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Fisher-Rosemount Systems

Maintaining Control I/O Subsystem

Maintenance Manual

MM2.0:CP6701

Revision F — December 1997

This manual supercedes Revision E dated November 1995. Revision D dated December 1994 is still valid for older Control I/O Termination Panels.

D5M00521602

CE *See CE Statement in Section 1*

Fisher-Rosemount Systems

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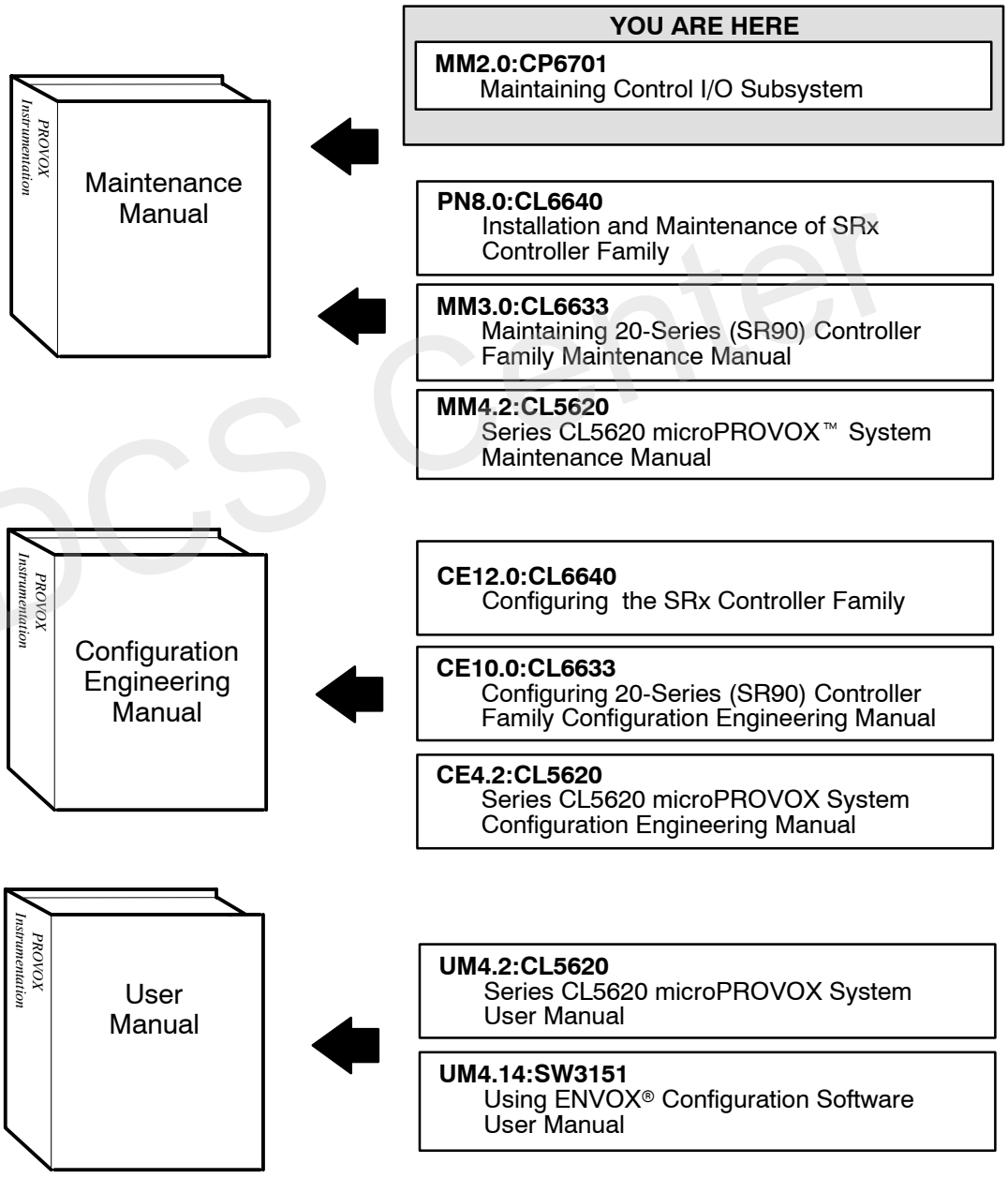
Documentation Map

Maintaining Control I/O Subsystem

This map shows manuals for the Type CP6701 Control I/O Subsystem. The number, title, and binder location are shown for each document, identifying where specific information is located. See the descriptions on the back of this map for more information. Section 1 lists additional related documentation.



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Fisher-Rosemount Systems

Section Tab Guide

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1 Introduction

1.1 Audience

This manual contains information required to maintain the Type CP6701 Control I/0 Subsystem. It is written for the maintenance technician who is familiar with control systems.

1.2 Products Discussed

This document deals with the Control I/O Subsystem and its components.

- Type CP6701 Control I/O Cardfile
- Type CL6721 Discrete I/O Card
- Type CL6821 Analog I/O Card
- Type CL6824 Analog Input Card
- Type CL6825 Smart Device Input Card (Refer to PN2.1:CL6825)
- Type CL6826 Smart Device Output Card (Refer to PN2.1:CL6825)
- Type CL6921 External Interface Card (Refer to PN2.1:CL6921)
- Type CL6923 Intelligent Device Interface Card (Refer to PN2.1:CL6923)
- Termination Panels
- Signal Conditioning Modules
- Miscellaneous hardware

1.3 CE Statement

CE

This manual describes installation and maintenance procedures for products which have been tested to be in compliance with appropriate CE directives. To maintain compliance, these products must be installed and maintained according to the procedures described in this document. Failure to follow the procedures may compromise compliance.

1.4 How to Use This Manual

This manual is written to help technicians at every level of experience. The comprehensive table of contents should provide ease of access to the material for reference.

1.5 Manual Contents

The contents of this document are listed below. with additional detail shown in the Table of Contents.

Section 1 — Introduction: includes the purpose of the document, the intended audience, and related documents.

Section 2 — Introduction to Control I/O Subsystem: scope of manual, product description and specifications.

Section 3 — Theory of Operation

Section 4 — Preventive Maintenance

Section 5 — Fault Isolation and Corrective Maintenance

Section 6 — Removal and Installation Procedures

Glossary — Contains definitions, acronyms, and abbreviations of process control terms

1.6 Related Documents

All documents relating to the Type CP6701 Control I/O Subsystem are listed below:

- *Planning the Installation* (PN1:002)
- *AC and DC Power and Ground Wiring* (PN1:003)
- *Signal Wiring and Data Highway Guidelines* (PN1:004)
- *Environmental Conditions for Instrumentation Systems* (PN1:006)
- *Lightning Protection Guidelines for Instrumentation Systems (PN1:007)*
- *Installing Control I/O Subsystem* (PN2.1:CP6701)
- *Series CL5620 microPROVOX™ System Maintenance Manual (MM4.2:CL5620)*
- *DH7080-Series Data Highway Products* (Bulletin 4.10:DH7080)

- *PROVOX® Highway II Communications System* (Bulletin BU4.10:010)
- *Installation and Maintenance of Type CL6825 Smart Device Input and CL6826 Smart Device Output Cards* (PN2.1:CL6825)
- *Installation and Maintenance of Type CL6923 Intelligent Device Interface (IDI)* (PN2.1:CL6923)
- *Installation and Maintenace of Type CL6921 External Interface Card* (PN2.1:CL6921)
- *Integrating Smart Devices into PROVOX Systems* (TR3.0:CL6825)

1.7 Manual Conventions

The following conventions are used in this document:

Abbreviations — Standard abbreviations and symbols are used throughout this manual. Instances where non-standard abbreviations or acronyms are used, will be explained at the first usage.

Revision Control — The title page of each document lists the printing date and any supersedure notice.

Cross References — References to other documents for additional information list the document name and number.

1.8 Warnings, Cautions and Notes

Warnings, Cautions, and Notes attract attention to essential or critical information in this manual. The types of information included in each are explained in the following:

Warning

All warnings have this form and symbol. Do not disregard warnings. They are installation, operation, or maintenance procedures, practices, conditions, statements, and so forth, which if not strictly observed, may result in personal injury or loss of life.

Caution

All cautions have this form and symbol. Do not disregard cautions. They are installation, operation, or maintenance procedures, practices, conditions, statements, and so forth, which if not strictly observed, may result in damage to, or destruction of, equipment or may cause a long term health hazard.

Warning

This caution label appears on some products. It indicates the need to refer to accompaning product documentation.

Note

Notes have this form and symbol. Notes contain installation, operation, or maintenance procedures, practices, conditions, statements, and so forth, that alert you to important information which may make your task easier or increase your understanding.

1.9 Excellence in Documentation

Our goal is to provide our customers with documents that meet your needs. Through surveys and interviews, we continually evaluate our documents as part of the broad Fisher-Rosemount Systems customer support program. Various documents are produced for different purposes and for readers with varying backgrounds and experience.

To assist us in evaluating how well this manual fills your needs, please complete the survey form included inside the back cover. If you have suggestions on ways to improve any page of the document, please mark your suggestions on a copy of the page and enclose the copy with the survey.

1

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2 Introduction to Control I/O Subsystem

2.1 Scope of Manual

This manual describes the maintenance of the Type CP6701 Control I/O Subsystem, its cardfile, I/O cards (except as noted), termination panels, and modules. The discussion includes a description of the unit and its components, interaction with the control unit, theory of operation, preventive maintenance, fault isolation and corrective maintenance, and removal and installation procedures with replacement parts list.

2.2 General Description

The Control I/O Subsystem consists of:

- Type CP6701 Control I/O Cardfile
- Type CL6721 Discrete I/O Card
- Type CL6821 Analog I/O Card
- Type CL6824 Analog Input Card
- Type CL6825 Smart Device Input Card (Refer to PN2.1:CL6825)
- Type CL6826 Smart Device Output Card (Refer to PN2.1:CL6825)
- Type CL6921 External Interface Card (Refer to PN2.1:CL6921)
- Type CL6923 Intelligent Device Interface (Refer to PN2.1:CL6923).
- Termination Panels
- Signal Conditioning Modules
- Miscellaneous hardware

The control I/O subsystem allows the customer to position the cardfile and termination panels outside the control room, closer to field devices. The cardfile is rack mountable, and provides power and grounding for the control I/O cards. The control I/O subsystem is also available with redundant capabilities. Figure 2-1 shows the simplex configuration of the control I/O subsystem.

2.3 Type CP6701 Control I/O Cardfile Description

The Type CP6701 Control I/O cardfile consists of:

- Cardfile
- Backplane
- Power Connection Card
- Power/Communications Card

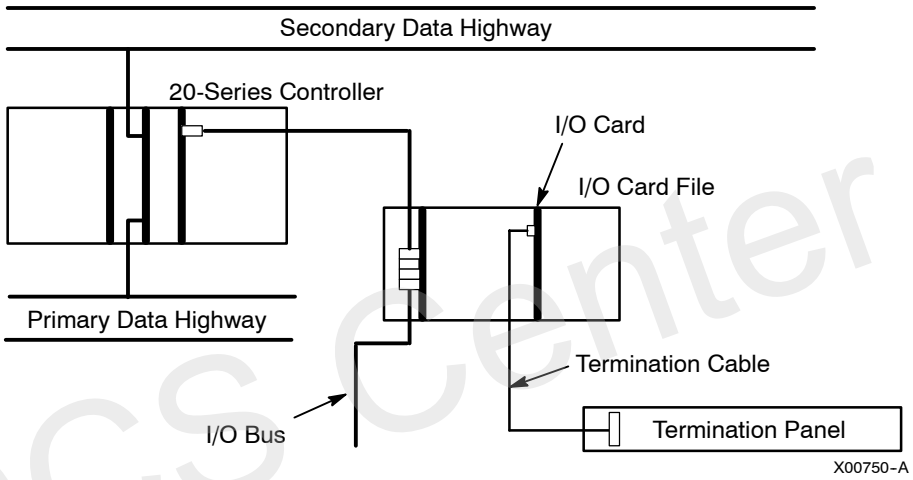

Figure 2-1 20-Series Controller and Simplex Control I/O

2.3.1 Cardfile and Backplane

The cardfile (Figure 2-2) mounts on standard 19-inch EIA rails in a system cabinet and supplies all internal connections for as many as 14 I/O cards. In addition, each cardfile provides space for a plug-in primary and optional backup power/communications card and one power connection card.

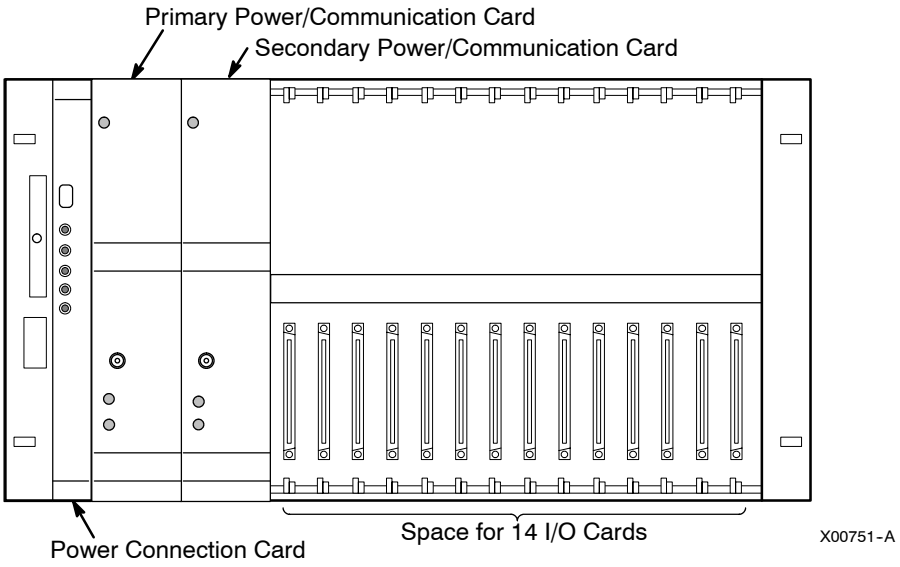

Figure 2-2 Control I/O Cardfile Layout

2.3.2 Power Connection Card

Caution

Do not remove or install the Power Connection card with power applied. Disconnect power to the unit or remove Power/Communications card(s) first.

The power connection card shown in Figure 2-3, has screw terminals for connecting 24 volt dc power and alarm signals to the cardfile. The file address select switches are located on the front edge of the card. ***Each file must have a unique address.*** Ensure that the switches (Table 2-1) are set for the proper address prior to activating the unit.

The test points (Figure 2-3) on the front of the power connection card can be used to check the cardfile voltages. Use a voltmeter across the test points to check voltage levels.

2

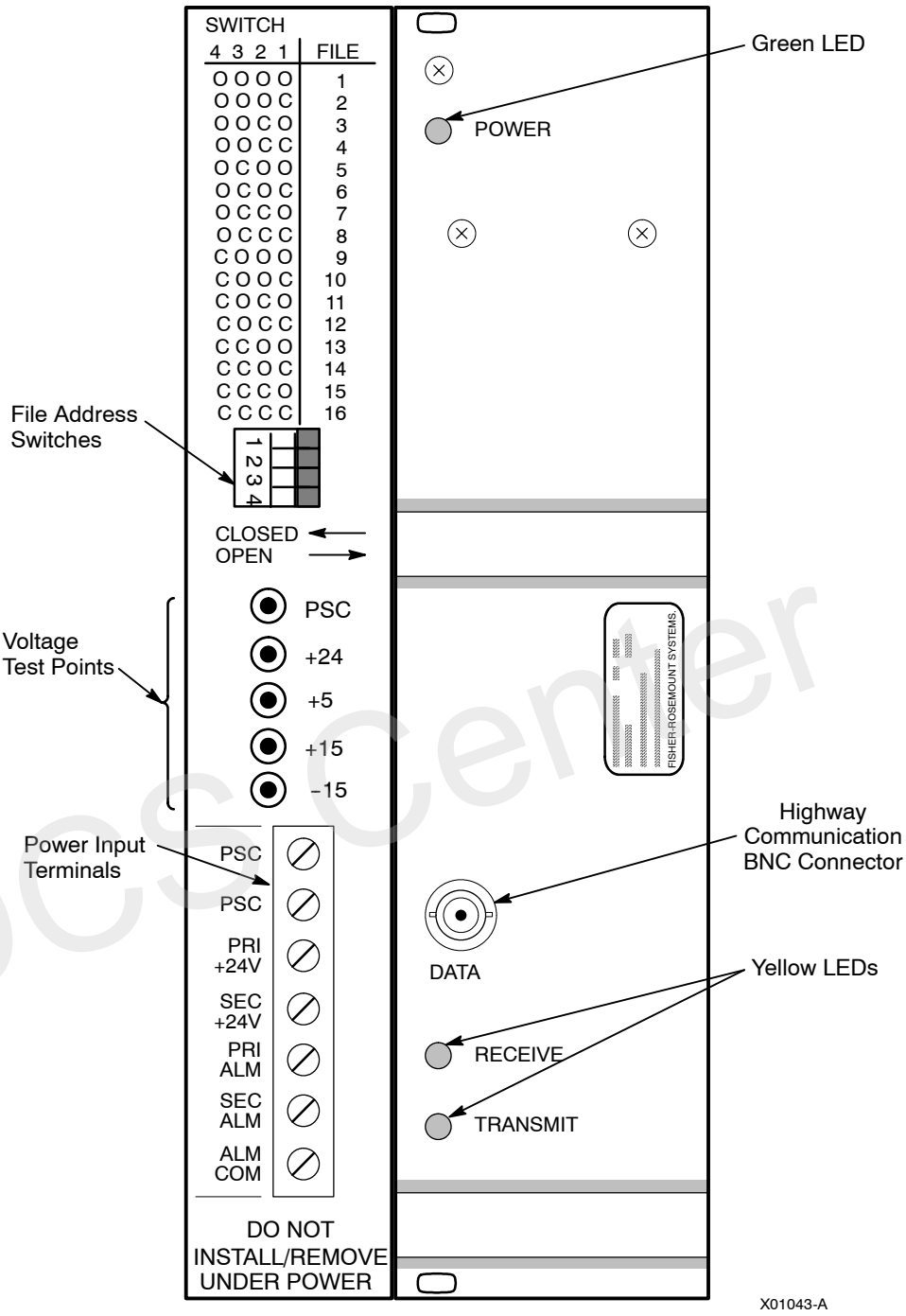

Figure 2-3 Power Connection and Power/Communications Cards

Table 2-1 Cardfile Address Switch Settings

File Address	Switch Settings			
	4	3	2	1
1	OPEN	OPEN	OPEN	OPEN
2	OPEN	OPEN	OPEN	CLOSED
3	OPEN	OPEN	CLOSED	OPEN
4	OPEN	OPEN	CLOSED	CLOSED
5	OPEN	CLOSED	OPEN	OPEN
6	OPEN	CLOSED	OPEN	CLOSED
7	OPEN	CLOSED	CLOSED	OPEN
8	OPEN	CLOSED	CLOSED	CLOSED
9	CLOSED	OPEN	OPEN	OPEN
10	CLOSED	OPEN	OPEN	CLOSED
11	CLOSED	OPEN	CLOSED	OPEN
12	CLOSED	OPEN	CLOSED	CLOSED
13	CLOSED	CLOSED	OPEN	OPEN
14	CLOSED	CLOSED	OPEN	CLOSED
15	CLOSED	CLOSED	CLOSED	OPEN
16	CLOSED	CLOSED	CLOSED	CLOSED

2.3.3 Power/Communications Card

The power/communications card converts the 24 volt dc to the voltages required by the control I/O cards. It also operates an alarm relay to indicate low or high output voltage. The alarm circuit actuates a card shutdown if in the alarm mode for more than 200 ms. The relay contacts are isolated, normally open and have a resistive load rating of 3 A at 29 Vdc. An illuminated green LED located on the front bezel indicates that all outputs are within specification. These voltages are:

- +5 volts dc (4.99 to 5.21)
- +15 volts dc (14.60 to 15.50)
- –15 volts dc (–14.60 to –15.50)
- +24 volts dc (20.0 to 28.0)

The power/communications card draws 300 mA from the system 24V.

Two yellow LEDs on the front bezel of later models, provides communication transmit and receive status. The power/communications card also passes serial data signals between the 20-Series Controller I/O Driver and the I/O cards.

2.3.4 Serial I/O Bus

A coaxial cable connects the cardfile to the 20-Series SR90 Controller. This cable is the serial I/O bus and can be as long as 5000 feet (1524 m). This cable is the same type used for the data highway and requires the same considerations. Refer to the bulletin for the DH7080-Series Data

Highway Products and PN1:004, Signal Wiring and Data Highway Guidelines.

2.4 24 Vdc Power Consumption

The current drawn from the system 24 V by the Type CP6701 cardfile is calculated by adding the 24 Vdc drawn by each I/O card and each power/communications card in the cardfile.

2.5 CL6700-Series Discrete Input/Output Products

The CL6700-Series Discrete Input/Output Products consist of:

- Type CL6721 Discrete I/O Card
- Termination Panels
- Signal Conditioning Modules
- Type CL6741 Discrete Cable Interface Panel
- Termination Cables

2.5.1 Type CL6721 Discrete I/O Card

Note

The mixing of high and low voltage discretes on the same termination panel is not recommended.

The Type CL6721 Discrete Input/Output (I/O) Card is a microprocessor-based interface that provides communication between various termination panels and a 20-Series controller. The card communicates with the controller via a serial I/O bus. The card can be configured to provide one of the following:

- 16 discrete channels individually configurable as inputs or outputs.
- 16 discrete relay output channels, either latching or momentary in groups of eight (1 through 8 or 9 through 16). Once a latching or momentary is defined in a group, the remaining channels in that group must be the same or configured as discrete inputs.
- 8 pulse-count input channels.

- 8 time-proportional output channels.

The discrete I/O card installs in any one of 14 slots in the Type CP6701 Control Input/Output cardfile.

Channels configured as outputs are capable of driving output relays or signal conditioning modules on the termination panel. Readback circuitry for each channel allows output verification. A separate status signal verifies that the termination panel is connected.

Channels configured as inputs check each channel to detect the input voltage from the termination panel signal conditioning modules. A separate status signal verifies that the termination panel is connected.

For pulse count applications, there are individual eight-bit counters which allow the card to count the pulses from the termination panel signal conditioning modules. The counters can be read individually by the microprocessor unit (MPU).

The discrete I/O card plugs into a 32-pin DIN connector on the cardfile backplane. The power/communications card and the backplane connector supply voltages necessary to drive the discrete I/O circuits.

A 37-pin female D-shell connector on the front edge of the I/O card provides the path for communications with its termination panel.

Two LEDs are mounted on the front edge of the card. The green LED indicates the self-test status and the yellow LED indicates activity status.

A momentary pushbutton switch mounted on the front edge of the card is used to force switchover to the standby card in redundant configurations.

2.5.2 Termination Panels

Each discrete I/O card requires one of six termination panels. The customer's application determines the appropriate termination panel. The panels mount on standard 19 inch (493 mm) rails and require a minimum depth of 4 inches (102 mm). The panels are:

- Type CL6763 Pulse Count Input Termination Panel
- Type CL6764 Redundant Pulse Count Input Termination Panel
- Type CL6775 Relay Output Termination Panel
- Type CL6776 Redundant Relay Output Termination Panel
- Type CL6787 Discrete Input/Output Termination Panel
- Type CL6788 Redundant Discrete Input/Output Termination Panel

Each termination panel contains terminals, fuses and power indicators for both primary (PRI +24V) and secondary (SEC +24V) power supplies.

Ensure proper connection of power and ground as improper installation could result in improper operation of the termination panels. If only one power supply is used, connect it to the PRI +24V and PSC terminals and install a jumper between the PRI +24V and SEC +24V terminals. The terminal block connectors provided will accommodate one 12 or two 14 AWG wires.

In addition to the power connections, each termination and cable interface panel has two terminals labeled **SHLD** and **GND**. Connect the **SHLD** terminal to cabinet ground.

The Type CL6763 and Type CL6764 Pulse Count Input Termination Panels provide field inputs for up to eight channels. Two green LED indicators provide status of the primary and secondary +24 VDC input power.

The Type CL6775 and Type CL6776 Relay Output Termination Panels provide relay contact outputs for up to 16 channels. Two green LED indicators provide status of the primary and secondary 24 Vdc input power. One yellow LED (internal to the relay module) is provided to indicate the status of the relay. A varistor (internal to the relay module) accross each set of output contacts provides arc suppresion. Channel output fusing is internal to the conditioning module.

The Type CL6787and Type CL6788 Discrete Input/Output Termination Panels provide 16 channels of inputs or outputs. Two green LED indicators provide status of the primary and secondary 24 Vdc input power. One yellow LED (internal to the module) is provided for each of the 16 signal conditioning modules to indicate the module is in the active state. Fusing of the outputs is internal to the conditioning module.

2.5.3 Signal Conditioning Modules

Type CL6753 Discrete Input Signal Conditioning Modules are used for input applications. The input modules are:

- CL6753X1-A2 — Low-level Fast DC Input
- CL6753X1-A5 — 120 Vac or Vdc Input
- CL6753X1-A6 — 240 Vac or Vdc Input
- CL6753X1-A10 — Low-level Slow DC Input
- CL6753X1-A11 — Vortex DC Input
- CL6753X1-A12 — Contact Input

Type CL6754 Discrete Output Signal Conditioning Modules are used for output applications. The output modules are:

- CL6754X1-A2 — Voltage Switching DC Output

- CL6754X1-A3 — 120 Vac Output
- CL6754X1-A4 — 240 Vac Output
- CL6754X1-A5 — 120 Vac Output with Integral MOV
- CL6754X1-A6 — 240 Vac Output with Integral MOV
- CL6754X1-A7 — Current Sinking DC Output

The Type CL6755 Mechanical Relay Module is used on the CL6775 and CL6776 Termination Panel.

- CL6755X1-A1 — 5 Amp Mechanical Relay Module

2.5.4 Type CL6741 Discrete Cable Interface Panel

The discrete I/O card can be configured as simplex or redundant. In a redundant configuration the card can be used as the primary card or as a backup. One backup can provide redundancy for as many as eight primary cards. To use the 1 for N redundancy feature, where N = two to eight, the Type CL6741 Discrete Input/Output Cable Interface Panel is required. When there is 1 for 1 redundancy, no cable interface panel is required.

2.5.5 Discrete I/O Specifications

Table 2-2 Discrete I/O Specifications

POWER REQUIREMENTS I/O Card: +24 volts dc at 100 milliamps

Terminations: all panels +24 volts dc

Type CL6763 Pulse Count Input	30 mA *
Type CL6764 Redundant Pulse Count Input	50 mA *
Type CL6775 Relay Output	30 mA **
Type CL6776 Redundant Relay Output	75 mA **
Type CL6787 Discrete I/O	30 mA ***
Type CL6788 Redundant Discrete I/O	110 mA ***

* Add 40 mA for each module installed. Also add current required by each Vortex Flowmeter connected and powered by +24 Vdc field circuit terminals on the termination panel.
** Add 40 mA for each relay module installed.
*** Add 40 mA for each module installed except Type CL6754-7. Add 200 mA for each Type CL6754-7 module installed.

SWITCHES One momentary switch for redundancy switchover

ELECTRICAL CLASSIFICATION Refer to the Nonhazardous Area Classification Bulletin, PS4.7:001 (A1)

OPERATING CONDITIONS

Conditions	Reference Limits[1]	Normal Limits[1]	Operative Limits[1]	Transport & Storage Limits[1]
Ambient Temperature[1]	73 to 81°F (23 to 27°C)	41 to 131°F (5 to 55°C)	32 to 131°F (0 to 55°C)	-40 to 149°F (-40 to 65°C)
Max Temperature Variation	3.5°F per hr (2°C per hr)	36°F per hr (20°C per hr)	9°F per min (5°C per min)	18°F per min (10°C per min)

Table 2-2 Discrete I/O Specifications (Continued)				
Ambient Relative Humidity (without condensation)	35 to 45%	10 to 90%	5 to 95%	5 to 95%
Max Relative Humidity Variation	6% per hr	6% per hr	6% per hr	6% per hr
1. Terms defined in ISA Standard S51.1–1979				
ELECTRO MAGNETIC COMPATIBILITY	Complies with Europeon Standards EN50081-2:1993 and EN0082-2:1995			
SIZE and WEIGHT	Discrete I/O Card: 8.66 inches x 9.18 inches (220 mm x 233 mm), 14 ounces (397 grams) Termination Panels: Type CL6763 Pulse Count Input Termination Panel Type CL6764 Redundant Pulse Count Input: Termination Panel Type CL6775 Relay Output Termination Panel Type CL6776 Redundant Relay Output Termination Panel Type CL6787 Discrete Input/Output Termination Panel Type CL6788 Redundant Discrete Input/Output Termination Panel All: 5.25 inches x 19 inches (133mm x 483 mm) (3 rack units) 3.25 pounds (1.48 kg)			

2.6 CL6800-Series Analog Input/Output Products

The CL6800-Series Analog Input/Output Products consist of:

- Type CL6821 Analog I/O Card
- Type CL6824 Analog Input Card
- Termination Panels
- Termination Cables
- Signal Conditioning Modules
- Type CL6841 Analog Input Cable Interface Panel
- Type CL6842 Analog Output Cable Interface Panel
- Type CL6891 Analog Calibration Adapter

2.6.1 Type CL6821 Analog I/O Card

The Type CL6821 Analog Input/Output (I/O) Card is a microprocessor-based card that provides the interface between various input/output termination panels and a 20-Series Controller. The I/O card, which fits into any one of 14 slots in the Type CP6701 Control I/O Cardfile, communicates with the controller via a serial I/O bus.

The analog I/O card has an eight-channel output port. Each output channel has an analog readback circuit that detects current flowing in the

output loop to verify operation. A separate status signal verifies that the termination panel is properly connected. Output channels use a dedicated 25-pin male D-shell connector on the card edge.

The analog I/O card has an input port which provides sixteen input channels. Each input channel has an analog readback circuit that detects current flowing in the input loop to verify operation. A separate status signal verifies that the termination panel is properly connected. Input channels use a dedicated 37-pin male D-shell connector on the card edge.

2.6.2 Termination Panels

Each analog I/O card requires one of eight termination panels. The customer's application determines the appropriate termination panel.

- Type CL6861 Simplex Single-Ended Analog Input Termination Panel
- Type CL6862 Redundant Single-Ended Analog Input Termination Panel
- Type CL6885 Simplex Analog/SMART Device Output Termination Panel
- Type CL6886 Redundant Analog/SMART Device Output termination panel.
- Type CL6895 Simplex Single-Ended/SMART Device Input Termination Panel.
- Type CL6896 Redundant Single-Ended/SMART Device Input Termination Panel.
- Type CL6897 Simplex Isolated Analog Input Termination Panel.
- Type CL6898 Redundant Isolated Analog Input Termination Panel.

Each termination panel contains terminals, fuses and power indicators for both primary (PRI +24V) and secondary (SEC +24V) power supplies. Ensure proper connection of power and ground as improper installation could result in improper operation of the power LEDs. If only one power supply is used, connect it to the PRI +24V and PSC terminals and install a jumper between the PRI +24V and SEC +24V terminals. The terminal block connectors provided will accommodate one 12 or two 14 AWG wires.

In addition to the power connections, each termination and cable interface panel has two terminals labeled **SHLD** and **GND**. Connect the **SHLD** terminal to cabinet ground through either a mounting screw or a grounding stud on the back plate.

The Type CL6861 and Type CL6862 Single-Ended Analog Input Termination Panels provide field termination for as many as 16, 1 to 5 volt

or 4 to 20 milliamp analog input channels. Two green LED indicators are provided to indicate the status of the primary and secondary 24 Vdc input power.

The Type CL6885 and Type CL6886 Analog/SMART Device Output Termination Panel provides termination for eight output channels. Output will be 4 to 20 milliamps or 1 to 5 volts dc, with the addition of a range resistor (receptacle provided) on a channel by channel basis. The CL6886 termination panel requires 24 Vdc to power the redundancy relays. Two green LED indicators are provided to indicate the status of the primary and secondary 24 Vdc input power.

The Type CL6895 and Type CL6896 Single-Ended/SMART Device Input Termination Panels provide field termination for up to 16, 1 to 5 Volt or 4 to 20 milliamp analog or HART input channels. The function of the panels is dependent on ths signal conditioning modules installed on the panel. Up to eight dual channel CL6859X1-A1 Single-Ended input or up eight dual channel CL6859X1-A2 SMART Device Inout Modules must be installed on the termination panel. Migration from Single-Ended analog Inputs to HART input is accomplished by changing the I/O card and replacing the Single-Ended Input Modules with SMART Device Input Modules. No action is required for the field wiring. Both module types provide current limited transmitter power outputs. Two green LED indicators are provided to indicate the status of the primary and secondary 24 Vdc input power.

The Type CL6897 and Type CL6898 Isolated Analog Input Termination Panels provide field termination for 16 channels. The type and range of analog inputs is dependent on the type of signal conditioning module used on each channel. Each input is protected from surge current.

2.6.3 Signal Conditioning Modules

Note

High-level modules without isolation are normally used when field input devices are already isolated. High-level modules with isolation are used when input field devices are not isolated from the PROVOX® System ground.

Signal conditioning modules are required for the CL6897 and CL6898 Isolated Analog Input Termination Panels and CL6895 and CL6896 Single-Ended SMART Device Input Termination Panels. The input modules are:

- Type CL6855 High Level/High Level Isolated (1500Vrms common-mode)Analog Input Signal Conditioning Modules for use with CL6897 and CL6898:
  - CL6855X1-A4 — 1 to 5V non-isolated
  - CL6855X1-A5 — 4 to 20 mA non-isolated
  - CL6855X1-A6 — 0 to 10V Isolated
  - CL6855X1-A7 — 1 to 5V Isolated
  - CL6855X1-A8 — 4 to 20 mA Isolated
- Type CL6856X1-A2 — -10 to 70mV Isolated Low-Level voltage input for use with CL6897 and CL6898.
- Type CL6857 RTD Input Signal Conditioning Modules for use with CL6897 and CL6898:

  100 ohm platinum with temperature coefficients 0.00392 ohms/^{o}C
  - CL6857X1-A14 — (-270 to 140^{o}F) RTD Input
  - CL6857X1-A15 — (-148 to 211^{o}F) RTD input
  - CL6857X1-A16 — (-100 to 600^{o}F) RTD input
  - CL6857X1-A17 — (32 to 392^{o}F) RTD input
  - CL6857X1-A18 — (32 to 1112^{o}F) RTD input
  - CL6857X1-A19 — (100 to 500^{o}F) RTD input

  100 ohm platinum with temperature coefficients 0.00385 ohms/^{o}C
  - CL6857X1-A20 — (-270 to 140^{o}F) RTD input
  - CL6857X1-A21 — (-148 to 211^{o}F) RTD input
  - CL6857X1-A22 — (-100 to 600^{o}F) RTD input
  - CL6857X1-A23 — (32 to 392^{o}F) RTD input
  - CL6857X1-A24 — (32 to 1112^{o}F) RTD input
  - CL6857X1-A25 — (100 to 500^{o}F) RTD input

  10 ohm copper
  - CL6857X1-A26 — (32 to 300^{o}F) Non-Isolated RTD input
- Type CL6858 Standard Isolation (1500Vrms common-mode)Thermocouple Input Signal Conditioning Modules for use with CL6897 and CL6898:
  - CL6858X1-A19 — Type J (-148 to 1400 ^{o}F)
  - CL6858X1-A20 — Type J (-60 to 640 ^{o}F)
  - CL6858X1-A21 — Type K (-148 to 2462 ^{o}F)

- CL6858X1-A22 — Type K (0 to 1000 °F)
- CL6858X1-A23 — Type R (32 to 3182°F)
- CL6858X1-A24 — Type T (–300 to 600°F)
- CL6858X1-A25 — Type E (–100 to 1600°F)
- CL6858X1-A26 — Type B (32 to 3272°F)
- CL6858X1-A27 — Type S (32 to 3182°F)

- Type CL6858 100 Vrms Common-Mode Isolation Thermocouple Input Signal Conditioning Modules for use with CL6897 and CL6898:
  - CL6858X1-A28 — Type J (-148 to 1400°F)
  - CL6858X1-A29 — Type J (-60 to 640°F)
  - CL6858X1-A30 — Type K (-148 to 2462°F)
  - CL6858X1-A31 — Type K (0 to 1000°F)
  - CL6858X1-A32 — Type R (32 to 3182°F)
  - CL6858X1-A33 — Type T (-300 to 600°F)
  - CL6858X1-A34 — Type E (-100 to 1600°F)
  - CL6858X1-A35 — Type B (32 to 3272°F)
  - CL6858X1-A36 — Type S (32 to 3182°F)
- Type CL6859 Analog/SMART Device Input Modules for use with CL6895 and CL6896:
  - CL6859X1-A1 — Single-Ended Analog Input
  - CL6859X1-A5 — SMART Device Input

2.7 Type CL6841 and Type CL6842 Cable Interface Panels

The analog I/O card can be configured as simplex or redundant. In a redundant configuration the card can be used as the primary card or as a backup. One backup can provide redundancy for as many as eight primary cards. To use the 1 for N redundancy feature, where N = 2 to 8, the Type CL6841 Analog Input Cable Interface Panel (for input configurations) or Type CL6842 Analog Output Cable Interface Panel (for output configurations) is required. When there is 1 for 1 redundancy, no cable interface panel is required.

2.8 Termination Cables

Cables connecting the I/O card to the termination panel, with or without the cable interface panel, may not exceed a total of 200 feet (61 m).

When calculating cable length for redundant systems, add the length of the cable from the I/O card to the interface panel to the length of the longest termination panel to interface panel cable.

Apply the 200 foot (61 m) requirement separately to 25-pin and 37-pin cables.

2.9 Type CL6824 Analog Input Card

The Type CL6824 Analog Input (AI) Card is a microprocessor- based card that provides the interface between various input termination panels and a 20-Series Controller. The input card, which fits into any one of 14 slots in the Type CP6701 Control I/O Cardfile, communicates with the controller through the serial I/O bus.

The analog input card has an input port which provides sixteen input channels. A separate status signal verifies that the termination panel is properly connected. Input channels use a dedicated 37-pin male D-shell connector on the card edge. 1 : N redundant configurations require the 25-pin connector.

2.9.1 Termination Panels

Each analog input card requires one of six termination panels. The customer's application determines the appropriate termination panel. The panels mount on standard 19 inch (493 mm) rails and require a minimum of 4 inches (102 mm) depth.

- Type CL6861 Simplex Single-Ended Analog Input Termination Panel
- Type CL6862 Redundant Single-Ended Analog Input Termination Panel
- Type CL6895 Simplex Single-Ended/SMART Device Input Termination panel
- Type CL6896 Redundant Single-Ended/SMART Device Input Termination panel
- Type CL6897 Simplex Analog Input Termination Panel
- Type CL6898 Redundant Analog Input Termination Panel

Each termination panel contains terminals, fuses and power indicators for both primary (PRI +24V) and secondary (SEC +24V) power supplies. Ensure proper connection of power and ground as improper installation could result in improper operation of the power LEDs. If only one power supply is used, connect it to the PRI +24V and PSC terminals and install a jumper between the PRI +24V and SEC +24V terminals. The terminal block connectors provided will accommodate one 12 or two 14 AWG wires.

In addition to the power connections, each termination and cable interface panel has two terminals labeled **SHLD** and **GND**. Connect the **SHLD** terminal to cabinet ground through either a mounting screw or a grounding stud on the back plate.

The Type CL6861 and Type CL6862 Single-Ended Analog Input Termination Panels provide field termination for up to16, 1 to 5 volt or 4 to 20 milliamp analog input channels. Two green LED indicators are provided to indicate the status of the primary and secondary 24 Vdc input power.

The Type CL6895 and Type CL6896 Single-Ended/SMART Device Input Termination Panels provide field termination for up to 16, 1 to 5 volt or 4 to 20 milliamp analog or HART input channels. The function of the panels is dependent on the signal conditioning modules installed on the panel. Up to eight dual channel CL6859X1-A1 Single-Ended Input or up to eight dual channel CL6859X1-A2 SMART Device Input Modules must be install on the termination panel. Migration from Single-Ended Analog Inputs to HART input is accomplished by changing the I/O card and replacing the Single-Ended Input Modules with SMART Device Input Modules. No action is required for the field wiring. Both module types provide current limited transmitter power outputs. Two green LED indicators are provided to indicate the status of the primary and secondary 24 Vdc input power.

The Type CL6897 and Type CL6898 Isolated Analog Input Termination Panels provide field termination for 16 channels. The type and range of analog inputs is dependent on the type of signal conditioning module used on each channel. Each input is protected from surge current.

2.9.2 Signal Conditioning Modules

Note

High-level modules without isolation are normally used when field input devices are already isolated. High-level modules with isolation are used when input field devices are not isolated from the PROVOX® System ground.

Signal conditioning modules are required for the CL6897 and CL6898 Isolated Analog Input Termination panels and CL6895 and CL6896 Single-Ended SMART Device Input Termination panels. The input modules are:

- Type CL6855 High Level/High Level Isolated (1500Vrms common-mode)Analog Input Signal Conditioning Modules for use with CL6897 and CL6898:

- CL6855X1-A4 — 1 to 5V non-isolated
- CL6855X1-A5 — 4 to 20 mA non-isolated
- CL6855X1-A6 — 0 to 10V Isolated
- CL6855X1-A7 — 1 to 5V Isolated
- CL6855X1-A8 — 4 to 20 mA Isolated

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- Type CL6856X1-A2 — -10 to 70mV Isolated Low-Level voltage input for use with CL6897 and CL6898.
- Type CL6857 RTD Input Signal Conditioning Modules for use with CL6897 and CL6898:

  100 ohm platinum with temperature coefficients 0.00392 ohms/^{o}C

  - CL6857X1-A14 — (-270 to 140^{o}F) RTD Input
  - CL6857X1-A15 — (-148 to 211^{o}F) RTD input
  - CL6857X1-A16 — (-100 to 600^{o}F) RTD input
  - CL6857X1-A17 — (32 to 392^{o}F) RTD input
  - CL6857X1-A18 — (32 to 1112^{o}F) RTD input
  - CL6857X1-A19 — (100 to 500^{o}F) RTD input

  100 ohm platinum with temperature coefficients 0.00385 ohms/^{o}C

  - CL6857X1-A20 — (-270 to 140^{o}F) RTD input
  - CL6857X1-A21 — (-148 to 211^{o}F) RTD input
  - CL6857X1-A22 — (-100 to 600^{o}F) RTD input
  - CL6857X1-A23 — (32 to 392^{o}F) RTD input
  - CL6857X1-A24 — (32 to 1112^{o}F) RTD input
  - CL6857X1-A25 — (100 to 500^{o}F) RTD input

  10 ohm copper

  - CL6857X1-A26 — (32 to 300^{o}F) Non-Isolated RTD input
- Type CL6858 Standard Isolation (1500Vrms common-mode) Thermocouple Input Signal Conditioning Modules for use with CL6897 and CL6898:

  - CL6858X1-A19 — Type J (-148 to 1400 ^{o}F)
  - CL6858X1-A20 — Type J (-60 to 640 ^{o}F)
  - CL6858X1-A21 — Type K (-148 to 2462 ^{o}F)

- CL6858X1-A22 — Type K (0 to 1000 ºF)
- CL6858X1-A23 — Type R (32 to 3182ºF)
- CL6858X1-A24 — Type T (–300 to 600ºF)
- CL6858X1-A25 — Type E (–100 to 1600ºF)
- CL6858X1-A26 — Type B (32 to 3272ºF)
- CL6858X1-A27 — Type S (32 to 3182ºF)

■ Type CL6858 100 Vrms Common-Mode Isolation Thermocouple Input Signal Conditioning Modules for use with CL6897 and CL6898:

- CL6858X1-A28 — Type J (-148 to 1400ºF)
- CL6858X1-A29 — Type J (-60 to 640ºF)
- CL6858X1-A30 — Type K (-148 to 2462ºF)
- CL6858X1-A31 — Type K (0 to 1000ºF)
- CL6858X1-A32 — Type R (32 to 3182ºF)
- CL6858X1-A33 — Type T (-300 to 600ºF)
- CL6858X1-A34 — Type E (-100 to 1600ºF)
- CL6858X1-A35 — Type B (32 to 3272ºF)
- CL6858X1-A36 — Type S (32 to 3182ºF)

■ Type CL6859 Analog/SMART Device Input Modules for use with CL6895 and CL6896:

- CL6859X1-A1 — Single-Ended Analog Input
- CL6859X1-A5 — SMART Device Input

2.9.3 Termination Cables

Cables connecting the AI card to the termination panel, with or without the cable interface panel, may not exceed a total of 200 feet (61 m).

When calculating cable length for redundant systems, add the length of the cable from the AI card to the interface panel to the length of the longest termination panel to interface panel cable.

Apply the 200 foot (61 m) requirement separately to 25-pin and 37-pin cables.

2.10 Analog I/O Specifications

Table 2-3 Analog I/O Specifications

INPUT SIGNALS	Quantity: 16 input channels Input Span: 1.0 to 5.0 volts dc Resolution: 0.03125 percent of span Input Overvoltage Protection: Performed on the termination Overrange: +20 percent of span Underrange: –20 percent of span
OUTPUT SIGNALS	Quantity: 8 output channels Accuracy: (Current output only) ± 0.10 percent at reference operating conditions, ± 0.25 percent at normal operating conditions Resolution: 0.05 percent of span Output Load: 840 ohms (max) at 24 volts dc and 700 ohms (max) at 21 volts dc Open Field Loop Detection Impedance: 24 volts dc: 5K ohms at 0 percent of span, 1K ohm at 100 percent of span, 21 volts dc: 4K ohms at 0 percent of span, 800 ohms at 100 percent of span Overrange: +13 percent of span Underrange: –20 percent of span
MODULES	Overrange: 13 percent of span Underrange: 20 percent of span Bandwidth: Refer to Table 9-1 Response Time: 0.2 seconds to 90% of span Input Resistance (Voltage Input Modules: 1 to 5 Vdc, 10 megohms 0 to 10 Vdc, 100 kohms
SWITCHES	One momentary switch for redundancy switchover
POWER REQUIREMENTS	Card: +24 Vdc, inputs only, 300 mA, outputs 475 mA Terminations: all panels +24 volts dc except Type CL6841, CL6842, and CL6871 which require no power Type CL6861 Single-Ended Analog Input 30 mA* Type CL6862 Redundant Single-Ended Analog Input 60 mA* Type CL6895 Single-Ended/SMART Device Input 30 mA* Type CL6896 Redundant SE/SMART Device Input 100 mA* Type CL6897 Analog Input 25 mA ** Type CL6898 Redundant Analog Input 75 mA ** Type CL6885 Analog/SMART Output 0 mA Type CL6886 Redundant Analog/SMARTOutput 125 mA * Add 22 mA for each 2-wire transmitter connected to the termination panel. ** Add 35 mA for each module
ELECTRO MAGNETIC COMPATIBILITY	Complies with European Standards EN50081-2:1993 and EN50082-2:1995
ELECTRICAL CLASSIFICATION	Refer to the Nonhazardous Area Classification Bulletin, PS4.7:001 (A1)
OPERATING CONDITIONS	Refer to Operating Conditions for Discrete I/O Cards

Table 2-3 Analog I/O Specifications (Continued)

SIZE and WEIGHT	Analog I/O Card: 8.66 inches x 9.18 inches (220 mm x 233 mm) 1 pound (0.45 kg) Termination Panels: Type CL6861 Single-Ended Analog Input: 5.25 inches x 19 inches (133 mm x 483 mm) (3 rack units) 3.31 pounds (1.5 kg) Type CL6862 Redundant Single-Ended Analog Input: 7 inches x19 inches (178 mm x 483 mm) (4 rack units) 4.5 pounds (2 kg) Type CL6885 Analog/SMART Device Output 3.5 inches x 19 inches (89 mm x 483 mm) (2 rack units including 1 inch cable tray) 2.1 pounds (0.96 kg) Type CL6886 Redundant Analog/SMART Device Output: 3.5 x 19 inches (89 mm x 483 mm) (2 rack units including 1 inch cable tray) 2.2 pounds (0.99 kg) Type CL6895 Single-Ended/SMART Device Input 5.25 inches x 19 inches (133 mm x 483 mm) (3 rack units including 1 inch cable tray) 3.2 pounds (1.4 kg) Type CL6896 Redundant Single-Ended/SMART Device Input 5.25 inches x 19 inches (133 mm x 483 mm) (3 rack units including 1 inch cable tray) 3.3 pounds (1.5 kg) Type CL6897 Analog Input: 5.25 inches x 19 inches (133 mm x 483 mm) including 1 inch cable tray (3 rack units) 3.25 pounds (1.48 kg) Type CL6898 Redundant Analog Input: 5.25 inches x 19 inches (133 mm x 483 mm) including 1 inch cable tray (3 rack units) 3.25 pounds (1.48 kg) Type CL6841 and Type CL6842 Cable Interface Panels: 5.25 inches x 19 in. (133 mm x 483 mm) (3 rack units) 3 pounds (1.36 kg) Cable Tray: 1.5 inches x 19.25 inches (38 mm x 489 mm)(1 rack unit)

2.10.1 Type CL6891 Analog Calibration Adapter

When the analog I/O or analog input card is operated at or near the environmental limits it may require periodic calibration. The Type CL6891 Analog Calibration Adapter is provided for this purpose.

The card consists of a high precision 5 Vdc reference and eight precision 250 ohm resistors as well as some protection circuitry. The 5 Vdc reference and GROUND reference are used to calibrate the analog input section of the Analog I/O Card. Once the input section is calibrated, the outputs may be calibrated using the input section of the Analog I/O Card. Refer to Section 6 for calibration procedures.

The calibration adapter card has one 25-pin female and one 37-pin female D-shell connector for interfacing with the Analog I/O Card. The card plugs directly into the male D-shell connectors on the Analog I/O or Analog Input Card and therefore no cable assemblies are required.

The calibration adapter card requires 24 Vdc to power the voltage reference. This power is provided by the analog I/O or analog input card.

2.11 Type CL6821 Analog I/O Card and Type CL6824 Analog Input Card Calibration

The analog I/O card and analog input card will not require calibration for a period of 2–3 years. However, when the card is operated at or near its environmental extremes, it may need calibration on a more regular basis. For these cases, the Type CL6891 Analog Calibration Adapter Card is provided.

2.11.1 Calibration Procedure

2.11.1.1 Type CL6891 Analog Calibration Adapter Card

Note

Fisher-Rosemount Systems recommends that the Type CL6891 Calibration Adapter be returned to the factory for calibration when required. Contact your Fisher-Rosemount Representative or the factory for further information

Step 1: Place calibration adapter card in a reference condition.

Step 2: Connect an external 24 Vdc power supply to the external power supply test points. Allow 3 minutes for the calibration adapter to stabilize.

Step 3: Connect a DVM (capable of reading +/– 0.1 mV) to the +5 VDC and GROUND test points.

Step 4: Adjust R1 for a reading of +5 Vdc +/– 0.5 mV.

2.11.1.2 Type CL6821 Analog I/O Card

Step 1: Place the analog I/O or analog input card in a reference condition and apply power.

Step 2: Place CALMODE switch on calibration adapter card to the OFF position.

Step 3: Remove termination cables from analog I/O or analog input card.

Step 4: Plug calibration adapter card into the analog I/O or analog input card.

Step 5: Allow 3 minutes for both cards to stabilize to reference condition.

Step 6: Place CALMODE switch to ON position.

Step 7: Check LED indicators on analog I/O or analog input card for results of calibration. Both LEDs will blink for approximately 20 seconds during the test.

- Both LEDs ON — Card is within reference limits
- Green LED OFF — Out of reference tolerance
- Yellow LED OFF — Out of operating tolerance

Step 8: If calibration fails (green LED is not ON), press DOCAL switch on calibration adapter card.

Step 9: When calibration is completed successfully (both LEDs ON), place CALMODE switch to OFF position.

Step 10: Remove calibration adapter card from analog I/O or analog input card.

2.12 Using Simplex I/O Cards with Redundant Termination Panels

The following describes a problem that can occur when a redundant termination panel is used with an I/O card configured to operate in the simplex mode.

In systems that are staged at the factory, this problem is detected and fixed before shipment. Typically, you will only see this problem with termination panels that are shipped direct.

The redundant termination panels use a latching relay to switch the inputs and outputs to the primary or backup connectors. If the power is removed from the panel, the relay remains in the last position used, until activated to switch.

An I/O card configured to operate in the simplex mode will not try to switch the redundant termination panel to the primary side. If the termination panel is left latched in the backup position, the simplex card will not work with its cable connected to the primary side. The termination panel needs to be switched back to the primary side.

Two methods for rectifying this problem are listed below.

2.12.1 Method One

To get the termination panel back to the proper position, use the following procedure:

Step 1: Edit the device definition configuration source file and change the card in question to a primary card.

Step 2: Build, generate and total download the configuration.

Step 3: Power up the card connected to the termination panel in question.

Step 4: The I/O card operating in the primary mode will cause the termination panel to switch to the primary side.

Step 5: Edit the configuration file to make the I/O card operate in the simplex mode again.

Step 6: Build, generate and total download again. The termination panel should now operate properly.

2.12.2 Method Two

Note

The following procedure should only be used by qualified personnel.

To get the termination panel back to the proper position, use the following procedure:

Step 1: Remove the cable from the termination panel.

Step 2: Momentarily short the appropriate pin in the primary side connector of the termination panel to power supply common.

This will switch the termination panel back to the primary side.

The primary side connector pin that can be momentarily shorted to power supply common is listed below for each type of redundant termination panel:

- Type CL6862 Redundant Single-Ended Analog Input Termination Panel — Pin 18
- Type CL6886 Redundant Analog Output Termination Panel — Pin 10
- Type CL6896 Redundant Single-Ended/SMART Device Input Termination Panel — Pin 18
- Type CL6898 Redundant Isolated Analog Input Termination Panel — Pin 18

Note

Should you encounter problems with either of the procedures, contact your Fisher-Rosemount Systems representative.

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Glossary

A/D
Acronym: Analog-to-Digital, or Analog to Digital Converter

ACK
Abbreviation: Acknowledge

Acknowledge (ACK)
To respond to an alarm or other indicator of an unusual condition. Operators of PROVOX systems can acknowledge alarms themselves. Optionally, in many situations, the system can acknowledge alarms automatically.

ACQ
Acquire

Activity
1. A named procedure that the control system activates during one or more named batch cycles. For example, if batch cycle BATCH 1 activates procedure PRODUCT A, PRODUCT A is an activity of that batch cycle.
2. A point type available in certain PROVOX consoles or other devices. Activity points schedule and monitor procedures.

ADC
Acronym: Analog to Digital Converter

Address
One or more integers arranged to identify the location of a device or logical unit of an instrumentation system. In PROVOX systems, address values identify such things as data highway, device, file, card, and channel.

AI
Acronym: Analog Input

AIO
Acronym: Analog Input/Output

AIU
Acronym: Alarm Interface Unit

Alarm Deadband
The amount by which the PV value must return within normal limits for the system to clear an alarm. (For example, if the system activates an alarm as soon as the PV value exceeds 100 percent, but the deadband is 5 percent, the system would not clear the alarm until the PV value drops to 95 percent.)

Alarm Trip Point
The user-defined value at which the system activates an alarm. Such activation occurs as the measured variable moves out of range (for example, going below the trip point for a low alarm).

Algorithm
A set of logical steps to solve a problem or accomplish a task. A computer program contains one or more algorithms. Many configurations of PROVOX systems also contain algorithms, particularly in operations, procedures, and function sequence tables.

ALM
Abbreviation: Alarm

Alphanumeric
Consisting of letters or numbers.

American National Standards Institute (ANSI)
A technical organization that develops standards for the compatibility of industrial equipment. This organization consists of users and manufacturers of such equipment.

American Wire Gauge (AWG)
The usual system of wire size measurement in the United States. A 14 AWG wire has a cross-sectional area of *2.*08 mm; a 000 AWG wire has a cross-sectional area of 85.02 mm. Note that the smaller the AWG value, the larger the wire.

Analog
Continuously variable over a given range. A process control system senses a physical variable such as voltage, current, or resistance as an analog value.

Analog Input (AI)
A PROVOX point type. An analog input point receives a single analog value, the process variable.

Analog Output (AO)
A PROVOX point type. An analog output point generates a single analog value, the set point.

Analog to Digital Converter (A/D or ADC)
An integrated circuit device that converts analog signals into a digital form. This enables a digital computer to operate on such signals.

ANSI
Acronym: American National Standards Institute

AO
Acronym: Analog Output

APU
Acronym: Arithmetic Processing Unit

ASCII
1. A standard digital encoding scheme for data: a 7-bit binary code represents numbers, letters, symbols, and control codes. (The designation is an acronym for American Standard Code for Information Interchange.)
2. A PROVOX point type. An ASCII point contains a single real value, referenced by the setpoint attribute, and an 80-character ASCII string.

Assembly (ASSY)
A collection of hardware and/or PWB modules, or a single PWB module that is built up from individual components.

ASSY
Abbreviation: Assembly

AWG
Acronym: American Wire Gauge

Baby N Connector (BNC)
A type of connector for coaxial cable; used for a variety of applications in PROVOX systems.

Baud
The unit of measurement of serial transmission speed for digital data. Baud usually means bits per second, but may have a different meaning if the encoding method used is frequency multiplexing.

BCU
Acronym: Backup Control Unit

Bit (Binary Digit)
A single place in a binary number. The only possible values for a bit are 0 and *1.*

BNC
Acronym: Baby N Connector

Boot or Boot Up
To start the operating-system software of a computer, so that the computer is ready for application software.

Bus
A general term for a group of signal lines to be considered together, as in a data bus or address bus. The data highway of a PROVOX system is such a bus.

Byte
A unit of binary digits (bits). Usually a byte consists of eight bits.

Canadian Standards Association (CSA)
A Canadian organization that develops safety standards for industrial equipment and certifies products that meet those standards.

Central Processing Unit (CPU)
The portion of a computer that manipulates and modifies data, carrying out the instructions of the computer program.

CHIP
Acronym: Computer/Highway Interface Package

CIA
Acronym: Communications Interface Assembly

CMOS
Acronym: Complimentary Metal Oxide Semiconductor

CMPTR
Abbreviation: Computer

CNSL
Abbreviation: Console

Communications Interface Assembly (CIA)
A printed circuit card that links files of PROVOX devices and the data highway. The CIA provides the timing and data conversion necessary for communications.

Computer Interface Unit (CIU)
A set of cards that acts as a protocol converter to the CCON, BCON, or CCOMP, to interface with the PROVOX data highway.

CONFIG
Abbreviation: Configuration

Configuration (CONFIG)
Giving instructions and supplying reference information to the controllers and other devices that make up a process control instrumentation system. For some PROVOX systems, configuration consists of responding to prompts in a series of console screen displays. For other PROVOX systems, configuration consists of creating and manipulating special ASCII text files.

Controller
A device that operates automatically to regulate a controlled variable.

Control Sequence
A type of primary control algorithm which provides basic functions such as alarming, data communication, tracking, and error signal calculation, but does not provide any form of control action. This allows the user to create a customized control algorithm transfer function using FST instructions.

CPU
Acronym: Central Processing Unit.

CRC
Acronym: Cyclic Redundancy Check

CSA
Acronym: Canadian Standards Association

CU MPU
Control Unit Microprocessor Unit

Cyclic Redundancy Check (CRC)
A method of error detection in data transmission and data storage. The check evaluates both the number of ones and zeroes in a block (parity) and the position of the values in the block.

D/A
Acronym: Digital to Analog, or Digital to Analog Converter

DAC
Acronym: Digital to Analog Converter

Data
A general term that denotes any information an MPU can process.

Database
A collection of data stored in a systematic way so that searches and sorts are rapid and so that retrieval of items is simple.

Deadband
[See Alarm Deadband]

Detail Display
A type of pre-formatted console display that shows the values of operating parameters and certain other parameters of a specified point.

Device
A piece of electronic hardware that performs one or more prescribed functions.

DI
Acronym: Discrete Input

Diagnostics
One or more programs in a computer or microprocessor that can detect and pinpoint a configuration error or a hardware fault. Also, the utility or functionality such programs add to a product.

Digital Volt Meter (DVM)
A test instrument that measures voltage, current, or resistance, and gives numerical readings.

DIO
Acronym: Discrete Input/Output

DIP
Acronym: Dual In-line Package

Discrete Input (DI)
A PROVOX point type. A DI point monitors a single discrete value of the process variable. That is, a DI point reads discrete data from a sensor or other system device.

Discrete Input/Output (DIO)
The reception and transmission of discrete signals. In PROVOX systems, DIO usually refers to a discrete input/output card in a controller.

Discrete Output (DO)
A PROVOX point type. A DO point generates a single discrete value referenced by the setpoint.

DO
Acronym: Discrete Output

Download
To transfer configuration instructions and reference information from a configuration device to other devices of a process control system.

DRVR
Driver (I/O driver)

Dual In-line Package (DIP)
An integrated circuit packaging method that allows for two rows of conductors spaced at least 0.3 inch (7.6 mm) apart with each conductor in the row spaced on 0.1-inch (2.5 mm) centers.

DVM
Acronym: Digital Volt Meter

EAROM
Acronym: Electrically Alterable Read-Only Memory

Acronym: Extended Data Acquisition System

EIA
Acronym: Electronic Industries Association

Electrically Alterable Read-Only Memory (EAROM)
A type of semiconductor memory device, electrically erasable and reprogrammable, that is used primarily for read-only information.

Electronic Industries Association (EIA)
A group of electronic manufacturers that creates industry standards for communication between electronic devices. Among these standards are RS-232 and RS-449.

Electromagnetic Interference (EMI)
The general category of electrical noise induced by radio frequency and magnetic, electrostatic, or capacitive coupling.

Electrostatic Damage (ESD)
Deterioration of integrated circuits due to high levels of static electricity. Symptoms of ESD include degradation of performance, device malfunction, and complete failure.

EMI
Acronym: Electromagnetic Interference

ENB
Abbreviation: Enable

ENBL
Abbreviation: Enable

Engineering Units (EU)
The range of measurement for an analog process variable. The low (0 percent) and high (100 percent) engineering unit limits define the anticipated range of the variable. For example, low and high engineering-unit values of 50 and 1550 might define a range for degrees Fahrenheit. In this example, the EU span would be 1500 degrees; each percent of the EU span would equal 15 degrees.

Engineering Units Descriptor
The name of the units an engineering units value represents. Possible examples include ***MTRS*** for ***meters***, ***LB/SQIN*** for ***pounds per square inch***, and ***DEGSCEL*** for ***degrees celsius***.

EOT
Acronym: End of Transmission

EPROM
Acronym: Erasable Programmable Read-Only Memory

Erasable Programmable Read-Only Memory (EPROM)
A semiconductor memory device that is programmable electrically, but erasable only by exposure to high-intensity ultraviolet light.

ERR
Abbreviation: Error

Error Signal
In a closed loop, the difference between the actual value of a particular signal and its desired value (usually PV and SP).

Error-Squared PI_PID
A type of primary control algorithm which is similar to a normal PI_PID algorithm, but acts on the square of the error signal (where the sign of the error signal is retained) instead of the normal error signal value.

EU
Acronym: Engineering Units

Firmware
Computer or microprocessor programming stored in an integrated circuit, in such a way that users cannot change the programming.

Hexadecimal
A base 16 number system commonly used in digital computers. It consists of the numbers 0 through 9 followed by the letters A through F, where A corresponds to a decimal (base 10) value of 10 and F corresponds to a decimal value of 15.

IC
Acronym: Integrated Circuit

IDI
Acronym: Intelligent Device Interface

IEEE
Acronym: Institute of Electrical and Electronics Engineers

IFC
Acronym: Integrated Function Controller

INAC
Inactive

Input/Output (IO or I/O)
Signal reception and transmission, or signal interfacing. Input, for a process control device, involves accepting and processing signals from field devices. Output, for a process control device, involves converting commands into electrical signals to field devices.

Institute of Electrical and Electronic Engineers (IEEE)
An independent technical organization that defines standards for the electrical, electronic, and computer industries.

Instrument Society of America (ISA)
A professional organization of designers, manufacturers, and users of process control instrumentation.

Integrated Function Controller (IFC)
An advanced function controller of the UOC family, that provides multiloop continuous control capability with interlocking and sequencing through the use of FSTs and LCPs.

International Standards Organization (ISO)
An official body that develops standards for data communication and interconnection of different manufacturers' equipment.

I/O Channels
Input/output channels: communications paths from a device to a communications link or other device.

ISA
Acronym: Instrument Society of America

ISO
Acronym: International Standards Organization

KB
Abbreviation: Keyboard

Least-Significant Digit (LSD)
The lowest-value position of an integer; used in the control panel of certain products.

LED
Acronym: Light-Emitting Diode

LGP
Acronym: Local Ground Point

Light-Emitting Diode (LED)
An electronic component that generates a small focused beam of light, in response to a current passing through. LEDs are available in several colors, depending on the type of crystal they contain.

Local Ground Point (LGP)
A central termination point for all signal common and power supply common circuits within a cabinet group of eight or fewer bays.

Local Traffic Director (LTD)
A communications device that controls the data flow on a local data highway. As many as 30 devices can be on the highway. An LTD also stores and forwards messages to other local areas.

LSD
Acronym: Least Significant Digit

LTD
Acronym: Local Traffic Director

Master Ground Point (MGP)
A common termination point for as many as six local ground point (LGP) assemblies.

MAX
Abbreviation: Maximum

Memory
A computer's storage for programs and data. Most computers and microprocessors have both internal and external memories: use of internal memories is usually faster, but the capacity of internal memories is more limited. Internal memories are usually ROM or RAM; external memories are usually disk or tape drives.

MGP
Acronym: Master Ground Point

Microprocessor
A complex integrated circuit that can be programmed to perform different tasks.

Microprocessor Unit (MPU)
A general-purpose integrated circuit that performs the functions of the central processing unit (CPU) of a computer.

microPROVOX™
A mark of Fisher Controls International, Inc. Fisher-Rosemount Systems' line of self-contained process control systems.

MIN
Abbreviation: Minimum

Mode
Identification of who or what controls changes to certain types of point data. Point data may potentially be changed by a human operator, a controller algorithm, a computer, and another point. Each mode determines which of these is allowed to change point data. The seven possible modes in a PROVOX system are: *manual, automatic, remote set point, supervisory, direct digital control, computer,* and *hard manual*.

Modem
Modulator/demodulator: a device that allows a computer to transmit and receive data via a telephone or other communications network.

Monitor
A PROVOX point type. A monitor point is used to retain a single analog or discrete value. Analog monitored values are typically displayed on a console display as a PV bar graph. In a monitor point, the device containing the point is allowed to read or write the value and other system devices are only allowed to read the analog value.

Most-Significant Digit (MSD)
The highest-value position of an integer; used in the control panel of certain products.

MPU
Acronym: Microprocessor Unit

MSD
Acronym: Most Significant Digit

Multiplexer (MUX)
A PROVOX highway device that transfers information between the data highway and field devices (both analog and discrete).

MUX
Abbreviation: Multiplexer

NC
Acronym: Normally Closed or no connection

NO
Acronym: Normally Open

Non-Volatile Memory (NVM)
A type of semiconductor memory that retains its contents even though power is disconnected.

Normally Closed (NC)
Said of a contact pair closed (conducting) when its device or relay coil is not energized. Such a contact pair also is called a break contact.

Normally Open (NO)
Said of a contact pair open (not conducting) when its device or relay coil is not energized.

NTD
Acronym: Network Traffic Director

NVM
Acronym: Non-Volatile Memory

OEM
Original Equipment Manufacturer

Acronym: Operational Amplifier

Operator Station
A local control station that can be connected to regulatory controllers. An operator station displays mst of the same information that appears in a faceplate display, and gives basic control over a control loop.

Original Equipment Manufacturer (OEM)
The firm that makes a product sold by another firm. For example, Hewlett Packard is the OEM for some products sold by Fisher Controls.

OWP
Operator Worlplace

PARAM
Abbreviation: Parameter

Percent of Span
A scheme for indicating very large or very small values as simple percentages. The span is a range of values defined for a specific situation. The user establishes the limits of the range as low (0 percent) and high (100 percent) engineering-unit values. A percent-of-span value is a percentage of the difference between these limits.

Plant Management Area (PMA)
A collection of plant process areas (PPAs). A PMA controls the console point reporting load, and indirectly, central processing unit (CPU) loading.

Port
A communications terminal of a regulatory controller card file. Each port is dedicated to the reporting of one controller. Consequently, port numbers identify particular controllers.

Power Supply Common (PSC)
The negative terminal of the 24- volt system power supply: a reference for digital signals.

Power Supply Unit (PSU)
In a PROVOX instrumentation system, a device or component that converts standard alternating current to the direct current voltage that other system devices need.

PRI
Abbreviation: Primary

Printed Circuit (PC)
A conduction path of metal on a substrate material which is used to carry signals between electronic components.

Printed Wiring Board (PWB)
A board containing printed circuits (printed wiring) which serves as the mounting base for integrated circuits and other electronic components.

Programmable Logic Controller (PLC)
A microprocessor or mini-computer system able to perform simple analog and discrete control. PLC's were developed as replacements for relay control panels, and are typically used for motor control.

PROFLEX®
A mark of Fisher-Rosemount Systems line of PROVOX® system configuration products for certain process control systems. ASCII text files are the principal disinguishing feature of configuration via a PROFLEX device.

Programmable Read-Only Memory (PROM)
A chip programmable only by means of a special device; once programmed in this way, it becomes a ROM.

PROM
Acronym: Programmable Read-Only Memory

PROVOX®
A mark of Fisher Controls International, Inc. A Fisher-Rosemount Systems' product line of distributed process control equipment.

PROVUE®
A mark of Fisher Controls International, Inc. A Fisher-Rpsemount Systems' line of console products that use a global database configuration and have high-resolution graphics, ergonomically designed keyboards, and color printers.

PSC
Acronym: Power Supply Common

PVE
Acronym: PROVUE Electronics

PWR
Abbreviation: Power

Radio, Electronic, and Television Manufacturers' Association (RETMA)
A group of electronic manufacturers who developed a standard for rack mounting of electronic equipment.

Radio Frequency Interference (RFI)
Inadvertently transmitted energy that falls in the frequency band of radio signals. If this energy is sufficiently strong, it can influence the operation of electronic equipment.

RAM
Acronym: Random-Access Memory

Random-Access Memory (RAM)
A type of semiconductor memory. A user can read from and write to a RAM as often as desired.

RAT
Abbreviation: Ratio

RCV
Abbreviation: Receive

Read-Only Memory (ROM)
A memory in which information is stored permanently. A user can examine ROM contents as often as desired but cannot change the contents.

Read/Write Memory (RWM)
Another name for random access memory (RAM).

Reset
1. To return the MPU and any associated circuits to their starting states. *2.* The name given to a button a user pushes for such a reset, or to a signal directing such a reset.
3. Another name for integral control action.

Resistance Temperature Detector (RTD)
A device or element that measures process temperature very accurately. RTDs sense temperature changes by measuring the resistance of a coiled metal wire, typically platinum.

Restart
To re-power a device of a PROVOX system.

RETMA
Acronym: Radio, Electronic, and Television Manufacturers' Association

RFI
Acronym: Radio Frequency Interference

ROM
Acronym: Read-Only Memory

RTD
Resistance-Temperature Detector

SC
Acronym: Signal Common

Scan
Sequential interrogation of devices or points.

Scientific Apparatus Makers Association (SAMA)
A trade association that develops standards for symbology, terminology, and procedures within the chemical and process control industries.

SEC
Abbreviation: Secondary

Serial
Sequential: said of data transmitted one bit after another.

SGP
Acronym: Shield Ground Point

Shield Ground Point (SGP)
A copper bus bar that fits in horizontal cable trays in a system cabinet. This bar is a convenient place to ground signal cable shields.

Signal Common (SC)
A ground point that provides a reference for analog input and analog output signals in a PROVOX system. System installers should reference all other DC wiring to power supply common (PSC).

Softkey
A keyboard key that activates one of several functions, according to the portion of software executing at the moment. Commonly, a screen display indicates the current functions of all softkeys.

Software
Microprocessor or computer programs and routines that reside in alterable memory (usually RAM or magnetic media), as opposed to firmware, which consists of programs and routines that are programmed into an integrated circuit.

Span
[See Percent of Span]

SQRT
Abbreviation: Square Root

STBY
Abbreviation: Standby

STAT
Abbreviation: Station

SW
Abbreviation: Switch

TC
Abbreviation: Thermocouple

Uninterruptible Power Supply (UPS)
A backup device for the AC power source. A UPS connects between the AC power source and computer equipment. Should there be a failure of or interruption in the AC power source, the UPS supplies continuous power to the computer.

Unit Operations Controller (UOC)
A PROVOX controller designed for batch, sequencing, discontinuous, and unit-oriented continuous-control applications. A UOC includes FST and LCP functionality.

UOC
Acronym: Unit Operations Controller

Upload
The movement of Detail Display Parameters from system devices to a configuration device. An upload lets the current values of parameters be incorporated into existing configuration source files, eliminating user entry specific tuning changes.

UPS
Acronym: Uninterruptible Power Supply

VDU
Acronym: Video Display Unit

Video Display Unit (VDU)
An electronic assembly that displays alphanumeric data and graphic images on a screen, for viewing by a user.

VME-bus
Acronym: Versa Module Eurocard Bus

WDT
Acronym: Watchdog Timer

WSI
Acronym: Weigh Scale Interface

XMIT
Symbol: Transmit

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