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Connector and I/O Cable Application Guide

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GE Fanuc Automation

Programmable Control Products

Connector and I/O Cable

Application Guide

GFK-2085

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December 2001

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Field Control	Motion Mate	Series Five	VuMaster
GEnet	ProLoop	Series One	Workmaster

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Chapter 1

Introduction, Description, and Specifications

Note

The information in this literature is offered as a helpful suggestion for experimentation you may want to undertake. It is intended as a guide for technically skilled persons to use at their own discretion and risk. GE Fanuc does not guarantee favorable results nor does it assume any liability in connection with its use. No statement or recommendation is intended by GE Fanuc for the use of information contained herein. Before using the products described herein, the user shall determine the suitability of the product(s) for his intended use, and user assumes all risk and liability whatsoever in connection therewith.

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This guide provides a description of the I/O connections that may be utilized with GE Fanuc's VMEbus product line.

Reference Material

Additional compatible I/O connector applications data is available from Framatone Connectors International (FCI). FCI offers a unique backpanel system that features an Insulation Displacement Contact (IDC) technique which can be applied to both flat cable connectors and round cable connectors. Framatone offers a 64-position round cable connector which fully complies with DIN 41612 (IEC 130-14) specifications, and is designed for IDC termination of round cable with 26 AWG solid wire conductors. Strain relief, connector covers, polarization, and latching is also possible if required. The reader should request a backpanel system brochure from the following source:

Framatone Connectors International (FCI)

FCI USA
825 Old Trail Road
Etters, Pennsylvania 17319
PH: 1-800-237-2374 (North America)
Internet: www.fciconnect.com/catalog/electronics_pt_04.asp

Harting Elektronik, Inc

Harting Elektronik, Inc. offers a 96-pin discrete wire cable connector that is compatible with the 96-pin board header connectors.

- Cable Connector - 09 03 096 3214
- Strain Relief/Housing - 09 03 096 0501
- Crimp Pin - 09 02 000 8484
- Left Latch - 09 02 000 9902
- Right Latch - 09 02 000 9903

Harting, Inc. of NA
1370 Bowes Road
Elgin, IL 60123
PH: (847) 741-1500
FAX: (847) 741-8257
Email: more.info@HARTING.com
Internet: www.harting.com

ITW Pancon

ITW Pancon offers 64- and 32-pin IDC ribbon cable connectors. For additional information, contact:

ITW Pancon
309 E. Crossroads Parkway
Bolingbrook, IL 60440
PH: (888) 515-2100 (U.S. and Canada)
(630) 972-6400 (International)
FAX: (630) 972-8900
Internet: www.itwpancon.com

Erni Components, Inc.

Erni Components, Inc. offers a wide variety of cables and cable connectors. For additional information, contact:

Erni Components, Inc.
12701 North Kingston Ave.
Chester, VA 23836
PH: (804) 530-5012
FAX (804) 530-5232
Email: info@ernicomponents.com
Internet: www.erni.com

Belden, Inc

Belden, Inc. offers a line of round-to-flat cable that incorporates the functional advantages of Vari-Twist flat cable with shielded and unshielded versions of round cable under one jacket. Belden's MASS-TER cable combines the features of conventional round cable optimum shielding, ease of installation, and longer reel lengths with the proven advantages of flat cable ease of mass termination, labor and space savings, and improved inspection time. MASS-TER cable is round in appearance with concealed flat sections clearly identified on the flexible PVC jacket. Contact:

Belden, Inc.
7701 Forsyth Blvd.
Suite 800
St. Louis, MO 63105
PH: (314) 854-8000
FAX: (314) 854-8001
Email: info@belden.com
Internet: bwcecom.belden.com

3M Electronic Products Division

For users who are required to meet class A and B FCC requirements and minimize ESD effects, a product is available from 3M that combines the flexibility of round cable with the easy termination characteristics of flat cable.

GE Fanuc recommends the use of shielded cables with several of its products. Shielded Input/Output (I/O) cables can greatly reduce or eliminate Electromagnetic Interference (EMI) and Electrostatic Discharge (ESD) problems. Applications data on 3M products may be obtained by contacting:

3M Electronic Products Division
3M Austin Center
Building A130-4N-36
6801 River Place Blvd.
Austin, TX 78726-9000
1-800-245-3573
(512) 984-5651 (International)
FAX: 1-800-245-0329
(512) 984-5771 (International)
Email: innovation@mmm.com
Internet: www.3M.com/interconnects
-or-
www.3M.com/esm

I/O Connections

A matrix of part numbers, manufacturers' strain relief options, and the number of pins per connector versus GE Fanuc's model numbers is shown in Table 1-1 on page 1-5.

Most of GE Fanuc's board-level products are manufactured with high-quality, high-reliability, and low mating force DIN connectors that are engineered to DIN 41612, MIL-C-55302, and IEC 130-14 specifications. These connectors are used primarily because they offer two offset corners on each male and female connector to prevent 180° mismatching.

Many GE Fanuc products are designed so the C row on the I/O printed circuit board connector is grounded to provide enhanced noise immunity and increased reliability. ITW Pancon provides the following series 120 female socket part numbers:

End Row Circuit Type	Type	Number of Contacts	Contact Arrangement	Part Number
End Circuit Row A	C	64	A + C/All	120-964-435D
	Half C	32	A + C/All	120-332-435D
End Circuit Row B	C	64	A + C/All	120-964-435D
	Half C	32	A + C/All	120-964-435D

These unique features provide the user with the flexibility and advantages of building a highly reliable system with extended service life that may be maintained efficiently by reducing the Mean-Time-To-Repair (MTTR). The connectors are designed to meet high standards by maintaining consistent electrical characteristics even after hundreds of mating cycles, exposure to corrosive environments, and vibration and shock tests up to 20 g (195.1 m/s/s).

Cable housings for male or female connectors are available to provide for single or double cable entry at the rear or side of the housing. To enhance the superior high-reliability design, snap wedges are available for additional vibration protection. For flat cable users, an optional strain relief is available. Many GE Fanuc products are manufactured with connectors that feature one length ejector/latch that is designed for use with or without the strain relief.

For users who require a simple solution to the problem of interfacing plant/instrument wiring to flat ribbon cable, the transition board provides a compact, cost-effective transition between field wiring and GE Fanuc I/O boards. Lift clamp-style terminal blocks are provided for attachment of field wiring, while two 64- or 96-pin DIN connectors are provided for connection to I/O boards. Mass-terminated flat cables may be used to connect between the transition panel and the I/O boards.

GE Fanuc has developed several system assembly diagrams (Figure 1-2 and Figure 1-3 on page 1-9, Figure 1-4 on page 1-10, Figure 1-5 on page 1-11, Figure 1-6 on page 1-12, and Figure 1-7 on page 1-13) to assist the Systems Integrator in designing and configuring systems based on GE Fanuc's products. These figures depict an organization of cables and cable assemblies that may be used as examples for building high-quality I/O subsystems.

Table 1-1: Connector Application Matrix

Model Number	Source	Header Soldered to PC Board	Compatible Connector	Compatible Strain Relief	No. of Pins
IC697VDD100	ERNI	913 216	913031		96
IC697VDQ120	ITW Pancon	120-964-033A	120-964-435	120-000-032	64
IC697VDR150 / IC697VDR151	ERNI	913 216	913 031		96
IC697VAL216 / IC697VAL232 IC697VAL264	ERNI	913 216	913 031		96
IC697VTM004 / IC697VTM008	PHOENIX	17-57-42-0	17-57-19-0		16
IC697VRD008	LMI	397948.92.000 FORM E	302432.100 FORM E		32
IC697VAL132 / IC697VAL134	LMI	397948.92.000 FORM E	302432.100 FORM E		32
IC697VAL348	ITW Pancon	120-332-033A	120-332-435	120-000-042	32
IC697VAL306	ITW Pancon	120-332-033A	120-332-435	120-000-042	32
IC697VAL301	ITW Pancon	120-964-033A	120-964-435	120-000-032	64
IC697VAL304 / IC697VAL308 / IC697VAL314 / IC697VAL318 / IC697VAL324 / IC697VAL328	LMI	397948.92.000 FORM E	302432.100 FORM E		32
IC697VRM015			2.5 mm ST-STYLE BAYONET		---

Figure 1-1: Example Transition Panel Installation

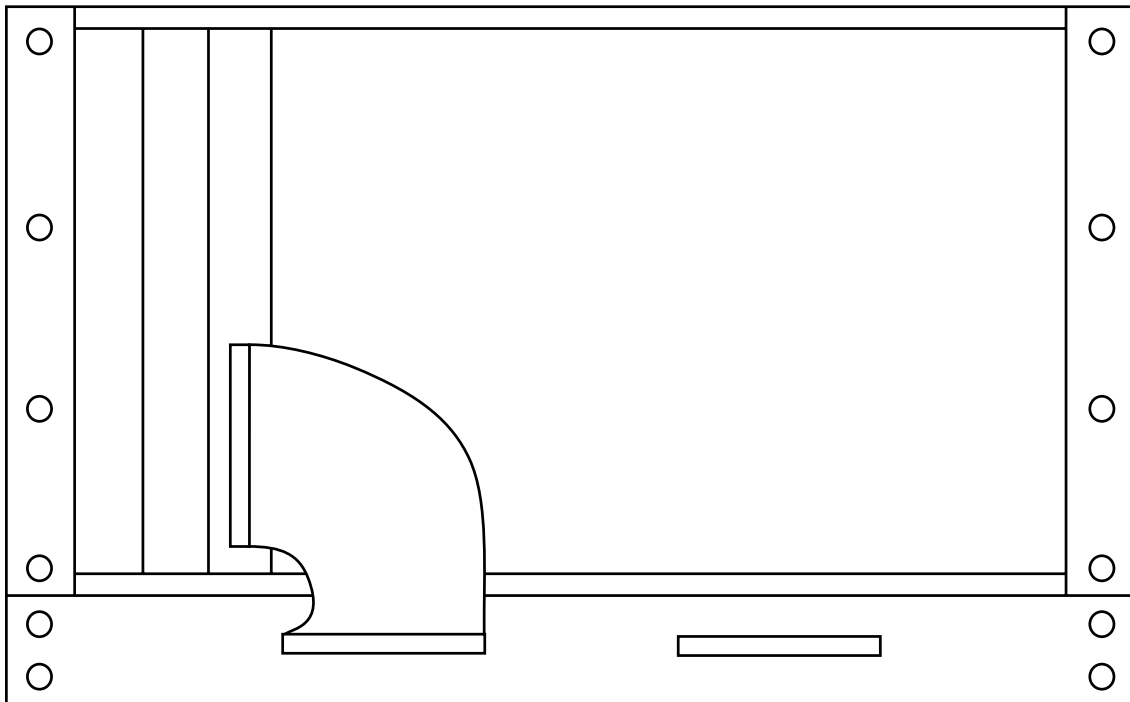


Figure 1-2: I/O Subsystem: Front View

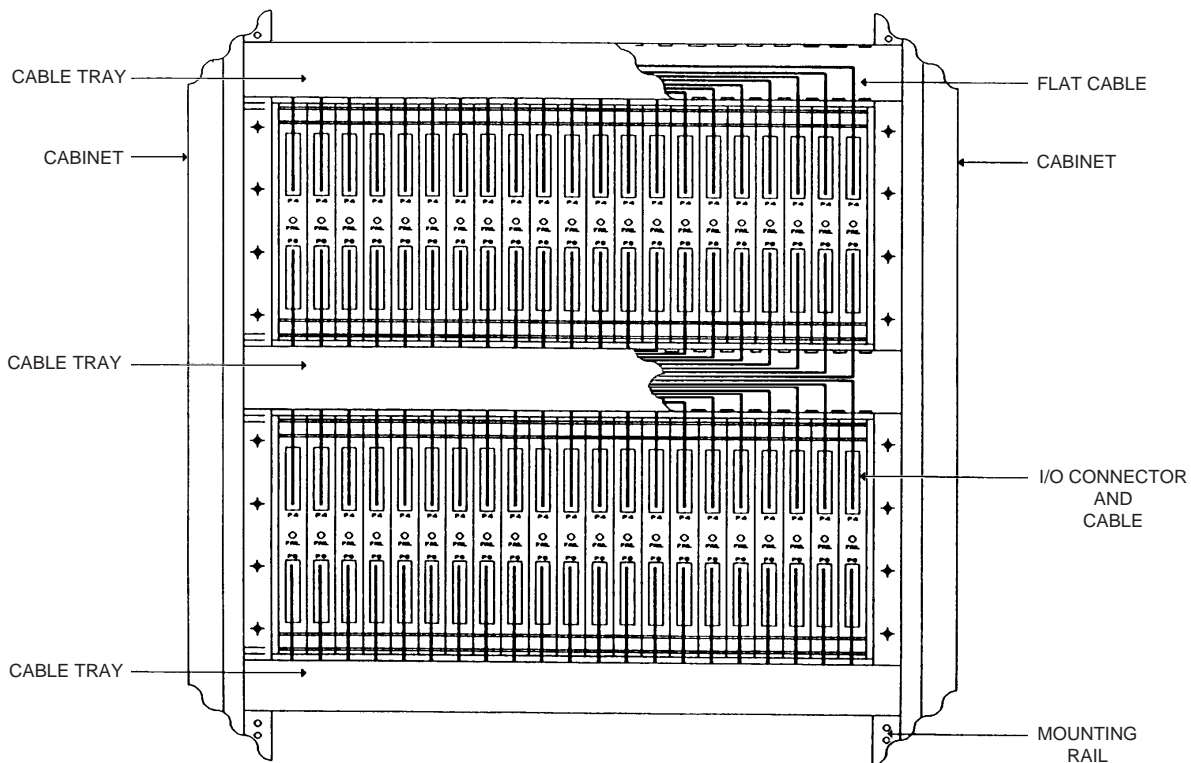


Figure 1-3: I/O Subsystem: Side View

BOARD CABLING EXAMPLE

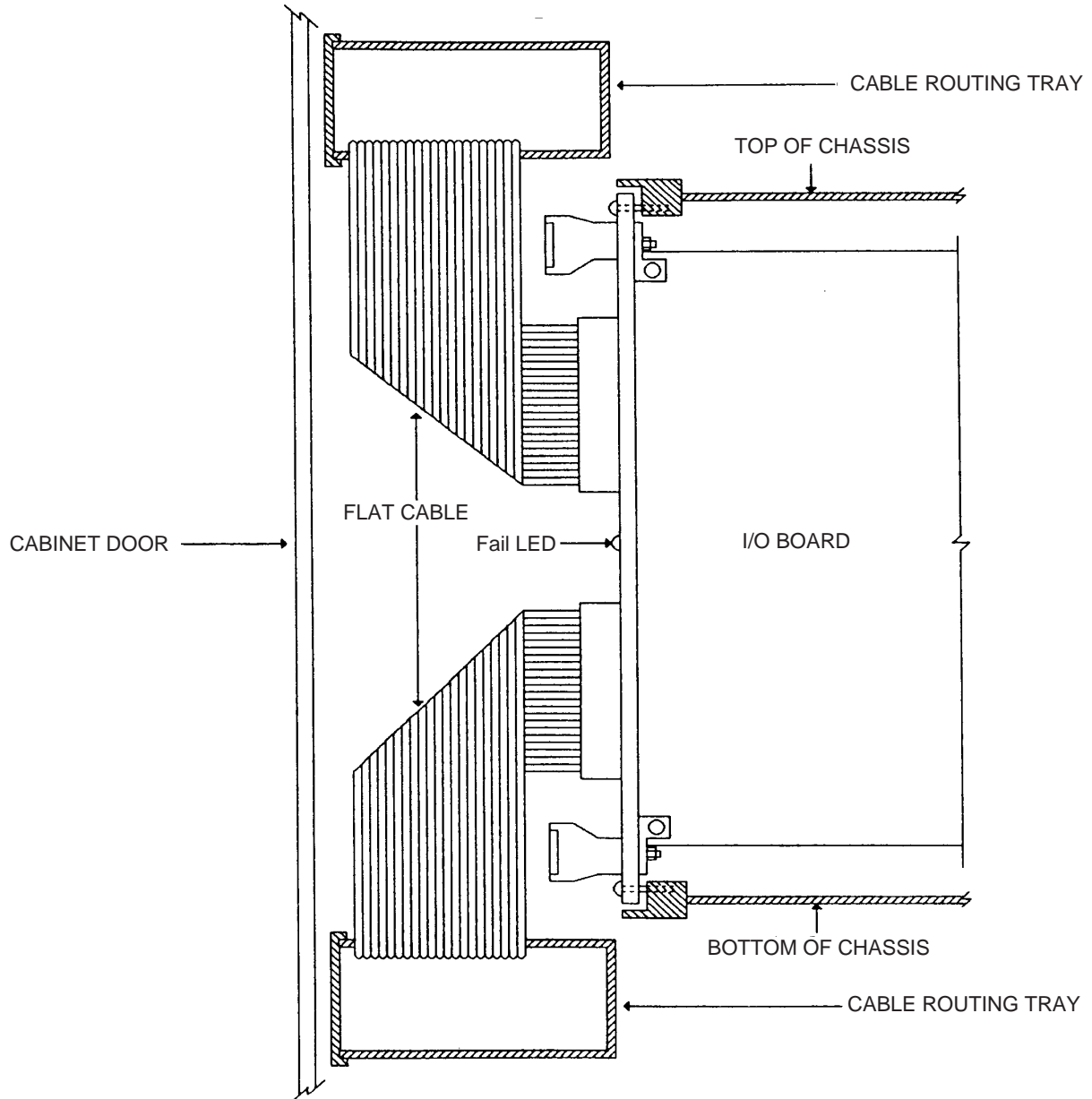
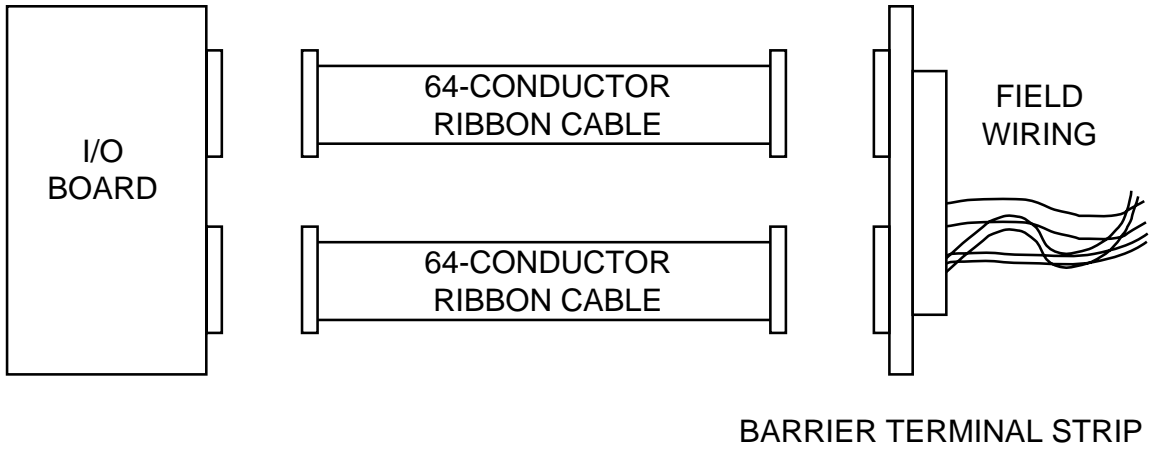
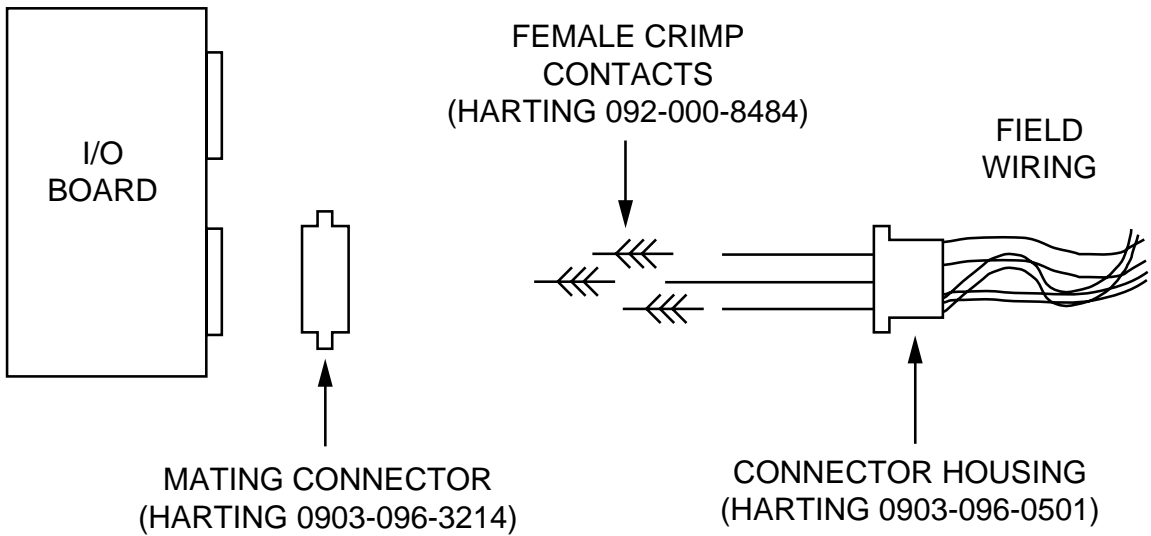


Figure 1-4: Example Board Termination Methods

MASS-TERMINATED INPUT

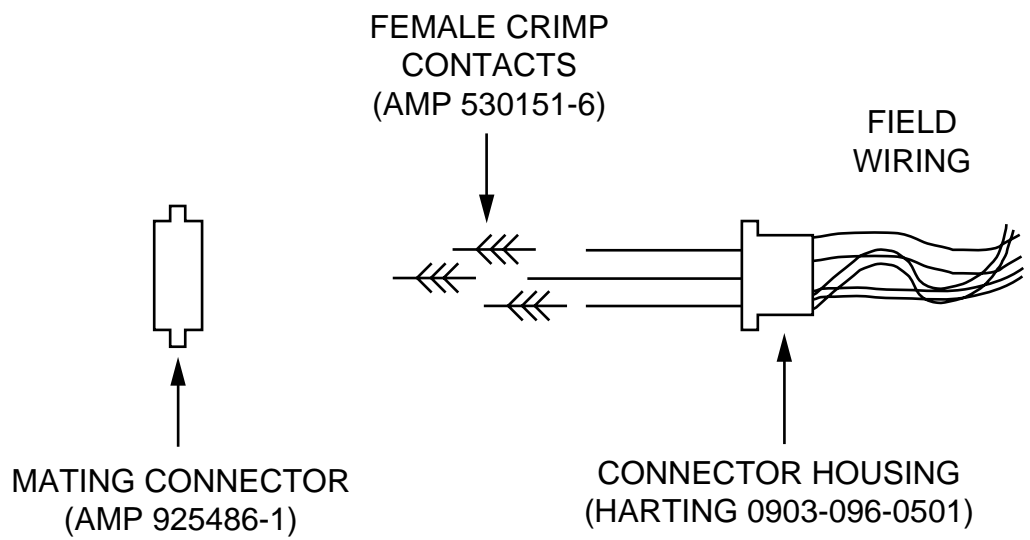


DISCRETE WIRE INPUT



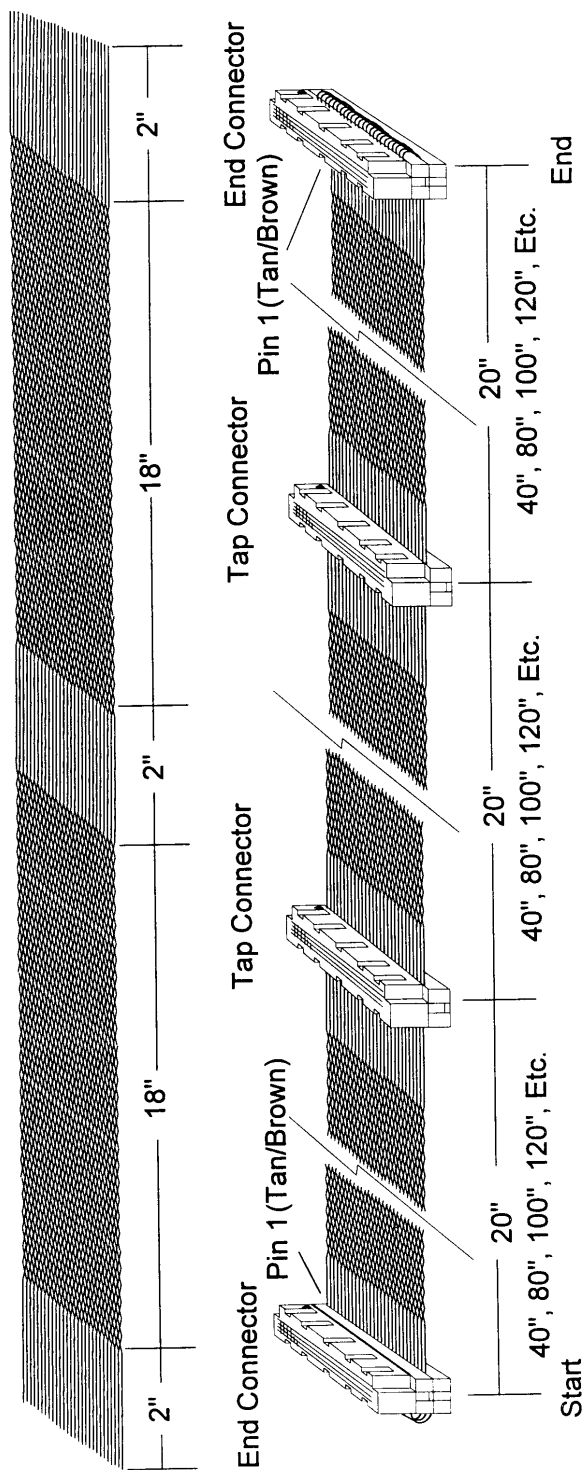
Female crimp pins are crimped to field wires and then inserted into the mating connector. The mating connector is then attached to the connector housing.

Figure 1-5: Alternate Discrete Wire Connection



Female crimp pins are crimped to field wires and then inserted into the mating connector. The mating connector is then attached to the connector housing.

Figure 1-6: Twist-n-Flat Cable Dimensions



This chapter provides information relative to the care and maintenance of GE Fanuc products.

If a product malfunctions, verify the following:

- Software
- System configuration
- Electrical connections
- Jumper or configuration options
- Boards fully inserted into their proper connector location
- Connector pins are clean and free from contamination
- No components of adjacent boards are disturbed when inserting or removing the board from the VMEbus card cage
- Quality of cables and I/O connections

User level repairs are not recommended. Contact your authorized GE Fanuc distributor for a Return Material Authorization (RMA) Number. **This RMA Number must be obtained prior to any return.**