HORNER APG

User Manual for the
HE693OIU190

Operator Interface Unit
For GE Fanuc GENIUS™ and
Universal Automation FloPro™

First Edition
19 August 2000

MAN0062-01

FOR NORTH AMERICA ONLY!

MODEL NUMBER: HE693OIU190

SERIAL NUMBER: _____

WARRANTY REGISTRATION FORM

Please fill out this form and return it to Horner APG. This information is vital to Horner APG, should warranty service be required. This document is also used to keep you informed of new product enhancements, software revisions and documentation updates.

IT IS IN YOUR BEST INTEREST TO FILL OUT AND RETURN THIS FORM!

Date of purchase: _____

Name: _____

Title: _____

Company: _____

Department/Division: _____

Street Address: _____

City/State/Zip: _____

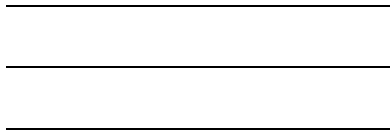Area Code/Phone Number: _____

Purchased from (Distributor): _____

Please indicate the type of application where this product is to be used, check all that apply:

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Horner APG, Inc.
APG - Controls Division

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Indianapolis, Indiana 46201

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PREFACE

This manual explains how to use the Horner APG Operator Interface Unit for use with the GE Fanuc Genius I/O Network and Universal Automation's FloPro.

For user manual updates, contact Horner APG, Technical Support Division, at (317) 916-4274 or visit our website at www.heapg.com.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Horner APG, LLC. ("HE-APG") warrants to the original purchaser that the Operator Interface Unit manufactured by HE-APG is free from defects in material and workmanship under normal use and service. The obligation of HE-APG under this warranty shall be limited to the repair or exchange of any part or parts which may prove defective under normal use and service within two (2) years from the date of manufacture or eighteen (18) months from the date of installation by the original purchaser whichever occurs first, such defect to be disclosed to the satisfaction of HE-APG after examination by HE-APG of the allegedly defective part or parts. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES AND HE-APG NEITHER ASSUMES, NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR HE-APG, ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF THIS OPERATOR INTERFACE UNIT. THIS WARRANTY SHALL NOT APPLY TO THIS OPERATOR INTERFACE UNIT OR ANY PART THEREOF WHICH HAS BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE. HE-APG MAKES NO WARRANTY WHATSOEVER IN RESPECT TO ACCESSORIES OR PARTS NOT SUPPLIED BY HE-APG. THE TERM "ORIGINAL PURCHASER", AS USED IN THIS WARRANTY, SHALL BE DEEMED TO MEAN THAT PERSON FOR WHOM THE OPERATOR INTERFACE UNIT IS ORIGINALLY INSTALLED. THIS WARRANTY SHALL APPLY ONLY WITHIN THE BOUNDARIES OF THE CONTINENTAL UNITED STATES.

In no event, whether as a result of breach of contract, warranty, tort (including negligence) or otherwise, shall HE-APG or its suppliers be liable of any special, consequential, incidental or penal damages including, but not limited to, loss of profit or revenues, loss of use of the products or any associated equipment, damage to associated equipment, cost of capital, cost of substitute products, facilities, services or replacement power, down time costs, or claims of original purchaser's customers for such damages.

To obtain warranty service, return the product to your distributor with a description of the problem, proof of purchase, post paid, insured and in a suitable package.

ABOUT PROGRAMMING EXAMPLES

Any example programs and program segments in this manual or provided on accompanying diskettes are included solely for illustrative purposes. Due to the many variables and requirements associated with any particular installation, Horner APG cannot assume responsibility or liability for actual use based on the examples and diagrams. It is the sole responsibility of the system designer utilizing Operator Interface Unit to appropriately design the end system, to appropriately integrate the Operator Interface Unit and to make safety provisions for the end equipment as is usual and customary in industrial applications as defined in any codes or standards which apply.

Note: The programming examples shown in this manual are for illustrative purposes only. Proper machine operation is the sole responsibility of the system integrator.

Revisions to This Manual

This version (MAN0062-01 of the **Operator Interface Unit User Manual** contains the following revisions, additions and deletions:

1. Converted manual into Word format.

2. Changed company name from Horner Electric, Inc. to Horner APG, LLC.

NOTES

Table of Contents

CHAPTER 1: INTRODUCTION

Congratulations on your purchase of the Horner APG Operator Interface Unit! This unit has been designed using state-of-the-art electronic components and incorporates a sophisticated firmware package that gives the Original Equipment Manufacturer (OEM) the ability to utilize this unit with the powerful FloPro Development Package from Universal Automation.

1.1   What You Have

The Horner APG Operator Interface Unit (OIU) comes complete with the following items:

A.   Assembled OIU module and mounting hardware, including the Micro-Genius™ Network Interface board (uGENI).

B.   Steel Rear Cover for OIU.

C.   This manual.

1.2   Operator Interface Unit Features

The Horner Operator Interface Unit provides the following features:

A.   Gasketed NEMA 4-12 panel with a rugged Lexan™ overlay, mounting hardware included.

B.   Four line by 20 character dot-matrix vacuum-fluorescent display.

C.   Tactile feel keypad with numeric support plus special function keys.

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D.   Integrated Genius Network Interface board (uGENI) for communications on GE Fanuc's Genius Distributed I/O Network.

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E.   Acts as a high-performance FloPro Remote Message Unit by communicating over a high speed I/O network instead of a slower, serial based connection.

F.   Standard 9-pin RS232 communications port, for connection to a GE Fanuc PowerMate Motion Controller.

1.3   Hardware Description

The Operator Interface Unit (HE693OIU190) consists of five main components. They are:

A)   Keypad / Mounting plate.

B)   Main Circuit Board.

C)   Vacuum Fluorescent Display Circuit Board.

D)   Genius Network Interface (uGENI) Board.

E)   Steel Rear Cover.

The OIU is a microprocessor-based high-performance communications device. The core of the Main Circuit Board is the Intel 80C152 microprocessor running at 11.0592 MegaHertz. The "firmware" memory is contained in a programmable memory storage device. The Main Circuit Board is also equipped with 32K bytes of high-speed static RAM memory. There is no retained memory on the unit. The OIU incorporates a Genius Network Interface board (uGENI) that provides the link to the Genius network.

1.4   Specifications

Mounting Requirements:	Panel Mounting, NEMA 4-12
Communications:	Genius Network Interface (uGENI)
Additional Communications:	Standard RS232 for PowerMate.
Power Requirements:	12.5-32 VDC, 7.5 Watts power max.
Operating Environment:	0 to 60° C. (32 to 140° F). 0 to 95% humidity (non-condensing).
Non-Volatile Memory:	None

CHAPTER 2: INSTALLATION

2.1   Mounting Requirements

The OIU is designed for permanent panel mounting. To install the OIU:

A.   Cut the host panel as described by the drawing in Appendix A.

B.   Make sure all terminal connectors are removed from the OIU.

C.   Remove the steel back cover (if installed), by removing the screws securing it to the OIU. Carefully lift the cover off the rear of the OIU a few inches, disconnecting the power terminal from the power supply circuit board. The rear cover should now be completely free of the OIU.

D.   Remove the #6-32 hex nuts and washers from the outer mounting studs on the rear of the OIU panel.

E.   Insert the OIU module through the front panel cutout. The gasket material should lie between the host panel and the OIU panel.

F.   Install the #6-32 nuts and lock-washers on the six mounting studs of the OIU. Tighten these nuts until the gasket material forms a tight seal, do not overtighten.

G.   Re-install the rear cover. Be sure to re-connect the power terminal to the power supply circuit board. Re-connect all terminal connectors (power and Genius network terminals). This completes the mechanical installation of the OIU module.

2.2   Power Requirements

The OIU power supply requires a DC supply voltage between 12 and 32 volts. A maximum of 7.5 watts will be drawn by the OIU. The OIU power supply features a 2-position, removable terminal block. See **Figure 2.1** for connector location. The pinout for this connector is shown below in **Table 2.1**.

Table 2.1 – DC Connector Pinout	
Pin	**Signal**
1	+12-32VDC
2	DC Common

Power Connector
(on main board)

Genius Bus Connector
(on main board)

RS-485 Port 2
DB-15

RS-232 Port 1
DB-9
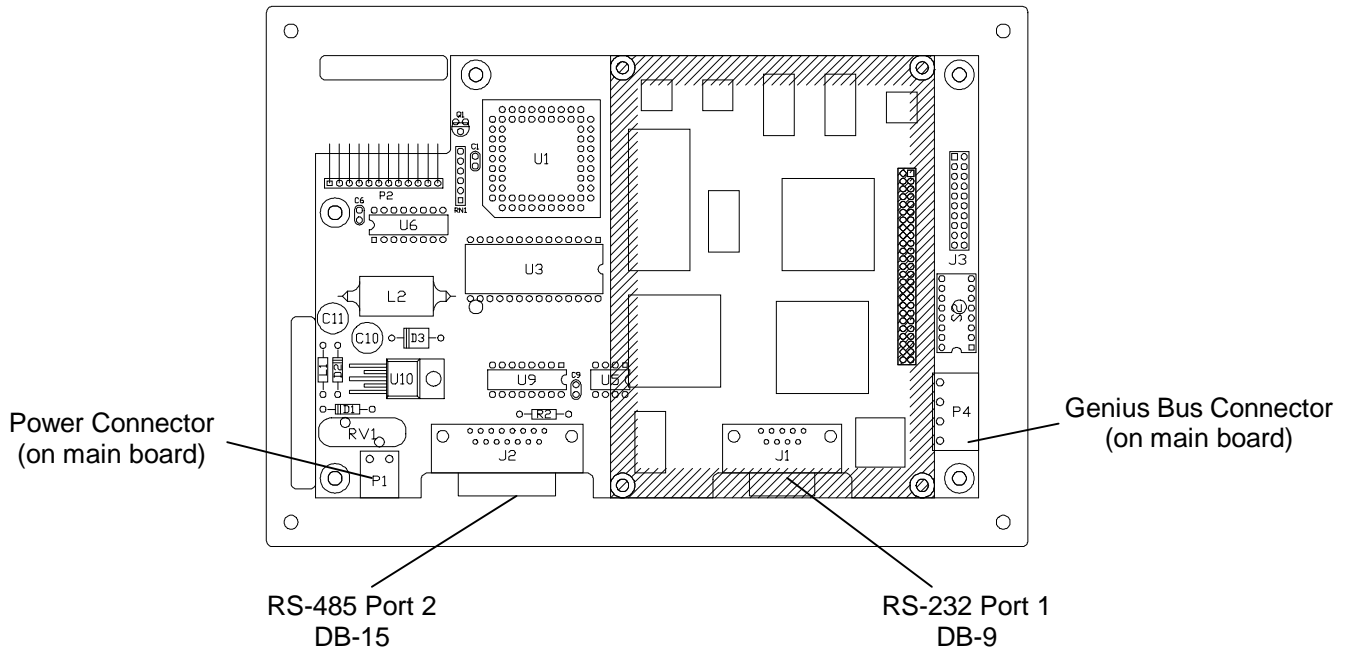
Figure 2.1 - Connectors

2.3   Genius Network Connector

The OIU is also equipped with a 4-pin Genius bus connector. The mating connector provides screw terminals for each circuit. The pinout for this connector is as follows:

Table 2.2 – Genius Network Connector Pinout	
Pin	Signal
1	Serial 1
2	Serial 2
3	Shield out
4	Shield In

2.4   RS232 Connector(s)

The 9-pin "D" connectors on the main circuit board provides an RS232 interface to the GE Fanuc PowerMate Motion Controller. The OIU-to-PowerMate cable pinout is shown in Appendix B.

2.5   uGENI Configuration

The uGENI board (located on the rear of the OIU module) is equipped with a bank of 8 "DIP" switches. DO NOT CONFUSE THIS DIP SWITCH WITH THE 6-POSITION DIP SWITCH ON THE MAIN CIRCUIT BOARD DESCRIBED LATER. These switches are used to configure the Genuis "bus" address or "Device Number" for the OIU module, and to set the module's Genius baud rate.

Each device on the Genius network must have a unique "Device Number" (0 to 31). The OIU may be configured for any device number, however the following conventions should be followed when choosing the device number for the OIU:

      A.   The bus controller is usually configured as device number 31.
      B.   The redundant bus controller (if any) is usually configured as device number 30.
      C.   The Hand-Held monitor is usually configured as device number 0.

When shipped from the factory, the OIU dip switches are configured for device number 29, and for communication baud rate of 153.6K standard. Multiple OIUs may reside on the network, provided that they have unique device numbers. Available dip switch settings are illustrated in **Figure 2.4**.

2.6   OIU DIP Switches

The MAIN circuit board is equipped with a bank of 6 "DIP" switches. These switches are accessible by removal of the metal back cover. **The user should never need to change the default position(s).** These switches are used to configure the following OIU options:

Table 2.3 – MAIN Board DIP Switch Assignments		
Switch #	**Definition when Closed**	**Default**
1	Always Closed	Closed
2	Always Closed	Closed
3	Always Open	Open
4	Power to Pin 5 of RS485 Port	Closed
5	Watchdog Timer Enabled	Closed
6	Run (Open for Serial Debug)	Closed

2.7   Logicmaster 90-70 Configuration

The 90-70 Genius Bus Controller must be configured by Logicmaster to communicate with the OIU. The proper settings are as follows:

GENI-based device		*the proper bit memory type
Config Mode:	manual	(%I, %M, %G, etc.) will be
To:	(bit type memory)*	determined by GE Fanuc and
Input Length:	8	Universal Automation

2.8   FloPro Configuration

Consult documentation provided with Universal Automation FloPro for the configuration of Remote Message Units (OIUs) in FloPro.

8	7	6	5	4	3	2	1

5	4	3	2	1	ADDRESS	5	4	3	2	1	ADDRESS
CLOSD	CLOSD	CLOSD	CLOSD	CLOSD	0	OPEN	CLOSD	CLOSD	CLOSD	CLOSD	16
CLOSD	CLOSD	CLOSD	CLOSD	OPEN	1	OPEN	CLOSD	CLOSD	CLOSD	OPEN	17
CLOSD	CLOSD	CLOSD	OPEN	CLOSD	2	OPEN	CLOSD	CLOSD	OPEN	CLOSD	18
CLOSD	CLOSD	CLOSD	OPEN	OPEN	3	OPEN	CLOSD	CLOSD	OPEN	OPEN	19
CLOSD	CLOSD	OPEN	CLOSD	CLOSD	4	OPEN	CLOSD	OPEN	CLOSD	CLOSD	20
CLOSD	CLOSD	OPEN	CLOSD	OPEN	5	OPEN	CLOSD	OPEN	CLOSD	OPEN	21
CLOSD	CLOSD	OPEN	OPEN	CLOSD	6	OPEN	CLOSD	OPEN	OPEN	CLOSD	22
CLOSD	CLOSD	OPEN	OPEN	OPEN	7	OPEN	CLOSD	OPEN	OPEN	OPEN	23
CLOSD	OPEN	CLOSD	CLOSD	CLOSD	8	OPEN	OPEN	CLOSD	CLOSD	CLOSD	24
CLOSD	OPEN	CLOSD	CLOSD	OPEN	9	OPEN	OPEN	CLOSD	CLOSD	OPEN	25
CLOSD	OPEN	CLOSD	OPEN	CLOSD	10	OPEN	OPEN	CLOSD	OPEN	CLOSD	26
CLOSD	OPEN	CLOSD	OPEN	OPEN	11	OPEN	OPEN	CLOSD	OPEN	OPEN	27
CLOSD	OPEN	OPEN	CLOSD	CLOSD	12	OPEN	OPEN	OPEN	CLOSD	CLOSD	28
CLOSD	OPEN	OPEN	CLOSD	OPEN	13	OPEN	OPEN	OPEN	CLOSD	OPEN	29
CLOSD	OPEN	OPEN	OPEN	CLOSD	14	OPEN	OPEN	OPEN	OPEN	CLOSD	30
CLOSD	OPEN	OPEN	OPEN	OPEN	15	OPEN	OPEN	OPEN	OPEN	OPEN	31

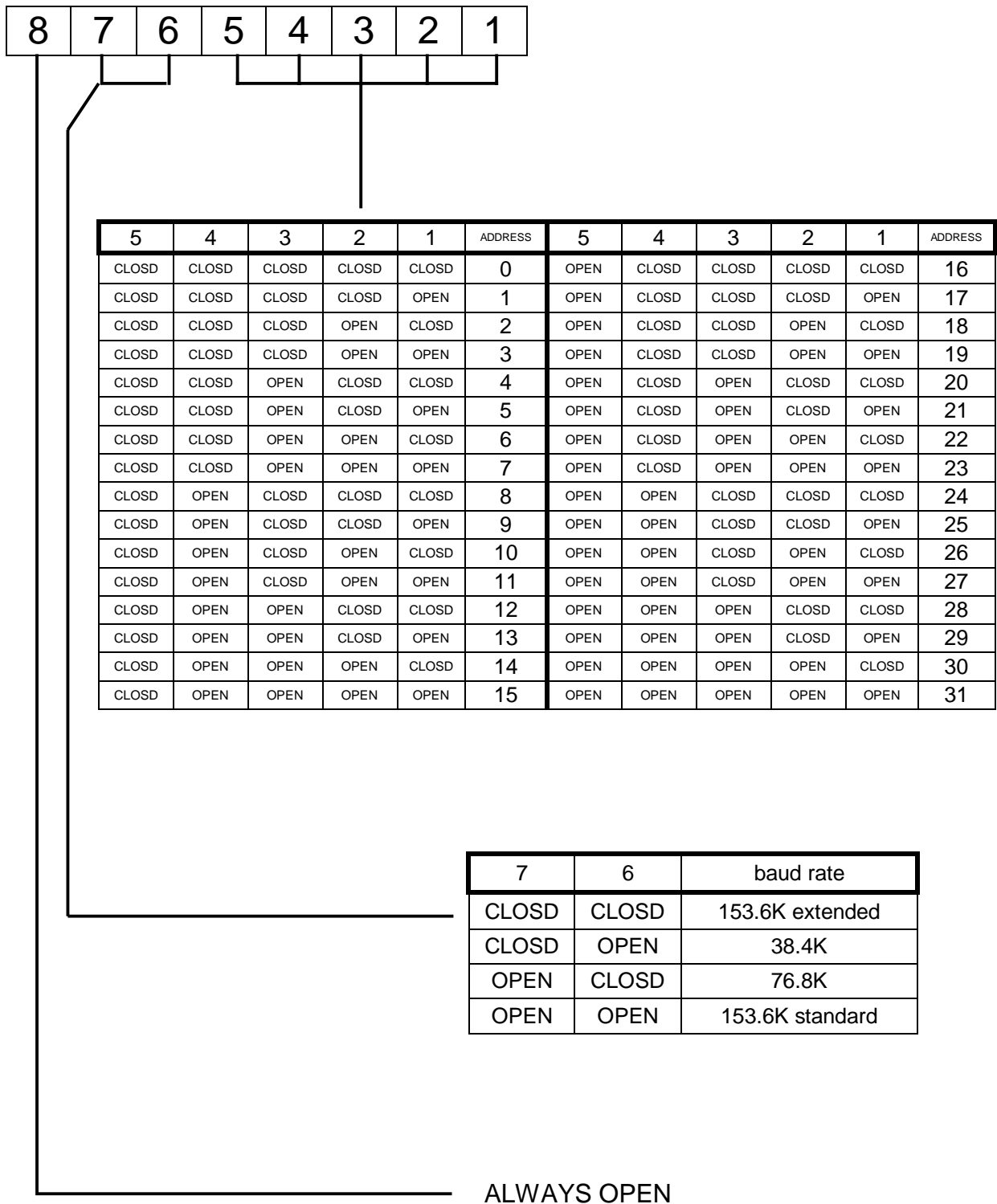| 7	6	baud rate
CLOSD	CLOSD	153.6K extended
CLOSD	OPEN	38.4K
OPEN	CLOSD	76.8K
OPEN	OPEN	153.6K standard

ALWAYS OPEN

Figure 2.2 – uGENI DIP Switch Assignments
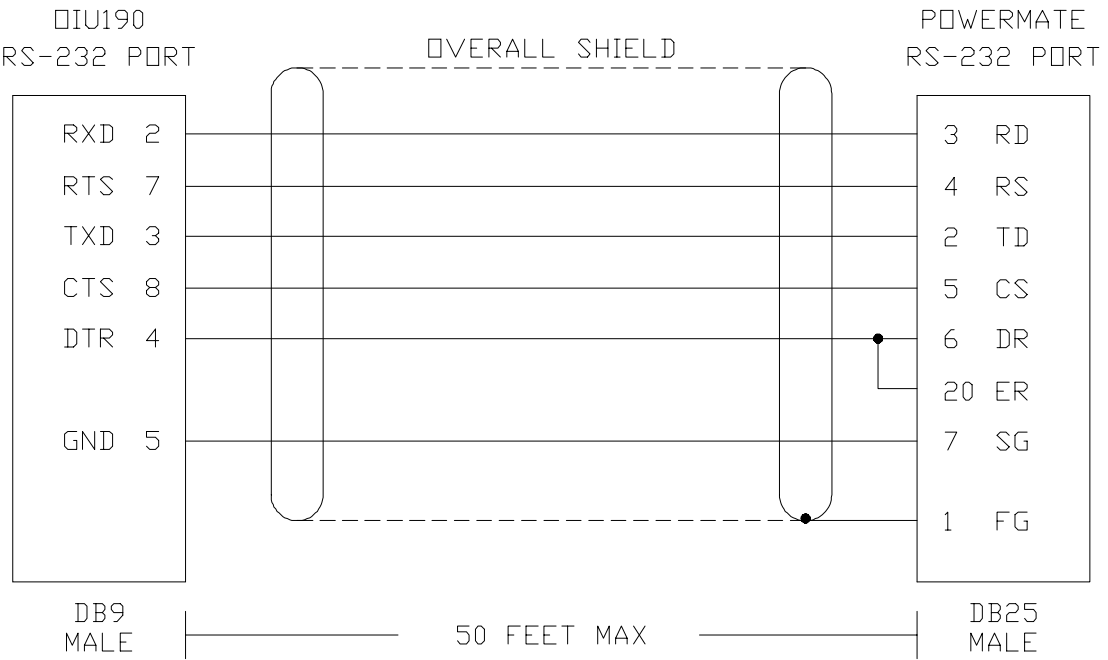
APPENDIX A: PANEL CUTOUT

The OIU module is designed for panel mounting. The drawing below illustrates the panel cutout required for OIU module mounting. All dimensions shown in brackets are in millimeters, and those shown without brackets are in inches.
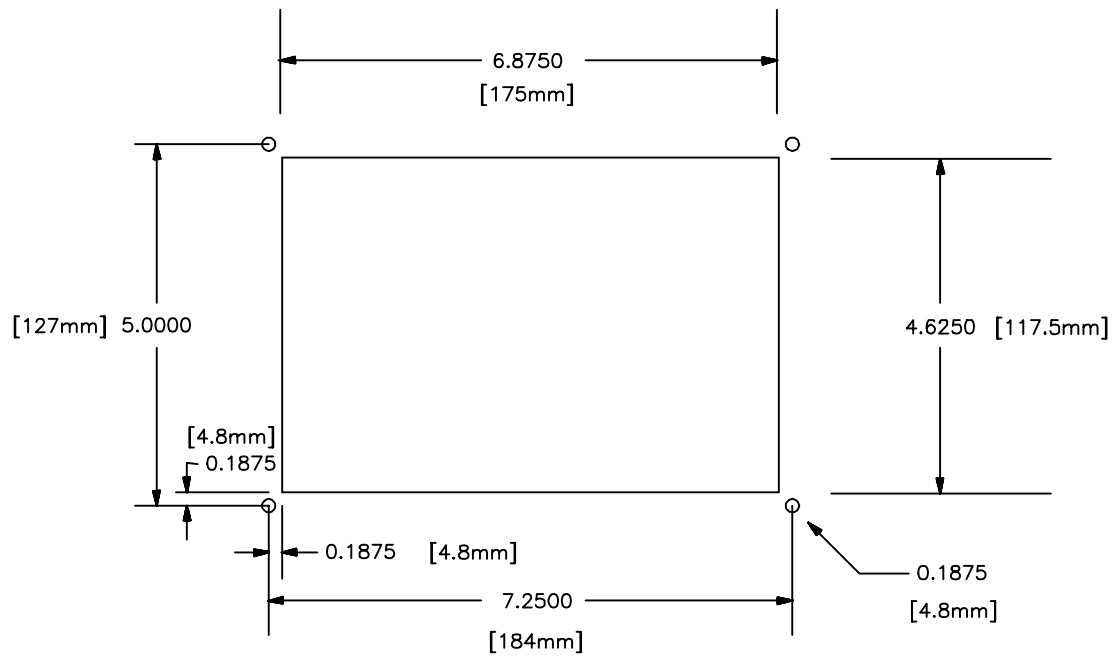
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APPENDIX B: RS-232 CABLE PINOUT

Following is the wiring diagram for the RS-232 cable for communications between the OIU190 serial port and the PowerMate Motion Controller Serial Port.

```
        OIU190                                              POWERMATE
      RS-232 PORT           OVERALL SHIELD                 RS-232 PORT

        RXD  2 ─────────────────────────────────────────── 3   RD
        RTS  7 ─────────────────────────────────────────── 4   RS
        TXD  3 ─────────────────────────────────────────── 2   TD
        CTS  8 ─────────────────────────────────────────── 5   CS
        DTR  4                                         ●─── 6   DR
                                                       └─── 20  ER
        GND  5 ─────────────────────────────────────────── 7   SG

                                                       ●─── 1   FG

         DB9              50 FEET MAX                      DB25
         MALE                                             MALE
```

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APPENDIX C: DISPLAYABLE CHARACTERS

The following chart lists the characters which are displayable by the 4-line by 20 character vacuum fluorescent display. The ASCII code for each character is indicated by the row (first digit 0-F in hex) and the column (second digit 0-F in hex) in which the character resides. For instance, the character "q" is represented by ASCII code 17H.

2nd / 1st	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		DP		0	@	P	`	p	Ç	É	á	α	§	À		≤
1		DC1	!	1	A	Q	a	q	ü	æ	í	β		È		≥
2		DC2	"	2	B	R	b	r	é	Æ	ó	γ		Ù		≠
3	DEF		#	3	C	S	c	s	â	ô	ú	Δ	∫	Ë		⊥
4	DIM		$	4	D	T	d	t	ä	ö	ñ	ε				∞
5			%	5	E	U	e	u	à	ò	Ñ	η		Â		≈
6			&	6	F	V	f	v	å	û		θ	²	Ê		≡
7			'	7	G	W	g	w	ç	ù		λ	³	Î		⊕
8	BS		(	8	H	X	h	x	ê	ÿ	¿	μ		Ô		θ
9	HT		)	9	I	Y	i	y	ë	Ö		Π	√	Û		←
A	LF		*	:	J	Z	j	z	è	Ü	¬	ρ	±			→
B			+	;	K	[	k	{	ï	¢	½	σ		Γ		
C			,	<	L	\	l	|	î	£	¼	τ				
D	CR		-	=	M	]	m	}	ì	¥	¡	φ	UF0			
E			.	>	N	^	n	~	Ä		«	Ω	UF1			
F		RST	/	?	O	_	o		Å	ƒ	»	Σ	UF2		°	

Note: Characters with second digit "E" (column E above) are Russian Letters

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