resolver Input and Limit Switch Modules.
iPLC-2 Intelligent Programmable Limit Controllers.
iPCE-2 Intelligent Programmable Controller Encoders.
AMCI Part #: MS-8
Phoenix #: MSTB 1.5/8-5.08

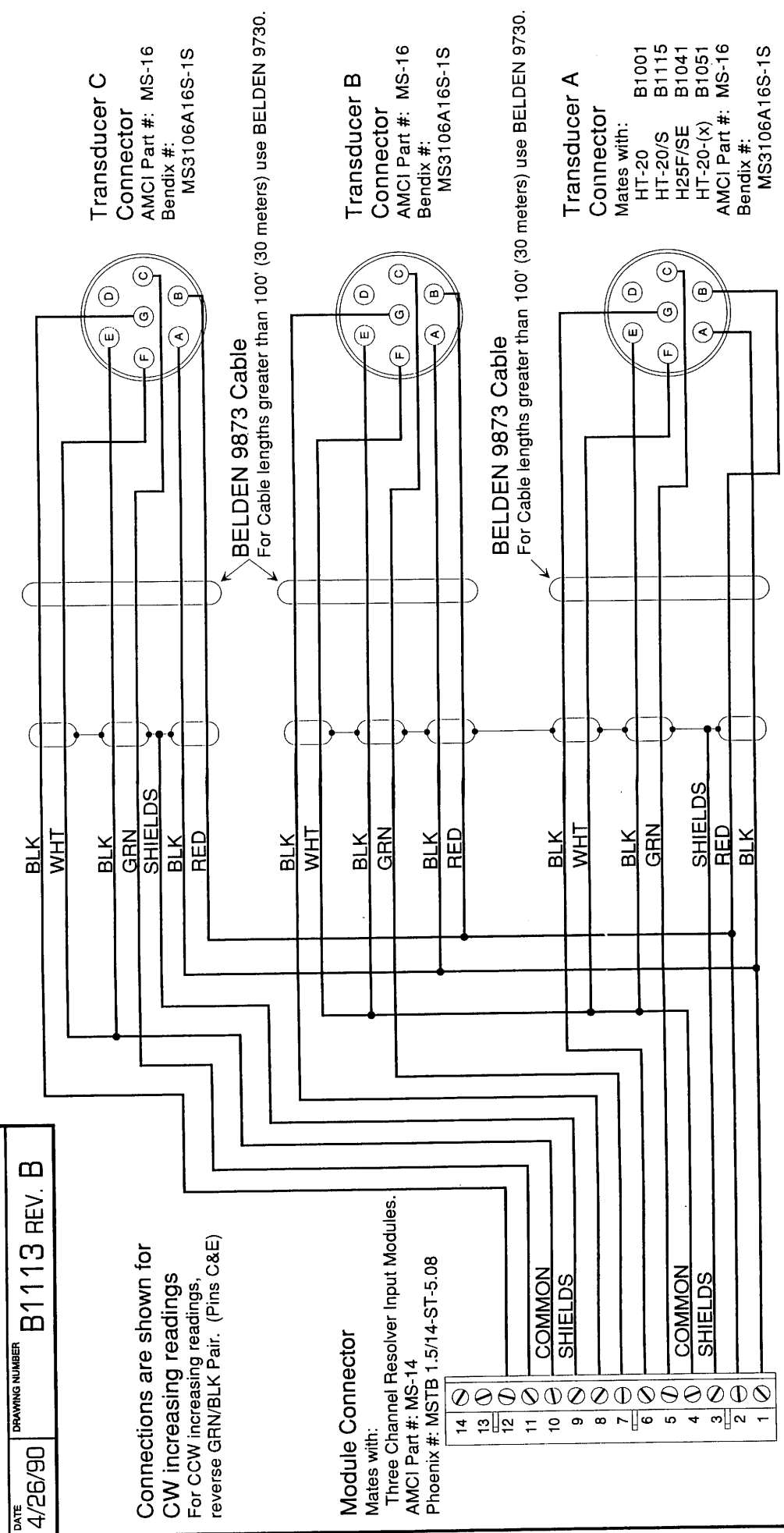
DATE BY/WH	REVISION RECORD	AUTH	DR	CK
1/90	A Name Change.	D/W/N		
8/91	B Added 9730 Note	D/W/N		
2/92	C Added 14/24/19/2900 Note.	D/W/N		

TOLERANCES (EXCEPT AS NOTED)	AMCI ADVANCED MICRO CONTROLS INC.		
DECIMAL	SCALE	DRAWN BY	D/W/N
±	None	APPROVED BY <i>(Signature)</i>	
FRACTIONAL	TITLE		
±	Transducer Cable Drawing		
ANGULAR	DATE	DRAWING NUMBER	
±	3/10/87	B1046 REV. C	

AMCI ADVANCED MICRO CONTROLS INC.
C3T-(x)
 SCALE: None
 DRAWN BY: DJW/J
 APPROVED BY: W X E
 (x) = Length in Feet
Transducer Cable Drawing
 DATE: 4/26/90
 DRAWING NUMBER: B1113 REV. B

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 transducer, but the transducer will not operate.

DATE	SYM	REVISION RECORD	AUTH	DR	CK
8/91	A	Added 9730 Note	D/W/J		
2/92	B	Added 14/1900 Note.	D/W/J		



C4T-(X)
 SCALE: DRAWN BY: DWN
 None APPROVED BY: (L) X Z

Transducer Cable Drawing

DATE: 6/10/87 DRAWING NUMBER: B1052 REV. C

Connections are shown for CW increasing readings. For CCW increasing readings, reverse GRN/BLK Pair. (Pins C&E)

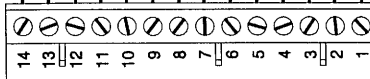
Transducer Connectors

Mate with:

- HT-20 B1001
- HT-20/S B1115
- H25F/SE B1041
- HT-20-(x) B1051

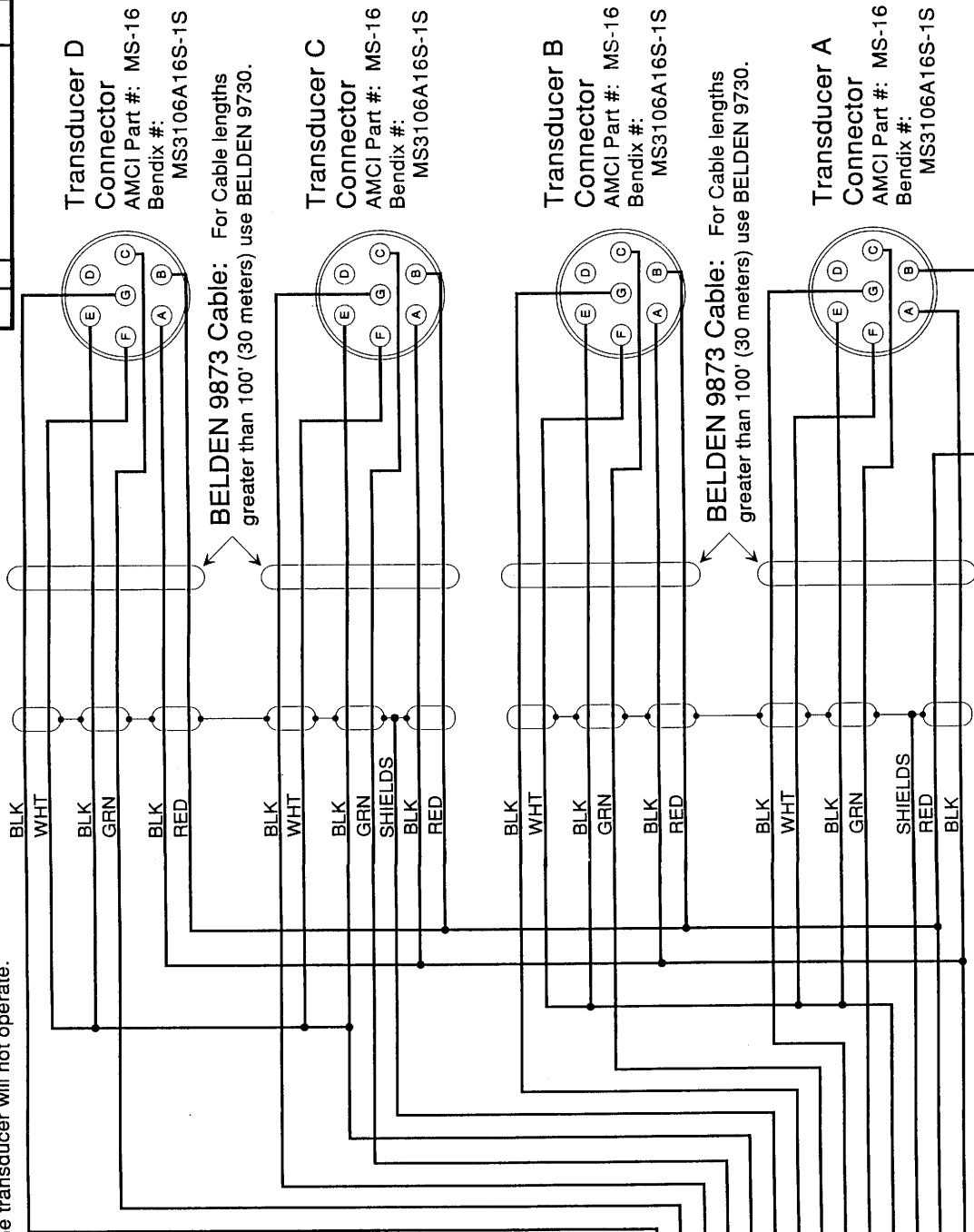
Module Connector

Mates with:
 Four Channel Resolver Input Modules.
 iPLC-4 Intelligent Programmable Limit Controllers.
 iPCE-4 Intelligent Programmable Controller Encoders.
 AMCI Part #: MS-14
 Phoenix #: MSTB 1.5/14-ST-5.08



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 transducer, but the transducer will not operate.



Transducer D Connector
 AMCI Part #: MS-16
 Bendix #: MS3106A16S-1S

Transducer C Connector
 AMCI Part #: MS-16
 Bendix #: MS3106A16S-1S

Transducer B Connector
 AMCI Part #: MS-16
 Bendix #: MS3106A16S-1S

Transducer A Connector
 AMCI Part #: MS-16
 Bendix #: MS3106A16S-1S

BELDEN 9873 Cable: For Cable lengths greater than 100' (30 meters) use BELDEN 9730.

BELDEN 9873 Cable: For Cable lengths greater than 100' (30 meters) use BELDEN 9730.

DATE	BY	REVISION RECORD	AUTH	DR	CHK
1/90	A	Name Change	DWN		
8/91	B	Changed Layout + 9730 Note	DWN		
2/92	C	Added 14/1900 Note.	DWN		



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