



WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-1996) of USA and any additional safety requirements applicable to your installation.

Installation, operation, and maintenance of this instrument must be performed by qualified personnel only. The National Electrical Code defines a qualified person as one familiar with the construction and operation of the equipment and the hazards involved.

Power Platform[®] PP1 & PP1E

TASKCard[®] - 8000

OPERATOR'S MANUAL

Revision A

April 15, 1997



DRANETZ-BMI
1000 New Durham Road
Edison, New Jersey 08818-4019

Part Number OM-PP1-TASK-8000

ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento debe ser hecha de acuerdo con las normas del Código Eléctrico Nacional (ANSI/NFPA 70-1996) de EE. UU., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

AVERTISSEMENT

Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-1996) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique".

WARNUNG

Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-1996) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Safety Summary

Definitions WARNING statements inform the user that certain conditions or practices could result in loss of life or physical harm.

CAUTION statements identify conditions or practices that could harm the Power Platform, its data, other equipment, or property.

NOTE statements call attention to specific information.

Symbols The following International Electrotechnical Commission (IEC) symbols are marked on the top and rear panel in the immediate vicinity of the referenced terminal or device:



Caution, refer to accompanying documents (this manual).



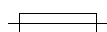
Alternating current (ac) operation of the terminal or device.



Direct current (DC) operation of the terminal or device.



Symbol preceding a fuse rating indicates the fuse is a time delay (slow-blow) type. Example: T10A = time-delay, 10 Ampere fuse.



Fuse WARNING notice.



Protective conductor terminal.



Power Switch.

Definiciones Las ADVERTENCIAS informan al usuario de ciertas condiciones o prácticas que podrían producir lesiones mortales o daño físico.

Las PRECAUCIONES identifican condiciones o prácticas que podrían dañar la Power Platform, sus datos, otros equipos o propiedad.

Las NOTAS llaman la atención hacia la información específica.

Continued on next page

Safety Summary, Continued

Símbolos

Los siguientes símbolos de la Comisión Internacional Electrotécnica (IEC) aparecen marcados en el panel superior y el posterior inmediatos al terminal o dispositivo en referencia:



Precaución, consulte los documentos adjuntos (este manual).



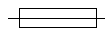
Operación de corriente alterna (ca) del terminal o dispositivo.



Operación de corriente continua (CC) del terminal o dispositivo.

T

El símbolo que precede la capacidad nominal de un fusible indica que se trata de un fusible con retardo de tiempo (fundido lento).
Ejemplo: T10A = fusible con retardo de tiempo, 10 Amperios.



ADVERTENCIA de fusible.



Terminal de protección del conductor.



Interruptor de encendido.

Définitions

Les messages d'AVERTISSEMENT préviennent l'utilisateur que certaines conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles.

Les messages de MISE EN GARDE signalent des conditions ou pratiques susceptibles d'endommager "Power Platform", ses données, d'autres équipements ou biens matériels.

Les messages NOTA attirent l'attention sur certains renseignements spécifiques.

Continued on next page

Safety Summary, Continued

Symboles

Les symboles suivants de la Commission électrotechnique internationale (CEI) figurent sur le panneau arrière supérieur situé à proximité du terminal ou de l'unité cité:



Mise en garde, consultez les documents d'accompagnement (ce manual).



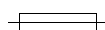
Fonctionnement du terminal ou du dispositif sur le courant alternatif (c.a.).



Fonctionnement du terminal ou de l'unité en courant continu (CC).

T

Symbole précédant la valeur nominale d'un fusible et indiquant que le fusible est du type à temporisation (fusible à action retardée).
Exemple : T10A = fusible de 10 ampères à temporisation.



AVERTISSEMENT sur les fusibles.



Borne conductrice de protection.



Interrupteur de tension.

Definitionen

WARNUNGEN informieren den Benutzer darüber, daß bestimmte Bedingungen oder Vorgehensweisen körperliche oder tödliche Verletzungen zur Folge haben können.

VORSICHTSHINWEISE kennzeichnen Bedingungen oder Vorgehensweisen, die zu einer Beschädigung von Power Platform, seiner Daten oder anderer Geräte bzw. von Eigentum führen können.

HINWEISE machen auf bestimmte Informationen aufmerksam.

Continued on next page

Safety Summary, Continued

Symbole

Die folgenden Symbole der Internationalen Elektrotechnischen Kommission (International Electrotechnical Commission; IEC) befinden sich auf der Abdeck- und Seitenplatte unmittelbar am betreffenden Terminal oder Gerät.



Vorsichtshinweis, siehe Begleitdokumente (dieses Handbuch).



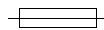
Wechselstrombetrieb des Terminals bzw. Geräts.



Gleichstrombetrieb im Terminal oder Gerät.

T

Dieses Symbol vor einem Sicherungswert weist darauf hin, daß es sich um eine Sicherung mit Zeitverzögerung (Trägsicherung) handelt. Beispiel: T10A = Trägsicherung mit 10 Ampere.



WARNHINWEIS Sicherung.



Terminal-Schutzleiter.



Netzschalter.

Safety Summary, Continued

Safety precautions

The following safety precautions must be followed whenever any type of connection is being made to the instrument.

- Connect the green safety (earth) ground first, before making any other connections.
- When connecting to electric circuits or pulse initiating equipment, open their related breakers. DO NOT install any connection of the instrument on live power lines.
- Connections must be made to the instrument first, then connect to the circuit to be monitored.
- Wear safety glasses and insulated gloves when making connections to power circuits.
- Hands, shoes and floor must be dry when making any connection to a power line.
- Make sure the unit is turned OFF before connecting probes to the rear panel.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

Medidas de seguridad

Las medidas de seguridad siguientes deberán observarse cuando se realice cualquier tipo de conexión al instrumento.

- Antes de hacer cualquier conexión, deberá enchufarse el conector de seguridad verde a tierra.
- Cuando se haga conexiones a circuitos eléctricos o a equipo de activación por pulso, deberá abrirse sus respectivas cajas de seguridad. NO deberá hacerse ninguna conexión del instrumento en líneas eléctricas bajo tensión.
- Las conexiones deberán hacerse primero al instrumento y, luego, al circuito a ser monitorizado.
- Al hacer conexiones a circuitos eléctricos, deberá utilizar anteojos y guantes protectores.
- Sus manos, zapatos y el piso deberán estar secos en todo momento en que se haga una conexión a un cable eléctrico.
- Verifique que la unidad esté DESACTIVADA antes de conectar sondas en el panel posterior.
- Previo a cada uso, deberá verificarse que los cables no estén rotos y que el material aislante no tenga rajaduras. Reemplace de inmediato cualquier parte defectuosa.

Mesures de Sécurité

Les mesures de sécurité suivantes doivent être prises chaque fois qu'un type de connexion quelconque est effectué sur l'instrument.

Continued on next page

Safety Summary, Continued

- Connecter d'abord la prise de terre de sécurité verte (terre) avant d'effectuer toute autre connexion.
 - Ouvrir les disjoncteurs correspondants lors d'une connexion à des circuits électriques ou à des équipement de génération d'impulsions. NE PAS effectuer de connexion d'instrument sur des lignes électriques sous tension.
 - Une fois toutes les connexions de l'instrument effectuées, connecter au circuit à contrôler.
 - Porter des lunettes de protection et des gants isolants pour effectuer des connexions aux circuits électriques.
 - S'assurer que les mains, les chaussures et le sol soient secs lors de connexions à une ligne électrique.
 - S'assurer que l'unité est ÉTEINTE avant de connecter les sondes au panneau arrière.
 - Inspecter tous les câbles, avant chaque utilisation, pour s'assurer que les isolants ne sont pas coupés ou fendus. Remplacer immédiatement tous les équipements défectueux.
-

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen sind immer dann zu befolgen, wenn eine Verbindung zum Instrument hergestellt wird.

- Schließen Sie zuerst die grüne Sicherheits-/Erdleitung an, bevor Sie eine andere Verbindung herstellen.
 - Öffnen Sie beim Anschluß an elektrische Stromkreise oder Impulsauslösungseinrichtungen die entsprechenden Unterbrecher. Es dürfen KEINE Anschlüsse an das Instrument unter stromführenden Spannungsleitungen montiert werden.
 - Die Verbindungen müssen zuerst am Instrument und danach an der zu überwachenden Schaltung hergestellt werden.
 - Tragen Sie Schutzbrillen und Isolierhandschuhe, wenn Sie Anschlüsse an den Stromkreisen vornehmen.
 - Hände, Schuhe und Fußboden müssen trocken sein, wenn Sie Anschlüsse an den Stromkreisen durchführen.
 - Stellen Sie sicher, daß das Gerät AUSgeschaltet ist, bevor Sie an der rückwärtigen Konsole Meßfühler anschließen.
 - Prüfen Sie vor jedem Gebrauch alle Kabel auf Bruchstellen und Risse in der Isolierung. Wechseln Sie schadhafte Kabel sofort aus.
-

Change Status

Revisions

Original Issue: March 1, 1994.
Change 1: April 15, 1994, ECOs 3294 and 3299.
Change 2: August 8, 1994, SDRN 209.
Change 3: ECOs 3360, 3350, 3377, 3380.
Revision A: April, 1997, ECO 3313 and 3437.

Revised Sections

Section	Change No.	Section	Change No.
Cover	A	Appendix C	A
Table of Contents	A	Appendix D	A
Chapter 1	A	Appendix E	A
Chapter 2	A	Appendix F	A
Chapter 3	A	Appendix G	2
Chapter 4	A	Appendix H	A
Chapter 5	A	Appendix I	A
Chapter 6	A	Appendix J	A
Chapter 7	A	Appendix K	A
Chapter 8	A	Appendix L	A
Chapter 9	A	Appendix M	A
Chapter 10	A	Glossary	A
Appendix A	A	Index	A
Appendix B	A		

Statements and Notices

Statement of warranty

All products of Dranetz-BMI are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of delivery. Dranetz-BMI will repair or replace, at its option, all defective equipment that is returned, freight prepaid, during the warranty period. There will be no charge for repair provided there is no evidence that the equipment has been mishandled or abused. This warranty shall not apply to any defects resulting from improper or inadequate maintenance, buyer-supplied hardware/software interfacing, unauthorized modification or misuse of the equipment, operation outside of environmental specifications, or improper site preparation or maintenance.

Statement of reliability

The information in this manual has been reviewed and is believed to be entirely reliable, however, no responsibility is assumed for any inaccuracies. All material is for informational purposes only and is subject to change without prior notice.

Notice regarding FCC compliance

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Notice regarding proprietary rights

This publication contains information proprietary to Dranetz-BMI. By accepting and using this manual, you agree that the information contained herein will be used solely for the purpose of operating equipment of Dranetz-BMI.

Continued on next page

Statements and Notices, Continued

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Table of Contents

Safety Summary	iii
Change Status	ix
Statements and Notices	x
CHAPTER 1 - Introduction	
Overview	1-1
Unpacking The Power Platform	1-3
Physical Description	1-4
Operational Description	1-6
CHAPTER 2 - Easy Start	
Overview	2-1
Time and Date	2-2
Billing Dates	2-3
Demand Criteria	2-5
Select Present Configuration	2-6
Program Monitoring Setups	2-8
Clear Memory	2-10
CHAPTER 3 - Controls, Indicators, and Connectors	
Overview	3-1
Front Panel	3-2
Rear Panel	3-4
Positioning the Unit	3-8
CHAPTER 4 - Getting Started	
Overview	4-1
Section A - Turn On Procedures	
Overview	4-2
Setting the Voltage Selector	4-3
Power Requirements	4-5
Installing a TASKCard	4-6
Turning the Unit On	4-7
Section B - Voltage and Current Cable Connections	
Overview	4-11
Connecting a Voltage Probe	4-15
Connecting to a Potential Transformer (PT)	4-20
Connecting a Current Probe	4-22
Connecting to a Current Transformer (CT)	4-26
Connecting to an Isolated Current Transformer (ISO)	4-28
Verifying Voltage and Current Connections	4-34

Table of Contents, Continued

Section C - Circuit Diagrams for Power Measurements	
Overview.....	4-37
Single Phase.....	4-39
Split Phase.....	4-40
3-Phase, 3-Wire (Delta) Circuits	4-41
Floating Delta, Two Probe Method	4-42
Floating Delta, Three Probe Method	4-43
Delta, One Leg Grounded, Two Probe Method.....	4-44
Delta, One Leg Grounded, Three Probe Method.....	4-45
Open Leg Delta.....	4-46
Four Wire Wye	4-47
High-Leg Delta	4-48
Wye, 2 1/2 Element Metering.....	4-49
Neutral-to-Ground	4-50
Phasor Diagrams for Standard Power Connections.....	4-51
Section D - Monitoring Setup Procedures	
Overview.....	4-54
Selecting and Activating a Setup	4-55
Reading Setups from a Memory Card	4-57
Section E - Scope and Meter Mode	
Overview.....	4-58
Viewing Scope Mode.....	4-59
Viewing Meter Mode.....	4-61
Viewing Voltage and Current Phasors.....	4-64
Viewing Voltage and Current Harmonics	4-65
 CHAPTER 5 - Programming Configuration Setups	
Overview.....	5-1
Section A - Input and Output Devices	
Overview.....	5-3
Select Wiring Configuration Type.....	5-4
Program Digital Input Channels	5-11
Setting Relays	5-14
Enable/Disable LCD Backlight Auto-Shutoff	5-16
Disable/Enable Audible Alarm.....	5-17
Section B - Analyzer Parameters	
Overview.....	5-18
Set Time and Date.....	5-19
Select Language.....	5-20
Redirect Error Messages.....	5-21
Select Memory Storage Type	5-22

Table of Contents, Continued

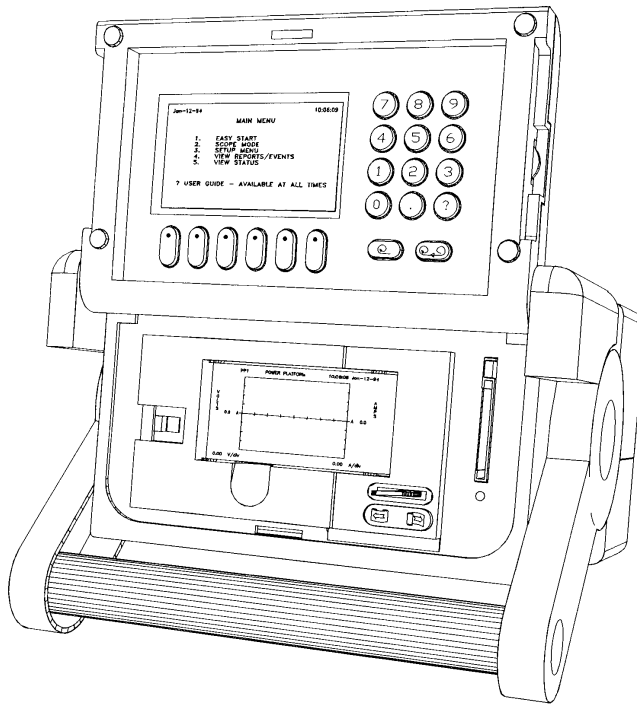
Section C - Site Parameters	
Overview.....	5-24
Program Site Identifier.....	5-25
Program Billing Dates	5-26
Program Rate Schedule.....	5-28
Program Time of Use Periods.....	5-30
Set Demand Interval Criteria	5-34
Section D - Analyzer Status Menu Functions	
Overview.....	5-38
Clear Memory	5-39
Reset Configuration	5-41
View Digital Input Status	5-42
Formatting a Memory Card	5-43
Writing to a Memory Card.....	5-44
 CHAPTER 6 - Programming Monitoring Setups	
Overview.....	6-1
Programming Reports.....	6-6
Monitoring Setups Report Screen.....	6-7
Trigger Screens	6-9
Print Monitoring Setups.....	6-13
Create User Reports	6-15
Print User Reports.....	6-19
Edit Time Plot Parameters	6-20
 CHAPTER 7 - Understanding Reports	
Overview.....	7-1
Report Types.....	7-2
Relay Reports.....	7-4
Viewing Reports	7-5
Report Memory.....	7-6
All Channels, All Parameters Report.....	7-7
Demand Report	7-9
Energy Report	7-11
Min/Max Report	7-12
Rate Schedule Report.....	7-13
Energy Cost Report.....	7-14
Demand Cost Report.....	7-15
Time-of-Use Report	7-16
Time Plot Reports	7-17
Set Scales	7-19
Events.....	7-21

Table of Contents, Continued

User Format Reports	7-23
Harmonics Reports	7-24
CHAPTER 8 - Transferring Data	
Overview	8-1
Connecting Local Devices to the RS232D Port.....	8-4
Connecting a Printer to the Parallel Port	8-10
Connecting Remote Devices to RS232D Port	8-14
Connecting Remote Devices to RJ-11C Jack (not available on PP1E)	8-20
Connecting to a Facsimile (Fax) Machine (not available on PP1E).....	8-25
Output Connected Device Configuration Test.....	8-28
CHAPTER 9 - Printer Operation	
Overview	9-1
Printer Controls	9-2
Normal Operation	9-5
Paper Replacement	9-7
CHAPTER 10 - System Test	
Overview	10-1
Power Turn-on Diagnostics	10-2
Self-Test.....	10-3
Analyzer Status Display.....	10-4
APPENDIX A - Optional Accessories	
Optional Accessories List	A-2
Optional Accessories Descriptions	A-4
APPENDIX B - Repacking for Return Shipment	
APPENDIX C - Battery Specifications and Replacement Procedure	
Overview	C-1
Battery Specifications	C-2
Battery Pack Safety Precautions	C-3
Battery Pack Replacement	C-5
Memory Card Battery Replacement	C-6
APPENDIX D - Fuse Replacement	
Overview	D-1
Main Power Fuses.....	D-2

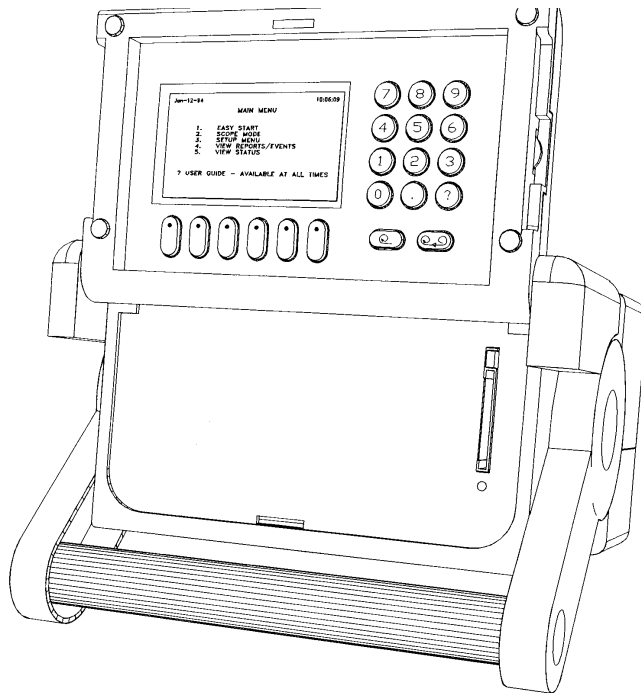
Table of Contents, Continued

Battery Fuse	D-5
APPENDIX E - Operator Replaceable Parts List	
APPENDIX F - Error Messages	
Error Message Listings	E-3
APPENDIX G - Default Settings	
APPENDIX H - Technical Specifications	
Overview	H-1
General	H-2
Interfaces	H-3
Measured Parameters	H-5
Computed Parameters	H-7
Harmonics	H-10
Current Probes	H-11
Isolated Current Transformer Boxes	H-12
APPENDIX I - Pre-Defined Monitoring Setups	
APPENDIX J - Internal Modem Commands	
Command Summary	J-2
Register Access	J-5
Dial Descriptors	J-7
APPENDIX K - Identifying Your Power Circuit Type	
APPENDIX L - Connecting an External DC Power Supply	
Overview	L-1
Making and Connecting the DC Input Cable	L-3
External Battery Filter	L-6
Extension Cables	L-7
Installing the Battery Filter	L-8
APPENDIX M - Menu Structure	
Glossary	
Index	



8600-37

Dranetz-BMI Power Platform, Models PP1 & PP1E.



8600-46

Dranetz-BMI Power Platform, Models PP1 & PP1E, without printer.

Chapter 1

Introduction

Overview

Power Platform description

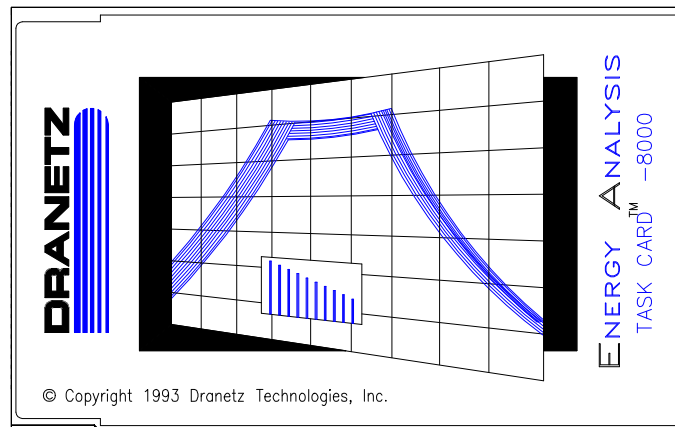
The Dranetz-BMI Power Platform, Models PP1 & PP1E, shown with and without printer on the facing page, introduces a new concept in power monitoring equipment by allowing you to change the type of monitoring the unit does by changing a TASKCard.

TASKCard definition

A TASKCard is a removable memory card that is installed in the rear panel of the Power Platform and contains an operating system that is designed for a specific application (task).

8000 TASKCard

The TASKCard 8000, shown below, offers Power Platform functions such as energy use surveys, demand analysis, and detailed harmonic analysis.



8600-63

Available TASKCards

Each available TASKCard provides the Power Platform with different capabilities. Refer to the optional accessories list in Appendix A for a description of all available TASKCards.

Continued on next page

Overview, Continued

This manual This manual contains instructions for operating the Dranetz-BMI Power Platform, Model PP1 & PP1E with or without the printer, with the TASKCard 8000 installed.

Throughout this manual reference to the Power Platform will be made when hardware or other generic functions are being described. Where software functions are being referenced, the term PP1-8000 will be used.

Index An Index is provided at the rear of this manual to assist you in quickly finding related subject information.

Easy Start Chapter 2 provides you with the information needed to quickly and easily set up the Power Platform for monitoring.

Quick Access Code The Quick Access Code (QAC) indicates the keys that have to be selected to reach the screen where that function is programmed from the MAIN MENU.

In this chapter The following topics are covered in this chapter.

Topic	See Page
Unpacking The Power Platform	1-3
Physical Description	1-4
Operational Description	1-6

Unpacking The Power Platform

Introduction

For maximum protection against possible shipping damage, the Power Platform has been sealed in a two-piece, pre-molded urethane foam pack, enclosed within a durable shipping carton. After opening the carton, inspect the contents for possible shipping damage and check the carton inventory. Save the carton for possible return of the Power Platform.

Unpacking

Unpack the Power Platform from the carton as follows:

1. Remove any remaining literature inside the top of the carton.
 2. Carefully remove the Power Platform from its shipping carton.
 3. Remove all accessories inside the carton. Check that the standard accessories (See next page) are included.
 4. Place all of the shipping materials back into the carton, close its flaps, and store it away. **DO NOT** throw away the carton and packing materials. Save the carton and packing materials in case you have to return the Power Platform to Dranetz-BMI for maintenance, repair, or calibration.
-

Shipping damage inspection

Visually inspect the Power Platform for possible shipping damage. If any damage exists, first notify and file an insurance claim with your carrier or underwriter or both. Then notify Dranetz-BMI Customer Service Department of your intentions to return the unit. **DO NOT** return the Power Platform without prior instructions from Dranetz-BMI Customer Service Department, telephone (732) 287-3680 or 1-800-372-6832.

Repacking for return shipment

If you have to return the Power Platform to Dranetz-BMI Customer Service Department, repack it in its original packing materials. Refer to the repacking instructions in Appendix B.

Physical Description

Dimensions The Dranetz-BMI Power Platform is a self-contained, portable instrument weighing less than 21 pounds and measuring 10" deep by 13" wide by 7" high.

Front panel The front panel, including screen, keypad, printer, and memory card is protected by a locking, flip-top type display housing. The padded bail handle can be used as a carrying handle or as a means to position the unit. See Chapter 3 for description of the front panel controls and indicators and how to position the Power Platform.

Rear panel The rear panel contains the input and output connectors including the slot for the TASKCard. See Chapter 3 for rear panel controls, indicators, and connectors.

Standard accessories The following table lists the Power Platform's standard accessories.

Part Number	Description
OM-PP1-TASK-8000	Operator's Manual
TASKCard-8000	8000 TASKCard, English only
115815-G1*	Measurement Cable Set (Domestic)
115815-G2*	Measurement Cable Set (Euro)
115815-G3*	Measurement Cable Set (UK)
115323-G1	Thermal Paper (4 rolls)
113218-G3	Terminal Block, 6 pin
113218-G4	Terminal Block, 8 pin
107506	Connector Plug, Battery
115520-G1	Wire Marker Kit
115240-G1	Shipping Carton
115818-G1	TASKCard Cover
107539-G13	TASKCard Cover Screw, Phillips Head, 4-40 x 1/4" long. Two used.
* User specified, one standard only.	

Optional accessories The optional accessories are described in Appendix A.

Physical Description, Continued

Batteries	Refer to Appendix C for the description and replacement of the batteries contained in the Power Platform.
------------------	---

Fuses	Refer to Appendix D for fuse information.
--------------	---

Replaceable Parts	Refer to Appendix E for operator replaceable parts.
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Operational Description

Monitoring Capacity

The PP1-8000 is a total electrical system analyzer which enables you to analyze electric power inefficiencies. It combines the best features of:

- a true RMS voltmeter and RMS clamp-on ammeter (for effective real time troubleshooting)
- oscilloscope (scope mode for real time waveform analysis)
- an event monitor (records out-of-limit conditions for any parameter)
- phase angle meter (analyzes phase imbalances)
- harmonic distortion analyzer (provides harmonic information as required by IEEE 519 and IEC 555-2)
- neutral-to-ground monitor
- a demand and energy use analyzer.

But with all its power and multi-functionality, the PP1-8000 is easy to use. Generally, three types of screens appear: menu selection screens, programming screens, and data screens.

Make selections from menu screens and enter numerical data for programming screens using the Power Platform's numeric keypad. Programming and data screens have an option bar containing up to six options across the bottom of the screen. Press the function key below an option to select it.

The PP1-8000 can monitor any of the following power configurations:

- Single phase, 2 wire
- Split phase, 3 wire
- 3 phase, 3 wire (Delta)
- 3 phase, 4 wire (Wye)
- 3 phase, 2 1/2 element
- KYZ pulse inputs

While monitoring any of the above configurations (with the exception of KYZ) the Power Platform-8000 can also be wired to monitor neutral to ground voltage.

Technical Specifications

Specifications for the PP1-8000, measured parameters, computed parameters, current probes, and isolated current transformers, are listed in Appendix H.

Continued on next page

Operational Description

Easy start The Easy Start function provides an online reference to quickly set up the Power Platform for monitoring and reporting. See Chapter 2.

Meter Mode In addition to monitoring for power disturbances, the PP1-8000 is a true RMS voltmeter and true RMS clamp-on ammeter. Voltage and current measurements, along with all other calculated parameters, are displayed on the Meter Mode screens. The PP1-8000 also functions as a phase angle meter, wattmeter, VAR meter, PF meter, and frequency meter.

Available Parameters: The following table lists all the parameters and their abbreviations as displayed on the Power Platform's screens.

Parameter	Abbreviation
Volts	V
Amps	I
Watts	W
Volt-Amperes	VA
Volt-Amperes Reactive	VAR
Power Factor (True)	PF
Frequency	HZ
Voltage Harmonic Distortion	Vthd
Current Harmonic Distortion	Ithd
Current Crest Factor	Icf
K-Factor	Kf
Demand • Projected Demand	Dmd
Energy • Accumulated Energy • Energy Rate • Monthly Energy • Daily Energy	WH
Voltage Crest Factor	Vcf
Displacement Power Factor	DPF
Transformer Derating Factor	TDF
Voltage Telephone Influence Factor	Vtif
Current Telephone Influence Factor	Itif

Operational Description, Continued

Meter Mode (continued)

Phase angle meter: The PP1-8000 can display voltage and current phasors for all of the channels. Functioning as a phase angle meter, the Power Platform can display system imbalance conditions. The phase angle display can also verify that monitoring connections have been made correctly.

Meter mode operation does not interfere with any of the analyzer's other monitoring or recording functions. The meter mode is not effected by the configuration of the PP1-8000. Turning monitoring off or individual channels off does not effect meter readings.

Scope mode

When in scope mode, the PP1-8000 is an oscilloscope, displaying real-time waveforms of voltage and current for all channels.

Setups

A setup consists of a number, title, and up to 32 reports. The types of reports programmed, and the conditions that must exist for the report to be generated, are all contained in a setup. A total of 32 setups are available, although only one setup can be active at a given time.

Setups 1-8 are predefined for the user's convenience. Setups 9-32 can be programmed by the user.

Events

An event is stored in memory when an out-of-limits trigger, return-to-normal trigger, or an external trigger generates a report. The event describes the trigger and states when it occurred. An event is also recorded when the Power Platform is turned on/off. AC power restored; Battery Low; Paper low; }

Events can be viewed through the VIEW REPORTS MENU (item 2 from the MAIN MENU), or they can be sent to one of the other output devices (printer, memory card, or communication ports) when a certain trigger condition is met.

Reports

A report is a unit of information pertaining to one or more channels and parameters. Report *types* are pre-defined, although the parameters that are contained in some reports are user-selectable.

Through the monitoring setups, a report can be programmed to be sent to the printer, to one of the communication ports, or to the report memory, when a certain "trigger condition" is met. Relay reports are used to activate a relay when a trigger condition is met.

Continued on next page

Operational Description, Continued

Reports (continued)	Present values for available report types, and any reports stored in memory, can be viewed through MAIN MENU item 2, View Reports.
Communication	The PP1-8000 provides full duplex communication for both RS232 and modem.
Help	Help is available by pressing the question mark (?) key on the numeric keypad. A help screen is a one page description of the screen (function) presently displayed.
Calibration	<p>The recommended calibration interval for this unit is once every 12 months.</p> <p>We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact the Dranetz-BMI Customer Service Department to obtain an Authorization Number.</p> <p>Telephone No.: (732) 287-3680 FAX: (732) 248-9240</p>
PP1-8000 Messages	Messages that appear on the display are described in Appendix F.
Connecting to an external power source	Connecting the Power Platform to an external DC power source is described in Appendix L.
Menu structure	The PP1-8000 menu structure is described and shown in Appendix M.

Continued on next page

Operational Description, Continued

Digital Inputs

The Power Platform's rear panel has four digital inputs. These inputs can be used for

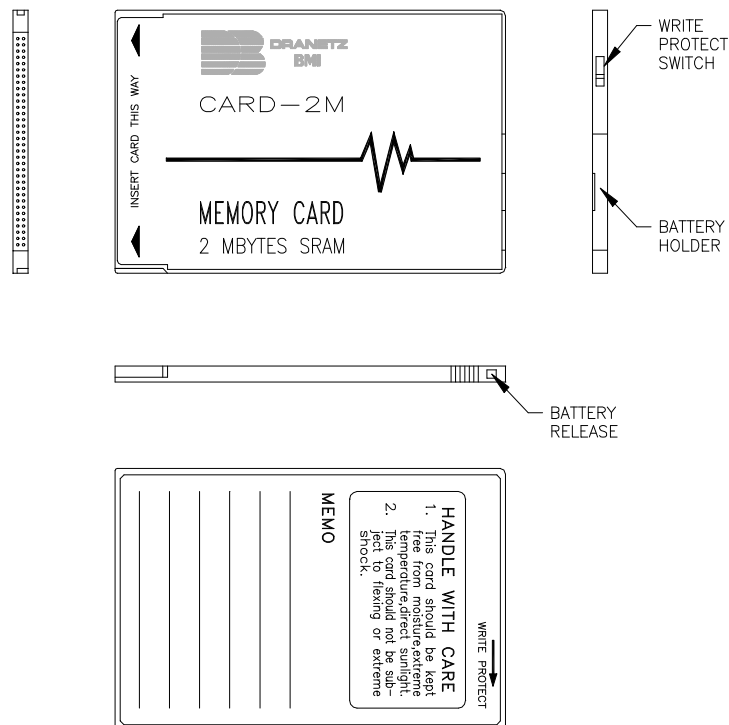
- KYZ pulse measuring, as mentioned in the previous subsection
- external triggers, to generate a report
- demand interval synchronization, to synchronize the Power Platform's demand intervals with the intervals used by the utility company
- start/stop measurements, for recording measurements only during a specified interval
- pulse interval or pulse duration timing, to act as an elapse-timer, indicating an interval's duration and ending point
- pulse rate, to measure pulses per second

Memory Card

A memory (data) card is used with the Power Platform to provide a removable, rugged, compact, solid state mass storage device. A memory card, shown below, uses low power, has an internal battery for data retention, and is available as an optional accessory in sizes from 512 Kbytes to 2 Mbytes.

For information about the battery, refer to Appendix C.

The PP1-8000 treats the memory card like a floppy disk storing files in a DOS format. In the PP1-8000, the memory cards are used to store events and setups.



8000-18

Operational Description, Continued

- Printing options** There are three printing conditions possible dependent on which version of the PP1 or PP1E is being used and whether or not an external printer is connected. These conditions are as follows:
- PP1 or PP1E with internal printer,
 - PP1 or PP1E with internal printer and external parallel printer connected,
 - PP1 or PP1E without Internal printer and external parallel printer connected.

In all three of these conditions, pressing the PRINT function key, when displayed, will produce a normal printing function to occur, on either the internal or external printer.

A PP1 or PP1E having an internal printer and connected to an external parallel printer, will automatically bypass the internal printer and will print to the external printer only.

Chapter 2

Easy Start

Overview

Introduction This chapter provides you with a quick and easy way to start monitoring if you are familiar with the setup and operation of similar power monitoring equipment. If you are not familiar with equipment of this type, proceed to Chapter 3 for a detailed description of the Power Platform.

Easy Start description Easy Start provides a condensed version of the programming sections of this manual for those who wish to start using the PP1-8000 before learning about all of its capabilities. It includes the minimal steps needed to easily and quickly program the Power Platform for monitoring.

The User Guide provides on-line help about individual screens whenever the question mark key (on the numeric keypad) is pressed.

The steps involved in EASY START are:

Topic	See Page
Time and Date	2-2
Billing Dates	2-3
Demand Criteria	2-5
Select Present Configuration	2-6
Program Monitoring Setups	2-8
Clear Memory	2-10

Installation can be done either before or after programming. Refer to Getting Started, Chapter 4, for information on the necessary hardware connections.

Easy Start Setup Guide The information contained in this chapter is available on-line by selecting 6, Easy Start, from the Main Menu. The guidelines for setting up the above mentioned parameters will be printed when you select their corresponding menu number from the Easy Start Setup Guide.

Time and Date

Procedure If the time and date appearing on the top line of the Power Platform's screen is incorrect, follow the procedures outlined below to program the time and date.

Step	Action
1	Using the numeric keypad, select 4,2,1 for the Set Time and Date screen to appear. <div data-bbox="639 537 1333 921" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <pre> Jun-11-91 11:02:09 SET TIME AND DATE PRESENT TIME (hh:mm:ss) : 11:02:09 PRESENT DATE (mmm-dd-yy): Jun-11-91 [ENTER TIME] [ENTER DATE] [] [] [] [EXIT] </pre> </div>
2	Select [ENTER TIME]. The options at the bottom of the screen change and the hour portion of the time is highlighted.
3	Use the numeric keypad to enter the hour in 24-hour format. Select [ENTER]. The highlight moves to the minute portion of the time.
4	Enter the minutes and select [ENTER]. If desired, enter the seconds. Select [ENTER].
5	Select [ENTER DATE]. The options at the bottom of the screen change and the month portion of the date is highlighted.
6	Use the numeric keypad to enter the month. (For example, enter "1" for January. The number entered is converted to three-character format when the complete date has been entered.) Select [ENTER].
7	The highlight moves to the day portion of the date. Enter the day and select [ENTER].
8	The highlight moves to the year portion of the date. Enter the year and select [ENTER].
9	The new date and time appear on the screen. Select [EXIT] until the MAIN MENU is displayed.

Billing Dates

Procedure

The billing dates define when one billing month ends and the next one begins. These dates can be programmed, changed, or cleared following the procedures outlined below.

Step	Action
1	<p>Using the numeric keypad, select 4,3,2 for the Set Billing Dates screen to appear</p> <div data-bbox="651 613 1318 1016" style="border: 1px solid black; padding: 5px; text-align: center;"> <pre> Jun-11-91 11:08:42 PROGRAM BILLING DATES # DATE # DATE 1 ████████ 7 Aug-13 2 Mar-10 8 Sep-14 3 Apr-08 9 Oct-16 4 May-11 10 Nov-16 5 Jun-11 11 Dec-18 6 Jul-13 12 Jan-18 NEXT SELECT SELECT CLEAR PRINT EXIT ENTRY MONTH DAY DATES </pre> </div>
2	<p>If more than the required number of dates are programmed, or to use month-long billing periods starting with the present date, select [CLEAR DATES].</p> <p>NOTE: If you clear the billing dates and exit this screen without programming any new dates, the PP1-8000 uses the present date as the first date of the billing month, and subsequent billing dates are set to be the same date each month.</p>
3	<p>If necessary, select [NEXT ENTRY] to move the cursor to the date to be programmed.</p>
4	<p>Select [SELECT MONTH]. The options at the bottom of the screen change and the month portion of the date is highlighted.</p>
5	<p>Use the numeric keypad to enter the month (for example, enter "1" for January). Select [ENTER]. The number entered is converted to three-character text format (for example, "Jan") and the previous options are displayed.</p>
6	<p>Select [SELECT DAY]. The options at the bottom of the screen change and the day portion of the date is highlighted.</p>

Continued on next page

Billing Dates, Continued

Procedure
(continued)

Step	Action
7	Use the numeric keypad to enter the day and select [ENTER]. The previous options are displayed.
8	Select [NEXT ENTRY] to move the highlight to the next programmable date.
9)	Repeat steps 6 through 10 until all the required dates have been set. After the billing dates are programmed, select [EXIT] until the MAIN MENU is displayed.

Demand Criteria

Introduction

Your utility company should provide you with information about the interval duration and demand parameter used for billing purposes by your system. These criteria can be programmed following the procedures outlined below.

Procedure

Step	Action
1	<p>Using the numeric keypad, select 4,3,4 for the Set Demand Interval Criteria Screen to appear.</p> <div data-bbox="656 680 1317 1058" style="border: 1px solid black; padding: 10px; text-align: center;"> <pre> Jun-11-91 12:56:40 SET DEMAND INTERVAL CRITERIA INTERVAL TYPE: FIXED INTERVAL DURATION: 1 MINUTES INTERVAL SYNCH: START NOW DEMAND PARAMETER: W SELECT SELECT SELECT SELECT START EXIT TYPE DURAT. SYNCH PARAM TIME </pre> </div>
2	<p>The interval type can be either FIXED or SLIDING. If SLIDING is displayed on the screen, select [SELECT TYPE] to change the setting to FIXED. (If you would rather use a sliding interval, refer to page 5-34.</p>
3	<p>To change the interval duration select [SELECT DURAT.]. The options at the bottom of the screen change and the interval duration field is highlighted.</p>
4	<p>Use the numeric keypad to enter the duration. (Duration must be between 1 and 120 minutes.) Select [ENTER].</p>
5	<p>To change the demand parameter, select [SELECT PARAM] until the desired parameter is displayed. The demand interval begins when the unit is turned on (unless it is programmed to start at an external trigger). To change the interval synchronization, refer to page 5-35 in this manual.</p>
6	<p>Once the demand criteria is programmed, select [EXIT] until the MAIN MENU is displayed.</p>

Select Present Configuration

Introduction

The PP1-8000 can be connected to single, split, or three phase power circuits using the analog (voltage and current) inputs. Or, the Power Platform can be connected to a pulse initiating device using the digital inputs.

The Power Platform's programming must correctly identify the type of configuration that is being monitored. This section describes how to program the proper configuration for single, split, or three phase power circuits. To configure the Power Platform for a pulse initiation device, refer to "Input and Output Devices" on page 5-3.

If Dranetz-BMI current probes are to be connected to the circuit to be monitored without any intermediate transformers, that channel's current scale factor should be "1.0". If the probes are to be connected to the circuit through the secondary of another CT, or if using an isolated termination box, refer to page 5-6 of this manual for information on computing the scale factor.

If the Power Platform's voltage cables are to be connected to the circuit to be monitored without any intermediate transformers, that channel's voltage scale factor should be "1.0". If the voltage cables are to be connected to the circuit through the secondary of a potential transformer, or if voltage connections are not made, refer to page 5-6 of this manual for information on computing the scale factor or programming the voltage values.

Continued on next page

Select Present Configuration, Continued

Procedure To program the Present Configuration when using analog (voltage and current) inputs:

Step	Action
1	<p>Using the numeric keypad, select 4,1,1 for the Analog Inputs Configuration screen to appear.</p> <div data-bbox="652 577 1318 949" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre> Jul-13-92 13:36:55 ANALOG INPUTS CONFIGURATION PRESENT CONFIG: SINGLE PHASE SCALE FACTOR: CHN VOLTS AMPS A 1.0000 1.0000 B 1.0000 1.0000 C 1.0000 1.0000 LOW D 1.0000 1.0000 FREQ SYNC (Press 1 to change): EXTERNAL SELECT PROG ENTER CHAN D PRINT EXIT CONFIG VALUES SCALE RANGE </pre> </div>
2	<p>If monitoring input on channel D, either HIGH or LOW range must be selected (refer to page 5-8).</p>
3	<p>If the scale factor for any of the channels needs to be changed, select [PROG VALUES] to move the highlight to the channel to be changed.</p>
4	<p>Select [ENTER SCALE]. The options at the bottom of the screen change and the volts entry is highlighted. Enter a value for the voltage scale and select [ENTER]. The Amps entry is highlighted. Enter a value for the amps scale and select [ENTER]. The previous options are displayed.</p>
5	<p>Repeat steps 3 and 4 until all the required scale values are programmed.</p>
6	<p>With the desired configuration displayed, select [EXIT]. Select [EXIT] until the MAIN MENU is displayed.</p>

Program Monitoring Setups

Introduction

A setup consists of a title, number, and up to 32 reports. A setup must be activated before monitoring can begin.

To simplify the programming process, the PP1-8000 comes equipped with 8 pre-defined monitoring setups. These setups can be found in Appendix I. They can also be printed out from the MONITORING SETUPS MENU. (The PP1-8000 allows for programming of up to 24 additional setups.)

Select one of the pre-defined setups from the appendix or from the printout. If you would rather create your own setup, or modify one of the pre-defined setups, refer to Chapter 6, "Programming Monitoring Setups."

Printing Pre-defined Setups

To print out the pre-defined setups:

Step	Action
1	Select 3,2 for the Selected Set-ups To Be Printed screen appears. <div data-bbox="651 976 1320 1346" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <pre> Jun-29-92 15:47:19 SELECTED SET-UPS TO BE PRINTED PRE-DEFINED 01 02 03 04 05 06 07 08 USER-DEFINED 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 USE KEYPAD & ENTER TO SELECT SET-UP: 1 ENTER BACK ALL ALL START EXIT SPACE PREDEF USER'S PRINT </pre> </div>
2	Select [ALL PREDEF]. Select [START PRINT].
3	Once printing has begun, select [EXIT] to return to the MONITORING SETUPS MENU. Skip step 1 below.

Continued on next page

Program Monitoring Setups, Continued

Selecting a Setup

To select a pre-defined setup:

Step	Action
1	<p>Select 3,1 for the Monitoring Set-ups Programming screen to appear.</p> <pre data-bbox="662 520 1307 865"> Oct-01-91 14:02:56 MONITORING SET-UPS PROGRAMMING SCREEN SET-UP# 1 24 SETUPS AVAILABLE. TITLE: DEMAND & ENERGY-PLOT & MIN/MAX STATUS: ACTIVE INPUT CONFIG: SINGLE PHASE A TOTAL OF 4 REPORTS ARE PROGRAMMED FOR THIS SET-UP. NEXT CHANGE SET-UP INPUT MORE EXIT SET-UP STATUS TITLE CONFIG ↑↓ PRINT COPY DELETE EDIT MORE EXIT SET-UP SET-UP SET-UP REPORT </pre>
2	Select [NEXT SETUP] until the desired setup is displayed.
3	If the setup is not active, select [CHANGE STATUS] to activate it.
4	Select [EXIT] until the MAIN MENU is displayed.

Clear Memory

Introduction The PP1-8000 starts recording data from the moment it is powered on; data recorded before the programming and installation steps were completed should be cleared from memory.

Additionally, if the Power Platform had been used for a previous application, it may contain data that does not apply to your present application; this data should also be cleared from memory.

CAUTION Clearing memory deletes all events that are currently saved. To avoid losing data, save all events to a memory card before proceeding.

PRECAUCIÓN Si se despeja la memoria se suprimen todos los sucesos actualmente guardados. Para evitar perder datos, guarde todos los eventos en una tarjeta de memoria antes de proceder.

MISE EN GARDE La fonction d'effacement de mémoire supprime tous les événements sauvegardés au fur et à mesure. Pour éviter toute perte de données, avant de poursuivre sauvegardez tous les événements sur une carte à mémoire.

VORSICHT Durch das Löschen des Arbeitsspeichers werden alle aktuell gespeicherten Ereignisse entfernt. Um einen Datenverlust zu vermeiden, sollten Sie alle Ereignisse vor dem Fortfahren auf einer Speicherkarte speichern.

Continued on next page

Clear Memory, Continued

Procedure Memory can be cleared following the procedures outlined below.

Step	Action
1	<p>Using the numeric keypad, select 5,3 for the Clear Analyzer's Memory screen to appear.</p> <div data-bbox="651 501 1321 867" style="border: 1px solid black; padding: 10px; text-align: center;"><p>Oct-01-91 14:15:35</p><p>CLEAR ANALYZER'S MEMORY</p><p>WARNING: SELECTING ANY OR ALL OF THE CLEAR MEMORY FUNCTIONS WILL IRREVOCABLY DESTROY THE DATA IN THAT MEMORY AREA. PRESS 'EXIT' TO RETURN TO PREVIOUS MENU WITHOUT EXECUTING ANY FUNCTION.</p><p>CLEAR ALL CLEAR HISTOR CLEAR REPORT CLEAR EVENT RESET CONFIG EXIT</p></div>
2	Select [CLEAR ALL]. A warning message appears asking for confirmation of the requested action.
3	Select [YES] to confirm clearing the memory.
4	Once the memory is cleared, select [EXIT] until the MAIN MENU is displayed.

Chapter 3

Controls, Indicators, and Connectors

Overview

Introduction This chapter identifies and describes the controls, indicators, and connectors on the front and rear panels of the Power Platform. In addition, the methods of positioning the unit for carrying, operating, and securing the unit are discussed.

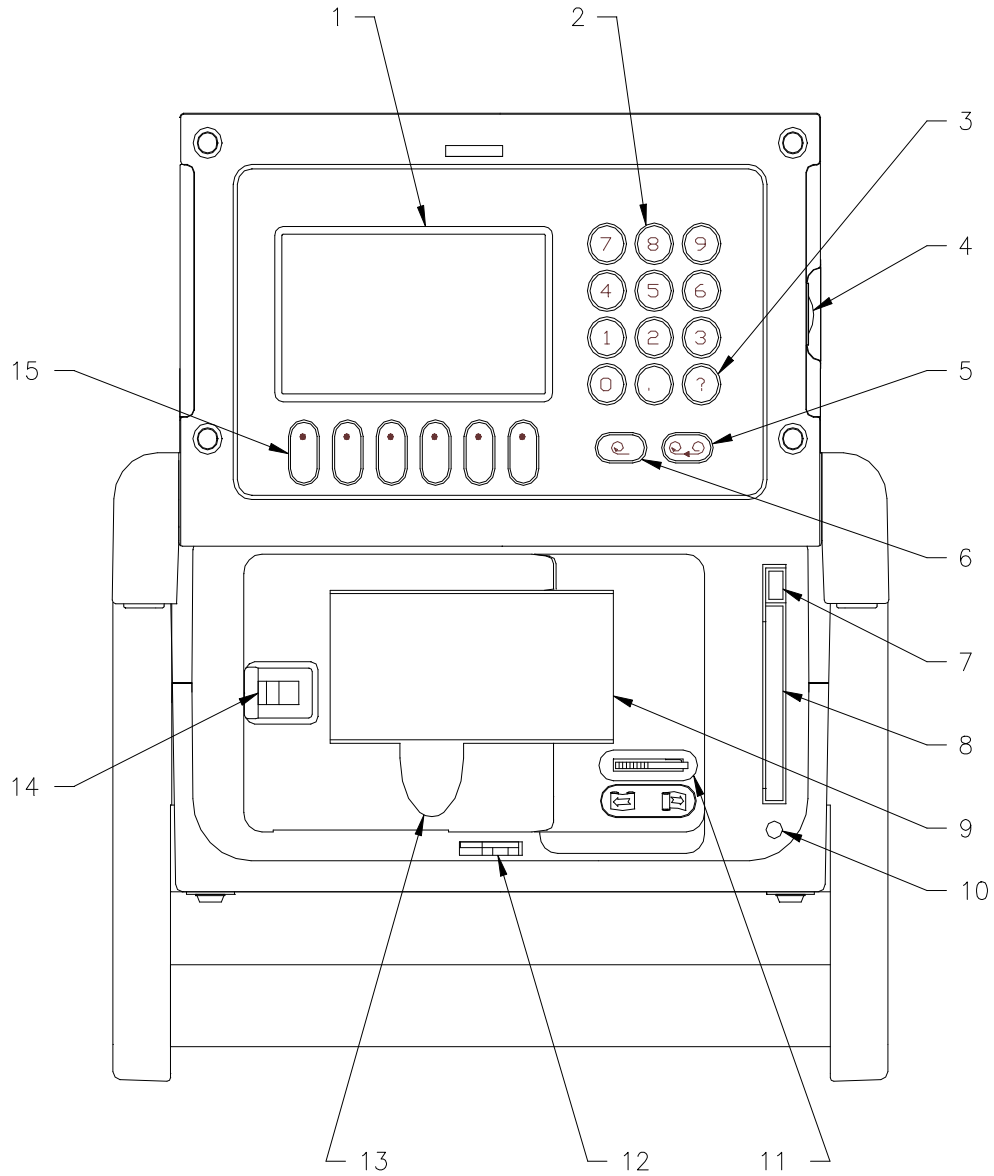
In this chapter The following topics are covered in this chapter.

Topic	See Page
Front Panel	3-2
Rear Panel	3-4
Positioning the Unit	3-8

Front Panel

Diagram

Models PP1 & PP1E



8600-16

Continued on next page

Front Panel, Continued

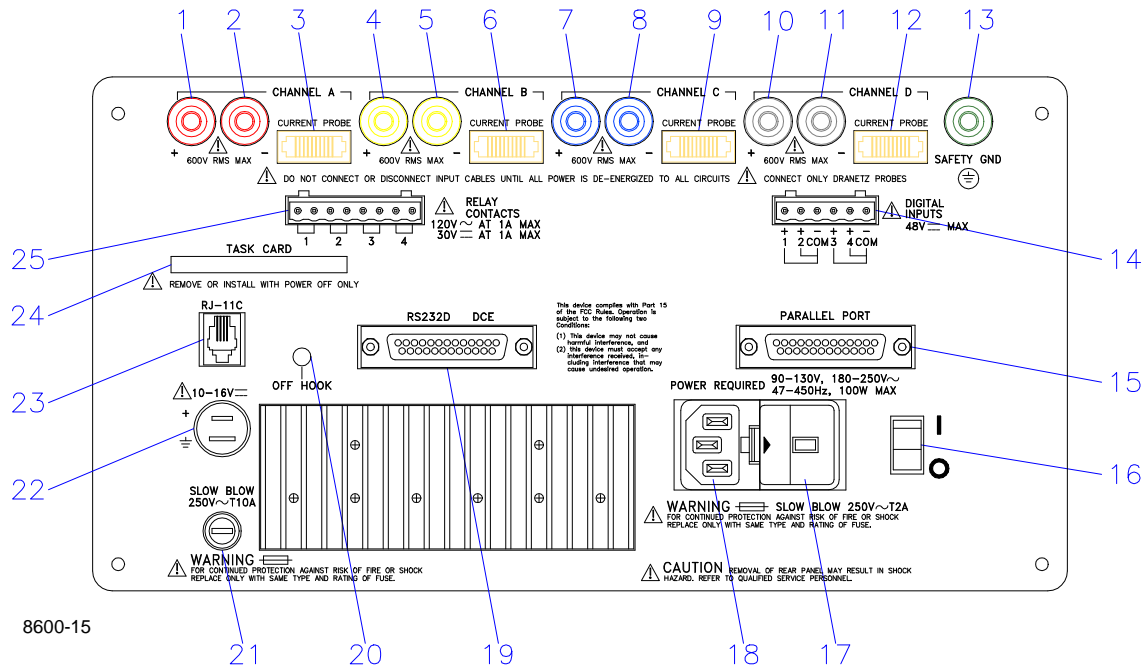
Parts Table

Part	Function
1	Liquid Crystal Display (LCD). Provides 2 3/4 x 4 1/2 inch (5 x 10 cm) display consisting of 240 by 128 pixels (dots) of text and graphic information. Has electroluminescent (EL) backlighting for low light level viewing.
2	Numeric keypad. Consists of keyboard keys 0 thru 9 and decimal point (.). Permits menu selection and numerical data entry.
3	Question Mark Key. Provides selection of User Guide to display help screens with reference to screen displayed at any time.
4	Contrast Control. Provides contrast range control for LCD viewing.
5	Paper Feed. Controls paper feed and take up to advance the paper uniformly across window from right to left.
6	Paper Take-up. Controls paper slack.
7	Data Card Release. Ejects data (memory) card.
8	Data Card Holder. Holds and connects data (memory) card to internal circuitry.
9*	Thermal Paper Printout. High-resolution thermal print of real-time data and report information.
10	Data Card Busy LED. Yellow LED indicates data (memory) card is being accessed.
11*	Run/Load Printhead Control. Lever in left position for normal run operation. Lever in right position lifts printhead from paper for loading or paper pulling.
12	Keylock. Secures front panel in locked shut position.
13*	Finger Groove. Access to grasp and pull paper out for viewing. (Note: Printhead control must be in LOAD position before paper is pulled.)
14*	Printer Door Latch. Moves to right to unlock printer door.
15	Function Keys. Used to select options that appear on bottom of screen. Function selected varies with screen displayed.
*Part of PP1 & PP1E with printer.	

Rear Panel

Diagram

Model PP1



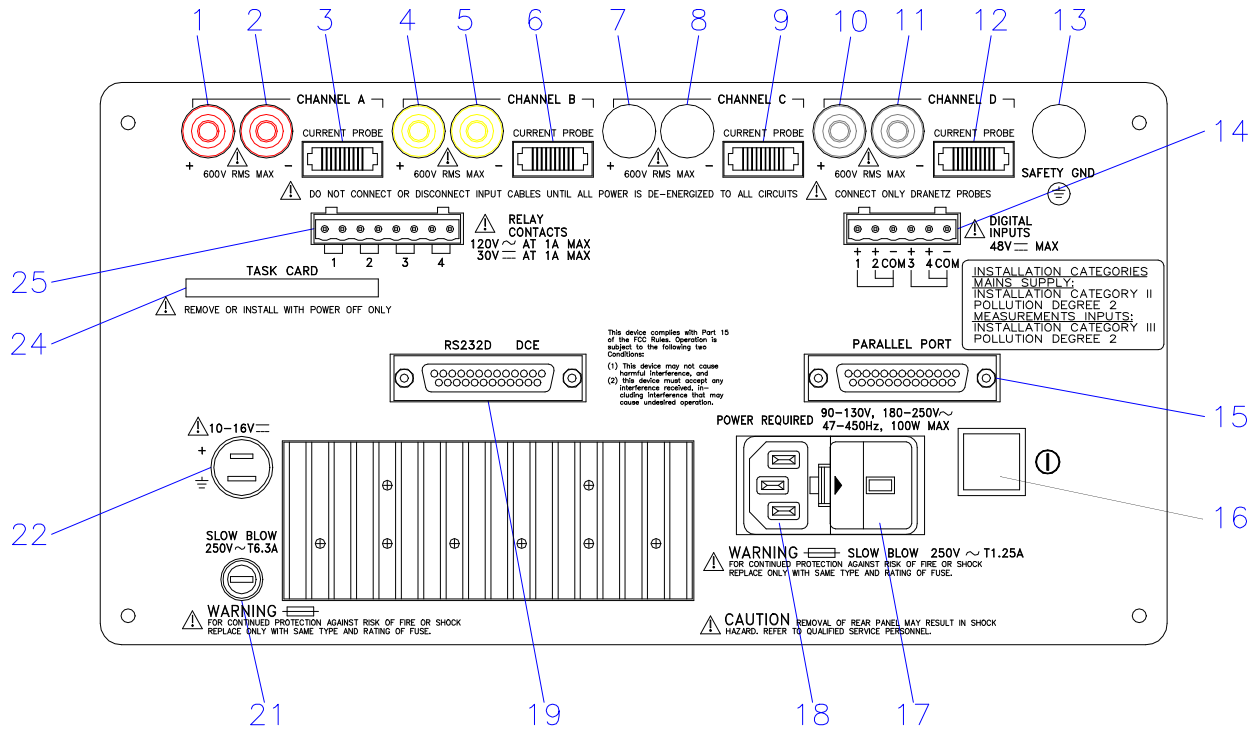
8600-15

Continued on next page

Rear Panel, Continued

Diagram

Model PP1E



Continued on next page

Rear Panel, Continued

Parts Table

Models PP1 & PP1E

Part	Description
1	CHANNEL A, + Differential Voltage Input Connector; color red.
2	CHANNEL A, - Differential Voltage Input Connector; color white.
3	CHANNEL A, CURRENT PROBE Input Connector.
4	CHANNEL B, + Differential Voltage Input Connector; color yellow.
5	CHANNEL B, - Differential Voltage Input Connector; color white.
6	CHANNEL B, CURRENT PROBE Input Connector.
7	CHANNEL C, + Differential Voltage Input Connector; color blue.
8	CHANNEL C, - Differential Voltage Input Connector; color white.
9	CHANNEL C, CURRENT PROBE Input Connector.
10	CHANNEL D, + Differential Voltage Input Connector; color grey.
11	CHANNEL D, - Differential Voltage Input Connector; color white.
12	CHANNEL D, CURRENT PROBE Input Connector.
13	SAFETY GROUND Connector; color green.
14	DIGITAL INPUTS, 12-48 VDC. Four channels of digital signal inputs.
15	PARALLEL PORT, Parallel data port.
16	On/Off Switch. 1 = ON, 0 = OFF.
17*	PP1: SLOW BLOW 250 VAC T2A. Fuseholder. (Main Power) PP1E: SLOW BLOW 250 VAC T1.25A 5x20 mm Fuseholder (Main Power).
18	POWER REQUIRED, 90-130 VAC 180-250 VAC, 47-450 Hz, 100 W MAX. Input power plug.
19	RS232D DCE, Serial data port.
20	PP1: OFF HOOK indicator. When lit yellow indicates that the telephone line is active. PP1E: Not available
21*	PP1: SLOW BLOW, 250 VAC T10A. Internal/External battery fuse. PP1E: SLOW BLOW, 250 VAC T6.3A 5x20 mm Internal/External battery fuse.

Continued on next page

Rear Panel, Continued

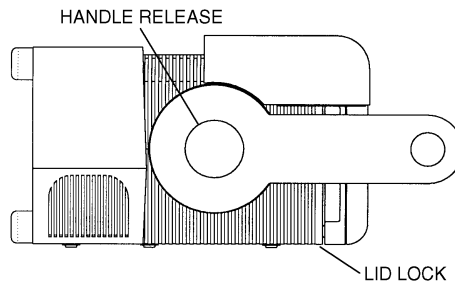
Parts Table (continued)

Part	Description
22	10-16VDC, External DC voltage source input.
23	PP1: RJ-11C. Telephone jack for internal 2400 baud modem connection. PP1E: Not available.
24	TASK CARD, connector slot. TASKCard Protective Cover, mounted with screws after TASKCard is installed. (Not shown.)
25	RELAY CONTACTS, 120 VAC AT 1A MAX, 30 VDC AT 1A MAX. Four sets of relay contacts.
* Refer to Appendix D for Fuse Replacement	

Positioning the Unit

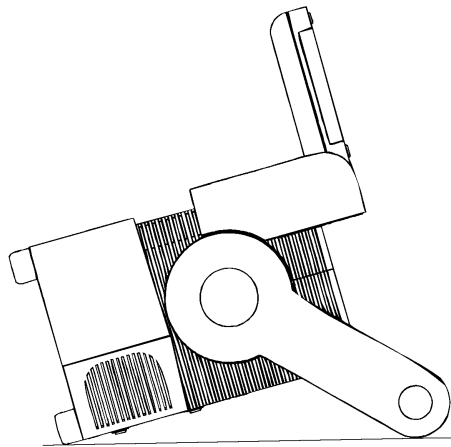
Handle release Handle releases, in the pivots of the handles, must be pressed inwards together to unlock the handles. Once released, the handles can be positioned in three positions: one for carrying the unit, and two for viewing the display at 15 or 45 degrees. At each position the handles will lock and must be released again to be repositioned.

Handle release location and carrying position

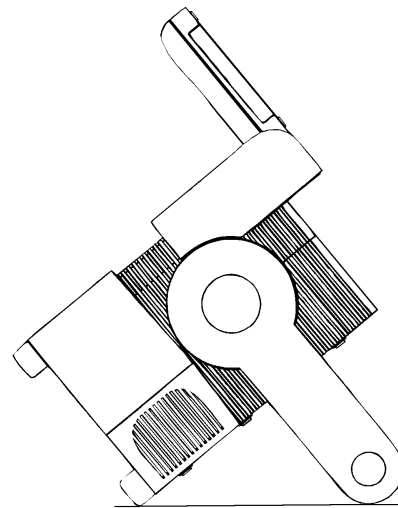


8600-53

Viewing positions



8600-54



8600-55

Chapter 4

Getting Started

Overview

What is getting started? This chapter helps you to get started in making the required connections to the circuit to be monitored, verify that your connections are made correctly, activate a monitoring setup so that the unit can begin gathering information, and view the basic displays of the parameters being monitored.

In this chapter This chapter is divided into five sections.

Section	Title	See Page
A	Turn On Procedures	4-2
B	Voltage and Current Cable Connections	4-11
C	Circuit Diagrams for Power Measurements	4-37
D	Monitoring Setup Procedures	4-54
E	Scope and Meter Mode	4-58

Section A

Turn On Procedures

Overview

Introduction This section describes the procedures you need to perform before you turn the unit on and what you should see after it is on. Possible error conditions and the necessary corrective actions are also discussed.

In this section The following topics are covered in this section.

Topic	See Page
Setting the Voltage Selector	4-3
Power Requirements	4-5
Installing a TASKCard	4-6
Turning the Unit On	4-7

Setting the Voltage Selector

Introduction The Power Platform input voltage may be set to 115VAC or 230VAC by manually positioning a selector type switch. The selected operating voltage is indicated in a window of the fuse holder.

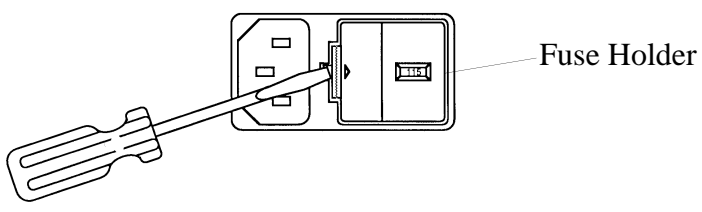
WARNING The power to the Power Platform must be off when changing the voltage selector.

ADVERTENCIA Se debe cortar la energía a la Plataforma de energía cuando se cambie el selector de voltaje.

AVERTISSEMENT L'alimentation jusqu'à la plate-forme d'alimentation doit être coupée lors du changement de tension.

WARNUNG Die Stromzufuhr zur "Power Platform" (Stromplattform) muß ausgeschaltet sein, wenn der Spannungswähler ausgewechselt wird.

Procedure Follow these steps to set the voltage selector.

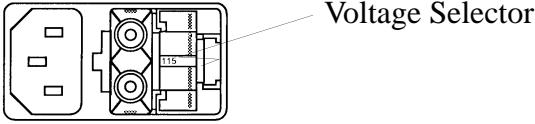
Step	Action
1	Turn power switch off and remove power cord, if connected.
2	Place screwdriver blade in fuse holder retaining slot and push to right to release fuse holder.
	
3	Remove fuse holder.

8600-56

Continued on next page

Setting the Voltage Selector, Continued

Procedure (continued)

Step	Action
4	Grasp and pull out voltage selector from fuse holder body.  8600-57
5	Rotate voltage selector so that desired voltage marking is facing rear of panel.
6	Insert voltage selector into fuse holder slot and push firmly to seat.
7	Replace fuse holder.
8	Verify that voltage selector indicator displays the required voltage. If not, repeat steps 2 through 7.

Power Requirements

Introduction

The Power Platform can be operated from an AC or DC power source. Refer to Appendix L for information about connecting to an external DC power source.

Connecting to an AC power source

Follow these steps to connect to an AC power source.

Step	Action
1	Verify that the power switch is off. See rear panel, page 3-5, item 16.
2	Verify that the voltage selector on the rear panel is set to the operating voltage of your facility. If voltage selection is wrong, refer to page 4-3.
3	Connect female end of correct operating voltage power cord (listed below) to the AC power input receptacle on the rear panel. <ul style="list-style-type: none">• 115 VAC power cord - Part No. 110893-G1 (Domestic)• 230 VAC power cord - Part No. 110726-G1 (Domestic)• 230 VAC power cord - Part No. 115369-G1 (Euro)• 230 VAC power cord - Part No. 115368-G2 (UK)
4	Connect male end of power cord to input power source.

Operating the PP1 using the internal battery

Follow these steps to run the Power Platform on the internal battery.

Step	Action
1	Turn the unit off.
2	Disconnect AC power cord.
3	Turn on power to the unit. <u>Note:</u> The unit will operate up to one hour without using printer. Using printer continuously will deplete the battery in approximately 15 minutes.

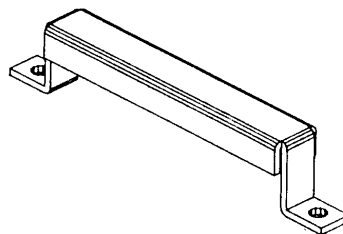
Installing a TASKCard

Procedure

Follow these steps to install a TASKCard.

Step	Action
1	Turn off power to the unit.
2	Remove TASKCard-8000 from its protective holder and check that the plug end of card is clean and free of any obstruction. <u>Note:</u> If plug end of card is dirty, clean with static-free, dry, low pressure air to remove any foreign material causing obstruction of the plug holes.
3	Verify that the Write Protect switch (end opposite plug) is set to the Write Protect position. Use pencil point to move switch.
4	At the rear of the unit, position the TASKCard-8000 with the label facing up and the plug end facing the TASK CARD slot.
5	Insert the card fully into the slot until resistance is felt, then press firmly until the card engagement is felt. <u>Note:</u> Do not force the card further into the slot if no card engagement is felt. Remove card and check that there is no foreign object on or in the plug end of the card. Remove any obstruction. Reinsert card and repeat card engagement. If card cannot be engaged, STOP all further action and call Dranetz-BMI Service for further instructions.
6	To prevent the inserted TASKCard from being removed during operation, install the TASKCard cover accessory (shown below) over the TASKCard and secure the cover with the two screws provided.
7	Go to next page for power turn on procedure.

TASKCard cover



8600-59

Turning the Unit On

WARNING Do not turn power on unless a secure safety ground, using the green safety wire, is connected to the green ground terminal on the rear panel.

ADVERTENCIA No encienda la energía a menos de que haya una conexión a tierra de seguridad, utilizando el alambre de seguridad verde, con el terminal de conexión a tierra verde en el panel posterior.

ATTENTION Ne pas mettre sous tension sauf si une mise à la terre adéquate, en utilisant le câble vert de sécurité, est connectée à la borne de mise à la terre verte sur le panneau arrière.

WARNUNG Schalten Sie den Strom nicht ein, bevor Sie eine sichere Erdung mit dem grünen Erdungsdraht hergestellt haben, der an den grünen Erdungsterminal auf der Rückwand angeschlossen ist.

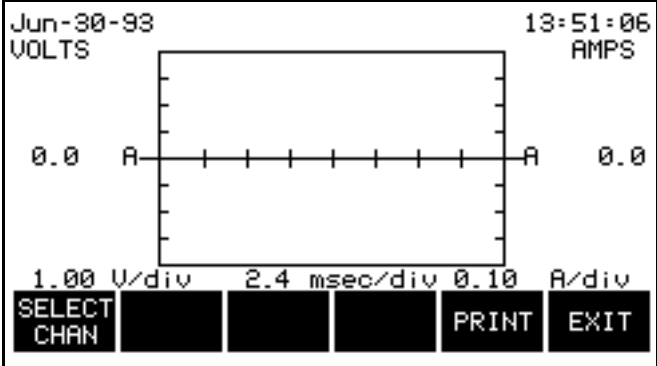
Procedure Follow these steps when turning on the Power Platform.

Step	Action
1	Verify that the green grounding connector is attached to the Safety Gnd connector on the rear panel and that the other end is firmly attached to a secure ground.
2	Verify that all voltage probe connections at the source or load are secure and that voltage probes are connected securely to the rear panel.
3	Verify that all current probe connections at the source or load are secure and that current probes are connected securely to the rear panel.
4	Verify that the TASKCard-8000 is installed in the rear panel.

Continued on next page

Turning the Unit On, Continued

Procedure (continued)

Step	Action
5	<p>Turn on power to the unit.</p> <p><u>Result:</u> If the TASKCard is inserted correctly, the unit will perform internal diagnostics, momentarily display the message “TASKCard Found, Loading 8000 Vxx”, then display the scope mode screen shown below.</p>  <p><u>Note:</u> If the TASKCard is not inserted correctly, or if the TASKCard is corrupted, an error message will be displayed indicating TASKCard or downloading failure. Refer to the error message table on next page for the error message types and what to do next.</p>

TASKcard error messages The following table describes the possible error messages when loading the TASKCard and the corrective action to take for each.

Error Message	What to Do Next
TASKCard Not Found. Booting From ROM.	TASKCard may not be installed or is installed incorrectly. Turn off power and recheck TASKCard installation. To boot from ROM see next page.

Continued on next page

Turning the Unit On, Continued

TASKcard error messages (continued)

Error Message	What to Do Next
Corrupt TASKCard. Booting from ROM.	A TASKCard was found but it was not recognized as a valid TASKCard. Turn off power and recheck TASKCard. If the TASKCard is properly inserted, there may be a problem, notify Dranetz-BMI. To boot from ROM, see next page.
<p>WARNING: The TASKCard found: (now installed) Is different than last used: (previous TASKCard) CHANGING TASKCARDS MAY ERASE MEMORY!</p> <p>ADVERTENCIA: La TASKCard que se encontró: (ahora instalada) Es diferente de la utilizada la última vez: (TASKCard anterior) ¡CAMBIAR LAS TASKCARDS PUEDE BORRAR LA MEMORIA!</p> <p>AVERTISSEMENT: La TASKCard détectée : (actuellement installée) est différente de la dernière utilisée : (TASKCard précédente) LE CHANGEMENT DE TASKCARDS PEUT EFFACER LA MÉMOIRE !</p> <p>WARNUNG: Die gefundene TASKCard: (jetzt installiert) ist unterschiedlich von der zuletzt benutzen: (vorherige TASKCard) WECHSELN DER TASKCARDS KANN SPEICHER LÖSCHEN!</p>	<p>Press any key to continue or turn off the unit and reinstall the last TASKCard used.</p> <p>Pulse cualquier tecla para continuar o apague la unidad y vuelva a instalar la última TASKCard utilizada.</p> <p>Appuyez sur une touche pour continuer ou éteignez l'unité et réinstallez la dernière TASKCard utilisée.</p> <p>Betätigen Sie eine Taste, um fortzufahren oder schalten Sie die Einheit aus und installieren Sie die zuletzt benutzte TASKCard erneut.</p>
<p>Any of the following:</p> <ul style="list-style-type: none"> •I/O Processor Download Failed •ACP Processor Download Failed •I/O Processor Will Not Respond •ACP Processor Will Not Respond 	TASKCard download problem. Notify Dranetz-BMI for further assistance.

Turning the Unit On, Continued

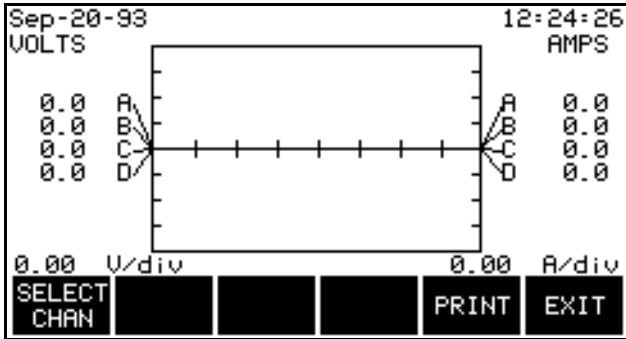
When to boot from ROM

Boot from ROM under the following conditions:

- you have a problem loading the TASKCard, or
- you want to operate the power platform without the TASKCard.

Booting from ROM

To boot from ROM proceed as follows:

Step	Action
1	<p>From the error message screen, press any key. The following screen is displayed.</p> 
2	Press EXIT to display the Meter Mode Menu.

Available Functions

When you boot from ROM, only the following functions are available.

Function	See Page
Scope Mode	4-59
One Channel, All Parameters Meter Mode	4-62
All Channels, One Parameter Meter Mode	
Voltage and Current Phasors	4-64
Set Time and Date	2-2

Note

No further monitoring or displaying of parameter data is possible without having a TASKCard installed.

Section B

Voltage and Current Cable Connections

Overview

Introduction

This section covers topics related to the connection of the various voltage and current devices that can be used when making measurements. For specific circuit applications, refer to Section C.

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-1996) of USA and any additional safety requirements applicable to your installation.

Installation, operation, and maintenance of this instrument must be performed by qualified personnel only. The National Electrical Code defines a qualified person as “one familiar with the construction and operation of the equipment and the hazards involved.”

ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento debe ser hecha de acuerdo con las normas del Código Eléctrico Nacional (ANSI/NFPA 70-1996) de EE. UU., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

Overview, Continued

AVERTISSEMENT

Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-1996) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique".

WARNUNG

Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-1996) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Safety precautions

The following safety precautions must be followed whenever any type of connection is being made to the instrument.

- Connect the green safety (earth) ground first, before making any other connections.
 - When connecting to electric circuits or pulse initiating equipment, open their related breakers. DO NOT install any connection of the instrument on live power lines.
-

Continued on next page

Overview, Continued

- Connections must be made to the instrument first, then connect to the circuit to be monitored.
 - Wear safety glasses and insulated gloves when making connections to power circuits.
 - Hands, shoes and floor must be dry when making any connection to a power line.
 - Make sure the unit is turned OFF before connecting probes to the rear panel.
 - Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
-

Medidas de seguridad

Las medidas de seguridad siguientes deberán observarse cuando se realice cualquier tipo de conexión al instrumento.

- Antes de hacer cualquier conexión, deberá enchufarse el conector de seguridad verde a tierra.
 - Cuando se haga conexiones a circuitos eléctricos o a equipo de activación por pulso, deberá abrirse sus respectivas cajas de seguridad. NO deberá hacerse ninguna conexión del instrumento en líneas eléctricas bajo tensión.
 - Las conexiones deberán hacerse primero al instrumento y, luego, al circuito a ser monitorizado.
 - Al hacer conexiones a circuitos eléctricos, deberá utilizar anteojos y guantes protectores.
 - Sus manos, zapatos y el piso deberán estar secos en todo momento en que se haga una conexión a un cable eléctrico.
 - Verifique que la unidad esté DESACTIVADA antes de conectar sondas en el panel posterior.
 - Previo a cada uso, deberá verificarse que los cables no estén rotos y que el material aislante no tenga rajaduras. Reemplace de inmediato cualquier parte defectuosa.
-

Mesures de Sécurité

Les mesures de sécurité suivantes doivent être prises chaque fois qu'un type de connexion quelconque est effectué sur l'instrument.

- Connecter d'abord la prise de terre de sécurité verte (terre) avant d'effectuer toute autre connexion.
 - Ouvrir les disjoncteurs correspondants lors d'une connexion à des circuits électriques ou à des équipement de génération d'impulsions. NE PAS effectuer de connexion d'instrument sur des lignes électriques sous tension.
 - Une fois toutes les connexions de l'instrument effectuées, connecter au circuit à contrôler.
-

Continued on next page

Overview, Continued

- Porter des lunettes de protection et des gants isolants pour effectuer des connexions aux circuits électriques.
 - S'assurer que les mains, les chaussures et le sol soient secs lors de connexions à une ligne électrique.
 - S'assurer que l'unité est ÉTEINTE avant de connecter les sondes au panneau arrière.
 - Inspecter tous les câbles, avant chaque utilisation, pour s'assurer que les isolants ne sont pas coupés ou fendus. Remplacer immédiatement tous les équipements défectueux.
-

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen sind immer dann zu befolgen, wenn eine Verbindung zum Instrument hergestellt wird.

- Schließen Sie zuerst die grüne Sicherheits-/Erdleitung an, bevor Sie eine andere Verbindung herstellen.
 - Öffnen Sie beim Anschluß an elektrische Stromkreise oder Impulsauslösungseinrichtungen die entsprechenden Unterbrecher. Es dürfen KEINE Anschlüsse an das Instrument unter stromführenden Spannungsleitungen montiert werden.
 - Die Verbindungen müssen zuerst am Instrument und danach an der zu überwachenden Schaltung hergestellt werden.
 - Tragen Sie Schutzbrillen und Isolierhandschuhe, wenn Sie Anschlüsse an den Stromkreisen vornehmen.
 - Hände, Schuhe und Fußboden müssen trocken sein, wenn Sie Anschlüsse an den Stromkreisen durchführen.
 - Stellen Sie sicher, daß das Gerät AUSgeschaltet ist, bevor Sie an der rückwärtigen Konsole Meßfühler anschließen.
 - Prüfen Sie vor jedem Gebrauch alle Kabel auf Bruchstellen und Risse in der Isolierung. Wechseln Sie schadhafte Kabel sofort aus.
-

In this section

The following topics are covered in this section.

Topic	See Page
Connecting a Voltage Probe	4-15
Connecting to a Potential Transformer (PT)	4-20
Connecting a Current Probe	4-22
Connecting to a Current Transformer (CT)	4-26
Connecting to an Isolated Current Transformer (ISO)	4-28
Verifying Voltage and Current Connections	4-34

Connecting a Voltage Probe

Safety precautions

Follow the safety precautions listed on page 4-12 when making all voltage probe connections.

Medidas de seguridad

Siga las medidas de seguridad listadas en la página 4-13 cuando efectúe todas las conexiones potenciales del transformador.

Mesures de sécurité

Suivez les mesures de sécurité données en page 4-13 lors de la réalisation de toutes les connexions du transformateur de tension.

Sicherheitsvorkehrungen

Folgen Sie den auf Seite 4-14 aufgeführten Sicherheitsvorkehrungen, wenn Sie an potentiellen Trafo-Verbindungen arbeiten.

Measurement cable set

Description: Voltage probes, jumpers, and power cord are provided as standard accessories and are stored in a cable pallet as part of the measurement cable set, part number 115815-G1 (Domestic), 115815-G2 (Euro), or 115815-G3 (UK).

Voltage Rating: Direct connection of all voltage probes for measurement are rated at 600 Vrms max. For measuring voltages greater than 600 Vrms Potential Transformers (PT's) must be used.

Contents: The voltage cables are shown in the figure on the next page (positioned relative to their actual use) and consist of the following:

- Eight, 8-foot channel measurement cable assemblies (probes), each with a detachable, crocodile jaw, safety clip assembly. The safety clip assemblies are red (+) and black (-) for each of the four channels. One probe assembly each of red (channel A), yellow (channel B), and blue (channel C) and five each of black are provided.
- Four 1-foot blue jumpers for input connector jumpering.
- A shielded power cord.

A pallet for storage of the cables and the input power cord are included in the contents of the measurement cable set but are not shown in the figure.

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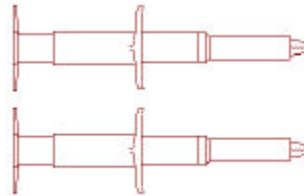
Connecting a Voltage Probe, Continued

Voltage Safety Clip Assemblies

Voltage safety clips, shown below, are supplied as four sets of the standard accessory measurement cable set. Each clip is a detachable, crocodile jaw type voltage probe that connects to a slip-on end connector of the channel measurement cables.

Voltage Safety Clip, Red
(Fluke, Model AC20-2)

Voltage Safety Clip, Black
(Fluke, Model AC20-0)



WARNING

Do not exceed 600 Vrms for the safety clip assemblies. The safety clip assemblies supplied are intended for use with Dranetz-BMI products only and we do not authorize them for any other use.

ADVERTENCIA

No supere los 600 V, valor eficaz, en los conjuntos de pinzas de seguridad. Los conjuntos provistos están diseñados para ser usados con productos Dranetz-BMI únicamente y no están autorizados para ningún otro uso.

AVERTISSEMENT

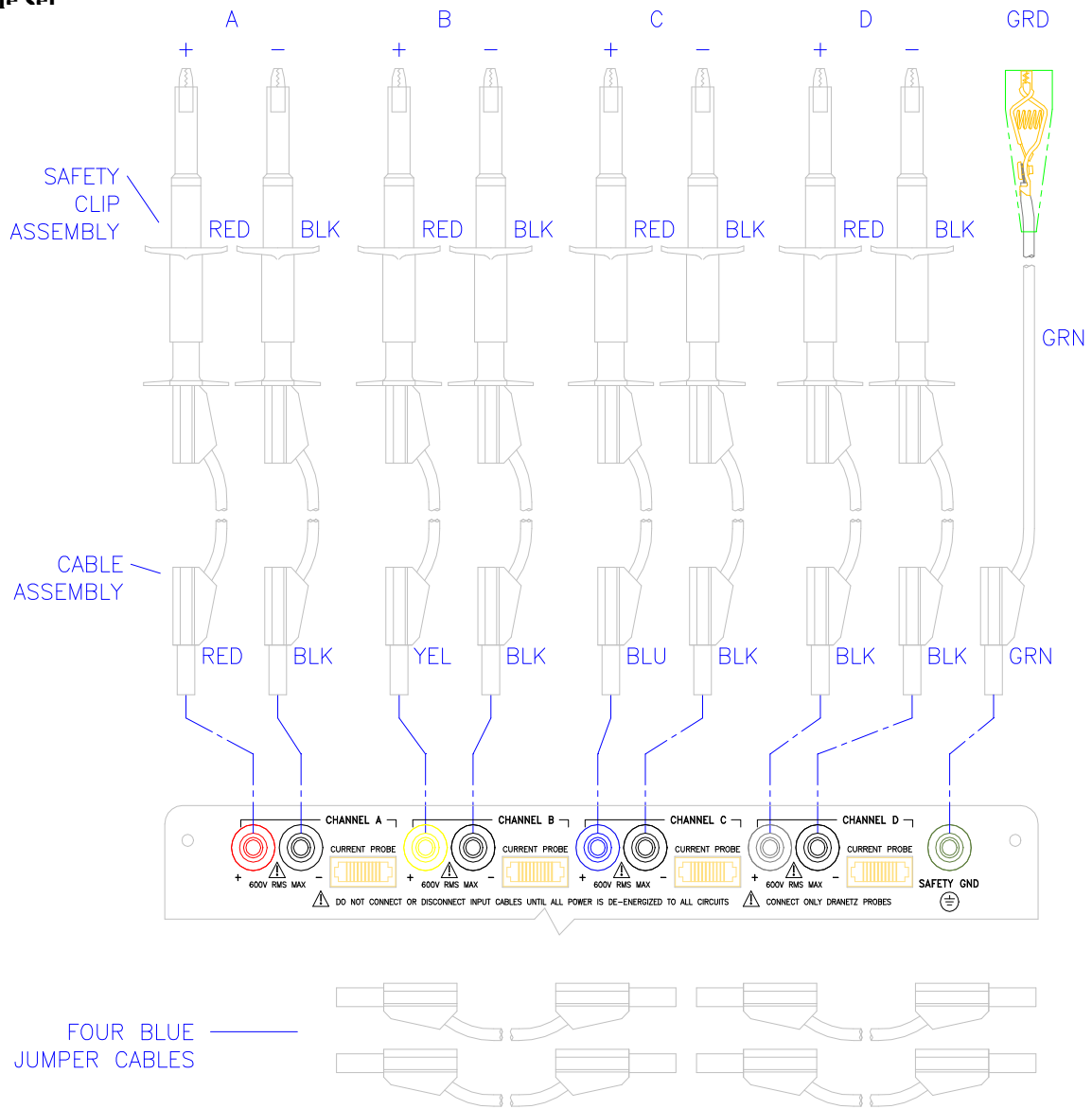
Ne dépassez pas 600 Veff pour les assemblages de clips de sécurité. Ces assemblages ont été conçus pour être utilisés avec les produits Dranetz-BMI seulement; nous n'autorisons aucune autre utilisation.

WARNUNG

Die Effektivspannung für die Sicherheitsklammern darf 600 Volt nicht überschreiten. Die mitgelieferten Sicherheitsklammern dürfen nur mit Produkten von Dranetz-BMI benutzt werden. Eine Verwendung auf einer anderen Art und Weise ist nicht gestattet.

Connecting a Voltage Probe, Continued

Measurement cable set



NOTE: Pallet and input power cable not shown.

8600-28

Connecting a Voltage Probe, Continued

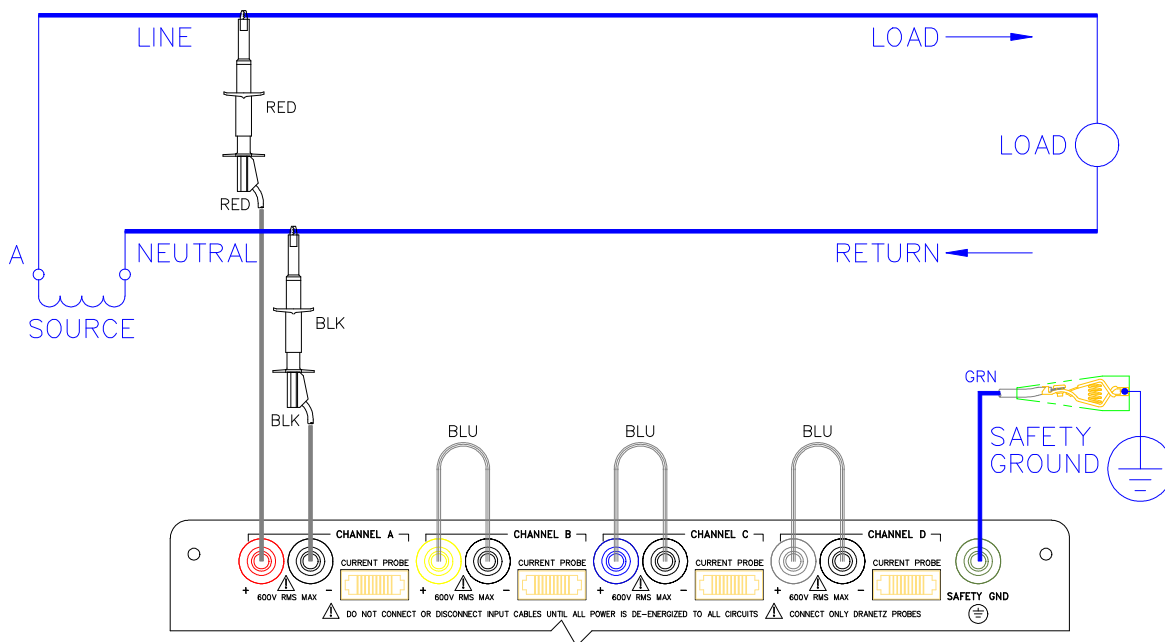
Connection guidelines

Follow these guidelines when making voltage connections.

- Refer to the measurement test set figure for color coding of probes that connect to input channel connectors A, B, C, and D.
- Each channel input has plus (+) and minus (-) differential inputs of 60 to 600Vrms max. Unused voltage channel differential inputs must be jumpered together using the blue jumpers provided.
- Channel D has an additional low voltage range of 0 to 60 Vrms max. for low voltage measurements.

Single phase connection example

The following figure shows a voltage connection to a single phase circuit for channel A. Jumpers are used to connect the differential inputs of channels B, C, and D together as shown to prevent erroneous data. The green cable is always connected to a secure ground (earth) connection as a safety ground.



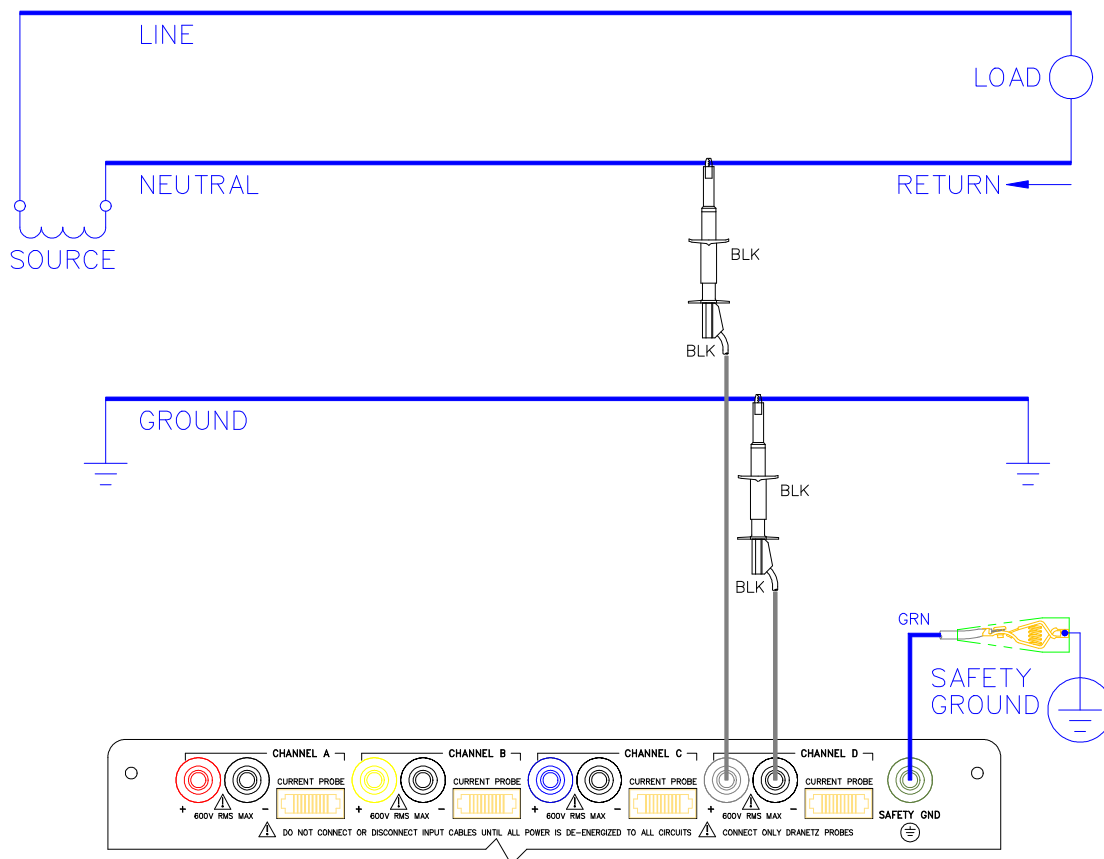
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Connecting a Voltage Probe, Continued

Neutral to ground connection example

The following figure shows a voltage connection using channel D as a differential input for a single phase connection. Connections are identical for split phase, delta, and wye configurations. One probe connects the source neutral line to the D+ input. Another probe connects the safety ground to the D- input. Any channel input may be used to perform this measurement but Channel D is usually used because it provides a low voltage range of 0 to 60 Vrms.



8600-19

Continued on next page

Connecting to a Potential Transformer (PT)

**Safety
Precautions**

Follow the safety precautions listed on page 4-12 when making all potential transformer connections.

**Medidas de
seguridad**

Siga las medidas de seguridad listadas en la página 4-13 cuando efectúe todas las conexiones potenciales del transformador.

**Mesures de
sécurité**

Suivez les mesures de sécurité données en page 4-13 lors de la réalisation de toutes les connexions du transformateur de tension.

Sicherheitsvorkehrungen

Folgen Sie den auf Seite 4-14 aufgeführten Sicherheitsvorkehrungen, wenn Sie an potentiellen Trafo-Verbindungen arbeiten.

Note

Potential Transformers are not manufactured by Dranetz-BMI and are discussed here for informational purposes only.

Definition

A potential transformer (PT), also referred to as a voltage instrument transformer, provides the necessary step-down ratio to reduce the high voltage of circuits above 600V_{rms} to a level for safe measurement. A PT also provides isolation and proper connections for instrument attachment.

Connections

PT's are usually fixed in position and require that the voltage probe(s) be connected to their terminal connections.

WARNING

Refer to the manufacturer's instructions, related to the PT, for exact information for probe connection for voltage monitoring. Do not exceed 600V_{rms} input to the PP1 Voltage inputs.

ADVERTENCIA

Consulte las instrucciones del fabricante referentes a TP (transformador potencial), para la información exacta de la conexión de sonda a fin de monitorear el voltaje. No supere la entrada de 600 V_{rms} a las entradas de voltaje de PP1.

Continued on next page

Connecting to a Potential Transformer (PT), Continued

AVERTISSEMENT

Se reporter aux instructions du fabricant relatives au transformateur de tension (Potential Transformer - PT) pour obtenir les renseignements exacts sur la connexion de sonde utilisée pour la surveillance du courant. Ne pas dépasser l'entrée de tension efficace de 600 RMS dans les entrées de tension de PP1.

WARNUNG

Genauere Informationen zur Meßfühlerverbindung für die Spannungsüberwachung entnehmen Sie bitte den Anleitungen des Herstellers (siehe Spannungsteilertransformator). Die Eingangsspannung von 600 V (Effektivwert) in die PP1 Spannungseingänge sollte nicht überschritten werden.

Procedure

Follow these steps to connect voltage probes to a potential transformer.

Step	Action
1	Turn off power to the PT.
2	Connect the green ground connector to the Safety Gnd connector on the rear panel of the Power Platform.
3	Connect the green ground connector to a solid ground point at or near the PT in accordance with the PT manufacturer's instructions.
4	Connect the colored voltage probes to the PT's connections in accordance with the manufacturer's instructions.
5	Connect the colored voltage probes to the channel inputs designated for monitoring.
6	Turn on power to the PT.

Scale factor

The scale factor of the PT must be accounted for in making accurate voltage measurements. Because the monitored output voltage of the PT is stepped-down (divided) from the original voltage, this ratio must be stepped-up (multiplied) by the PP1-8000 when voltage computations are performed. The PT scale factor is usually mounted on the PT assembly and is entered into the PP1-8000 on the scale factors screen (refer to 5-6). Refer to the PT manufacturer's literature for definition of the scale factors.

Connecting a Current Probe

Safety precautions

The following safety precautions apply to current probe connections in addition to those safety precautions stated on page 4-12.

- DO NOT attempt to measure current in any circuit in which the circuit to ground voltage exceeds the insulation rating of the current probe (600 Vrms max).
 - Make sure the jaws of the current probe are tightly closed. Keep mating surfaces clean and free from foreign matter.
-

Medidas de seguridad

Las medidas precauciones de seguridad se aplican a las conexiones de la sonda actual además de las precauciones de seguridad que aparecen en la página 4-13.

- NO deberá intentar medir la corriente eléctrica en ningún circuito en que el voltaje del mismo a tierra sea mayor al promedio de aislamiento de la sonda eléctrica (600 Vrms máx).
 - Verifique que la mordaza de la sonda eléctrica esté bien apretada. Mantenga las superficies de fusión limpias y libres de materia extraña.
-

Mesures de sécurité

Les mesures de sécurité suivantes doivent être respectées en plus des consignes de sécurité données en page 4-13 lors de la réalisation de connexions de sondes.

- NE PAS essayer de mesurer le courant dans un circuit où la tension est supérieure au régime d'isolation de la sonde (600 Vrms max.).
 - S'assurer que les mâchoires de la sonde sont bien serrées. S'assurer que la surface de contact est propre et exempte de corps étrangers.
-

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen treffen auf derzeitige "Probe"-Verbindungen zu und gelten zusätzlich zu den Sicherheitsvorkehrungen auf Seite 4-14.

- Versuchen Sie NICHT, den Strom in einem Schaltkreis zu messen, in dem der Durchgang zur Erdspannung den Isolierwert des Spannungsmeßfühlers (600 Volt Effektivwert) übersteigt.
 - Stellen Sie sicher, daß die Klemmbacken des Spannungsmeßfühlers fest geschlossen sind. Halten Sie die zusammengehörigen Oberflächen sauber und frei von Fremdteilen.
-

Continued on next page

Connecting a Current Probe, Continued

Types of current probes Several types of current probes¹ (clamp-on current transformers) are available as optional accessories. These probes are shown in the figure on the next page and consist of the smallest current probe (Dranetz-BMI model CT10), used to monitor up to 10 amps rms max, to the largest current probe (Dranetz-BMI model CT3000) for measurements up to 3000 amps rms max.

Refer to Appendix H for complete probe specifications.

WARNING When using either the CT-10 or CT-150 current probe, **DO NOT** connect the probe jaws around a non-insulated wire. These probes are to be used to monitor current of insulated wire only.

ADVERTENCIA Cuando use la punta de prueba de corriente CT-10 o CT-150, **NO** sujete las mandíbulas de la punta alrededor de un cable sin aislación. Esta punta se usa para mediciones en cables aislados solamente.

AVERTISSEMENT Lorsque vous utilisez la sonde de courant CT-10 ou CT-150, **NE FERMEZ PAS** les mâchoires de la sonde sur un fil non isolé. Cette sonde ne doit être utilisée qu'avec des fils isolés.

WARNUNG Der Stromfühler CT-10 oder CT-150 **DARF NICHT** an ein unisoliertes Kabel angeschlossen werden. Dieser Stromfühler darf nur für die Überwachung von isolierten Kabeln benutzt werden.

Description Each probe has a polarized plug to fit any one of the four current input connectors (A, B, C, or D) on the rear panel of the Power Platform.

Maximum jaw openings are described in the specifications in Appendix H.

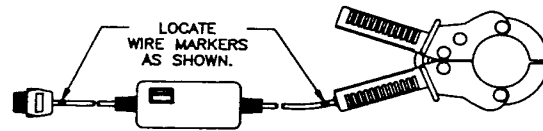
An arrow marking on the handle is a guide to ensure that you position the probe with the arrow pointing towards the load. Correct position of the probe is necessary for correct power measurements.

1. Portions of this product manufactured under license from BMI, Patent No. 5,089,979.

Connecting a Current Probe, Continued

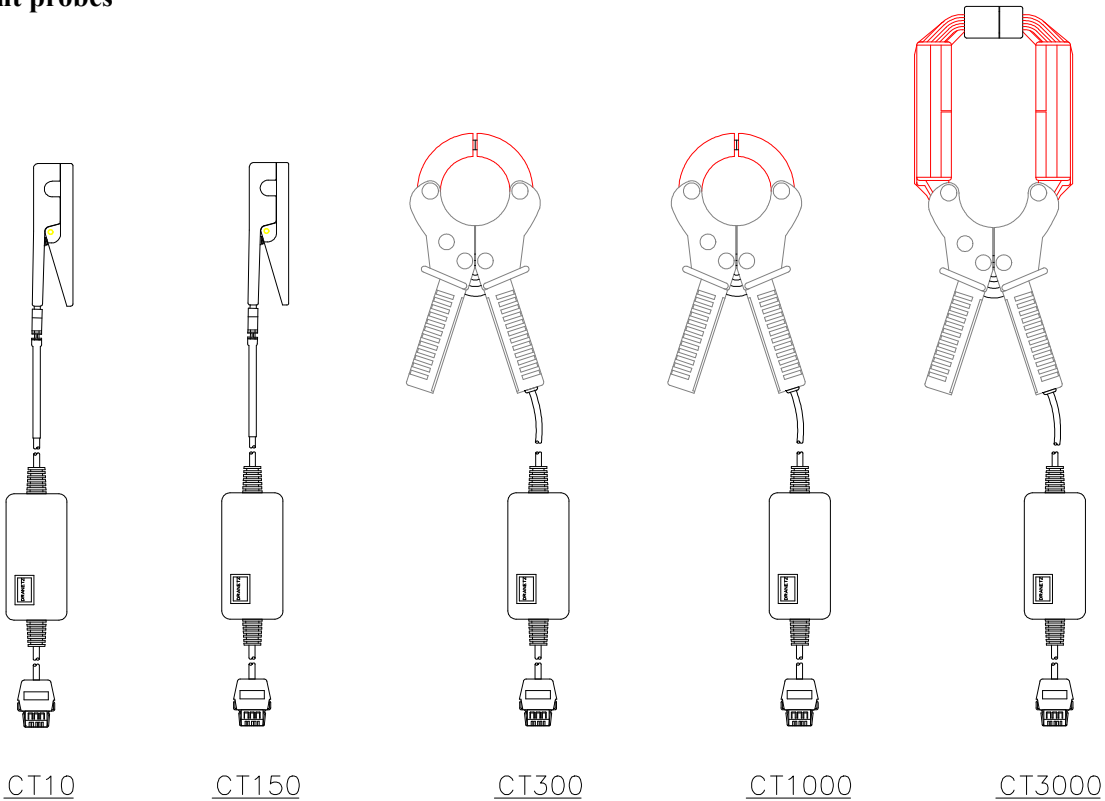
Wire marker kit The wire marker kit, supplied as a standard accessory, helps you identify which current probe is connected to each current channel input. This kit, part number 155520, contains adhesive backed color-coded marker labels to attach to the probe handle and the plug end of the probe. Use red label for channel A, yellow for B, and blue for C. Channel D is left unmarked. See figure for proper wire marker placement.

Wire marker placement



8600-62

Dranetz-BMI current probes



8600-21

Connecting a Current Probe, Continued

Connection guidelines

Follow these guidelines when making current connections.

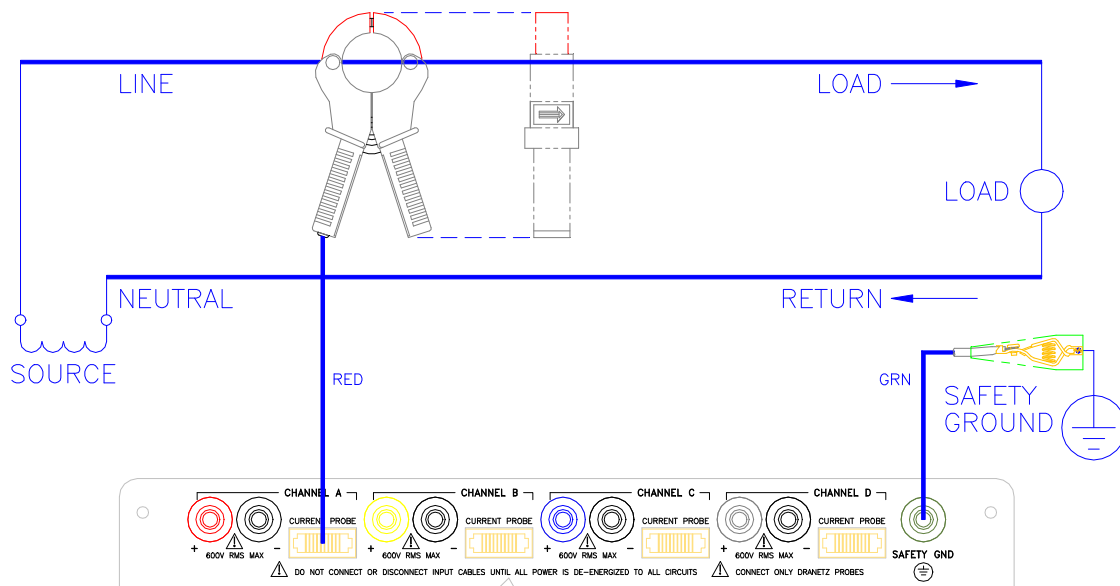
- Position the probe with the arrow on the handle facing the load.
- For greatest accuracy, use a probe that is rated at no more than twice the nominal value you expect to measure.

Example

The following figure shows how to connect a current probe to channel A for current monitoring of a single phase line.

The current probe may be connected to the return line if desired to measure the return current when checking for load current leakage, loop current relationships, etc.

Single phase current probe connection example



8600-20
8600-20

Note

The connection shown above is not recommended without a voltage connection to ensure frequency synchronization. If this configuration is used, then an internal frequency reference must be entered. Refer to page 5-8.

Connecting to a Current Transformer (CT)

Safety precautions

The following safety precautions apply to current transformer (CT) connections in addition to those safety precautions stated on page 4-12.

- Never energize a CT with the secondary open.
 - Never disconnect the secondary of a CT with primary energized.
-

Medidas de seguridad

Las medidas de seguridad siguientes corresponden a conexiones de transformadores eléctricos (CT) además de las medidas de seguridad que aparecen en la página 4-13.

- Nunca deberá poner bajo tensión un CT con el transformador secundario abierto.
 - Nunca deberá desconectar el transformador secundario de un transformador eléctrico si el transformador primario está bajo tensión.
-

Mesures de sécurité

Les mesures de sécurité suivantes s'appliquent aux connexions de transformateurs de couranten plus des mesures de sécurité données en page 4-13.

- Un jamais mettre un transformateur sous tension lorsque la bobine secondaire est ouverte.
 - Ne jamais déconnecter la bobine secondaire d'un transformateur lorsque la bobine primaire est sous tension.
-

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen gelten für Anschlüsse an Transformatoren und gelten zusätzlich zu den Sicherheitsvorkehrungen auf Seite 4-14.

- Führen Sie einem Transformator niemals Strom zu, wenn die Niederspannungsseite geöffnet ist.
 - Lösen Sie niemals die Verbindung der Niederspannungsseite eines Transformators, wenn die Oberspannungsseite unter Strom steht.
-

WARNING

Refer to the manufacturer's instructions related to the CT for exact information for connections for current monitoring. Do not exceed manufacturer's ratings.

Continued on next page

Connecting to a Current Transformer (CT), Continued

ADVERTENCIA	Consulte las instrucciones del fabricante referentes a TC (transformador de corriente) para la información exacta de las conexiones a fin de monitorear la corriente. No exceda las capacidades nominales del fabricante.
ADVERTISSEMENT	Se reporter aux instructions du fabricant relatives au transformateur de courant (Current Transformer - CT) pour obtenir les renseignements exacts sur les connexions utilisées pour la surveillance du courant. Ne pas dépasser la puissance recommandée par le fabricant.
WARNUNG	Genaue Informationen zu Verbindungen für die Stromüberwachung entnehmen Sie bitte den Anleitungen des Herstellers (siehe Stromumwandler). Die Grenzwerte des Herstellers sollten nicht überschritten werden.
Note	Current Transformers are not manufactured by Dranetz-BMI and are discussed here for informational purposes only.
Description	Current transformers, also known as instrument transformers, reduce high level currents to low level currents so they can be safely monitored. These devices are similar to PT's used for voltage measurements in that both reduce values for safe measurement. The reduction, or step-down ratio, is stated as a scale factor that is used by the PP1-8000 to step-up the measured value to its original value.
Types of CT's	There are single-phase CT's and polyphase CT's dependent on the source transformer used. Current reduction ratios vary widely and are also dependent on the source transformer used. Rating plates attached to the CT provide information as to the ratio and current limitations.

Connecting to an Isolated Current Transformer (ISO)

Safety precautions

The following safety precautions apply to isolated current transformer connections in addition to those safety precautions stated on page 4-12.

- Never energize a ISO with the secondary open.
 - Never disconnect the secondary of a ISO probe with primary energized.
-

Medidas de seguridad

Las medidas de seguridad siguientes corresponden a conexiones de transformadores eléctricos (ISO) además de las medidas de seguridad que aparecen en la página 4-13.

- Nunca deberá poner bajo tensión un ISO con el transformador secundario abierto.
 - Nunca deberá desconectar el transformador secundario de un transformador eléctrico si el transformador primario está bajo tensión.
-

Mesures de sécurité

Les mesures de sécurité suivantes s'appliquent aux connexions de transformateurs de courant plus des mesures de sécurité données en page 4-13.

- Un jamais mettre un transformateur sous tension lorsque la bobine secondaire est ouverte.
 - Ne jamais déconnecter la bobine secondaire d'un transformateur lorsque la bobine primaire est sous tension.
-

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen gelten für Anschlüsse an Transformatoren und gelten zusätzlich zu den Sicherheitsvorkehrungen auf Seite 4-14.

- Führen Sie einem Transformator niemals Strom zu, wenn die Niederspannungsseite geöffnet ist.
 - Lösen Sie niemals die Verbindung der Niederspannungsseite eines Transformators, wenn die Oberspannungsseite unter Strom steht.
-

Description

Low current monitoring devices made by Dranetz-BMI are called isolated current transformers or ISO boxes for short. Dranetz-BMI makes two types of ISO boxes; one model (ISO-1A) monitors up to 1 amp rms of current maximum, the other model (ISO-5) up to 5 amps rms maximum. Both are available as optional accessories.

Continued on next page

Connecting to an Isolated Current Transformer (ISO), Continued

WARNING **Physical injury or equipment damage could result if ISO boxes are improperly connected. Do not connect an ISO box between two conductors which are at different voltage potentials.**

ADVERTENCIA **Podrían producirse lesiones físicas o daños al equipo si se conectan indebidamente las cajas del transformador aislado de corriente (ISO). No conecte una caja del ISO entre dos conductores que tengan distintos potenciales de voltaje.**

AVERTISSEMENT **Une mauvaise connexion des transformateurs d'intensité isolés (ISO) peut provoquer des blessures corporelles ou des dégâts matériels. Ne pas relier les transformateurs ISO entre deux conducteurs de tensions différentes.**

WARNUNG **Falsch angeschlossene ISO-Kästen (Isolierte Stromumwandler) können zu körperlichen Verletzungen oder Geräteschäden führen. Schliessen Sie einen ISO-Kasten nicht zwischen zwei Leiter mit unterschiedlichem Spannungspotential.**

Applications ISO boxes can be used in a number of ways. These methods include connecting them to the secondary of CT's for metering by the PP1-8000, inserting them in series with the load current to measure low current values, and connecting them to a non-Dragnetz-BMI clamp-on current transformer and using that CT to monitor current with the PP1-8000.

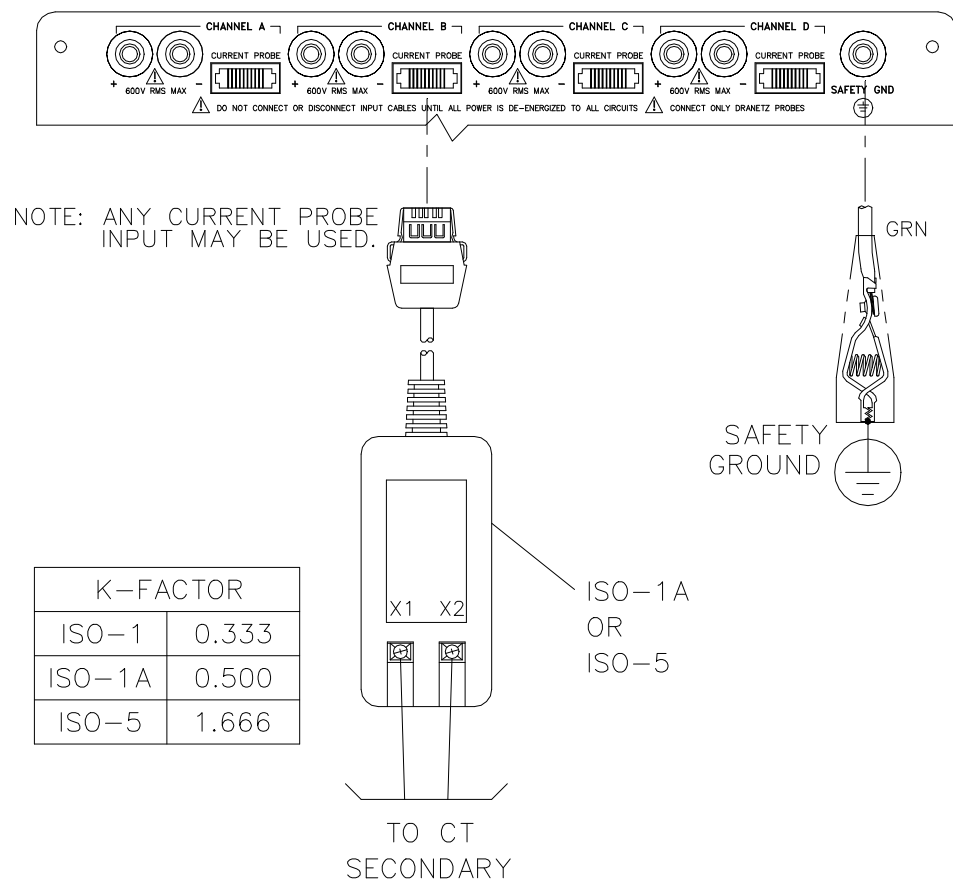
Continued on next page

Connecting to an Isolated Current Transformer (ISO), Continued

ISO box connection to a current transformer

The figure below shows an ISO box connected from Channel B current input to a permanently installed CT. Polarities of the ISO box and CT are kept in-phase by matching markings. Scale factors of both devices must be multiplied together to get the resultant scale factor. Refer to page 5-6 for more information about scale factors.

ISO box connection to a CT



8600-24

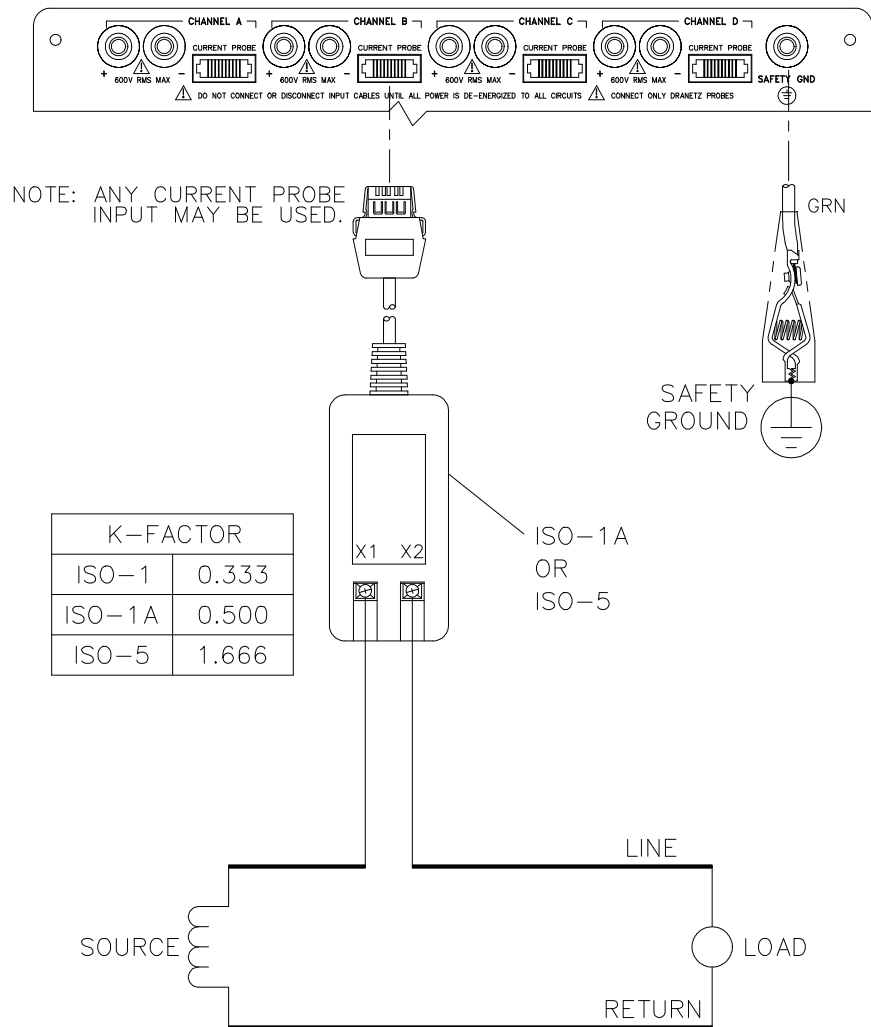
Continued on next page

Connecting to an Isolated Current Transformer (ISO), Continued

ISO box in-line connection

The figure below shows the ISO box connected in series with the load of a single-phase line. The connection is made with the X1 terminal connected to the source input line and X2 connected to the load line. The scale factor is that of the ISO box only.

ISO box connection in-line with a load



8600-25

Continued on next page

Connecting to an Isolated Current Transformer (ISO), Continued

Connecting to a non-Dranetz-BMI current probe The figure below shows the ISO box connected to a non-Dranetz-BMI clamp-on current transformer. In this case the scale factor is the product of the ISO box and the CT. Refer to manufacturer's literature to determine the CT scale factor.

WARNING Refer to the manufacturer's instructions related to the CT for exact information for connections for current monitoring. Do not exceed manufacturer's ratings.

ADVERTENCIA Consulte las instrucciones del fabricante referentes a TC (transformador de corriente) para la información exacta de las conexiones a fin de monitorear la corriente. No exceda las capacidades nominales del fabricante.

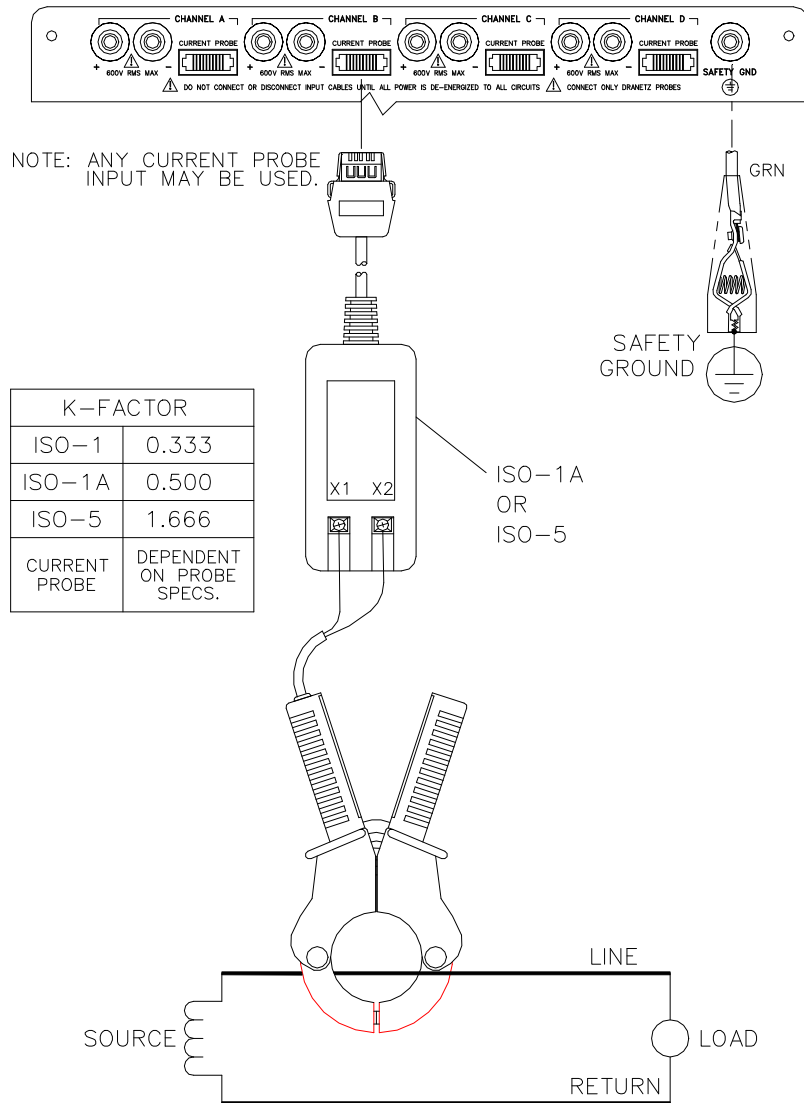
ADVERTISSEMENT Se reporter aux instructions du fabricant relatives au transformateur de courant (Current Transformer - CT) pour obtenir les renseignements exacts sur les connexions utilisées pour la surveillance du courant. Ne pas dépasser la puissance recommandée par le fabricant.

WARNUNG Genaue Informationen zu Verbindungen für die Stromüberwachung entnehmen Sie bitte den Anleitungen des Herstellers (siehe Stromumwandler). Die Grenzwerte des Herstellers sollten nicht überschritten werden.

Continued on next page

Connecting to an Isolated Current Transformer (ISO), Continued

Diagram



8600-26

Verifying Voltage and Current Connections

Introduction

Correct voltage and current connection of single phase, split phase, or polyphase connections can be verified using phasor diagrams. Phasor diagrams are graphic representations that show the magnitude and angular relationship of each phase of a monitored connection.

Displaying the screen

Follow these steps to display the Voltage and Current Phasor screen.

Step	Action
1	From Main Menu, select item 1, Meter Mode.
2	From Meter Mode Menu, select item 4, Voltage and Current Phasors.

Note: The following screen will appear if no voltage inputs are connected. See next page for actual inputs.

Single phase

A single phase voltage or current phasor is displayed as a single line showing a channel reference at 0 degrees and a magnitude relative to its measured value. An arrowhead on the line indicates direction.

Split phase

Split phase vectors are displayed as dual lines showing channel references and magnitudes and opposite (180 degrees) directions.

Three phase

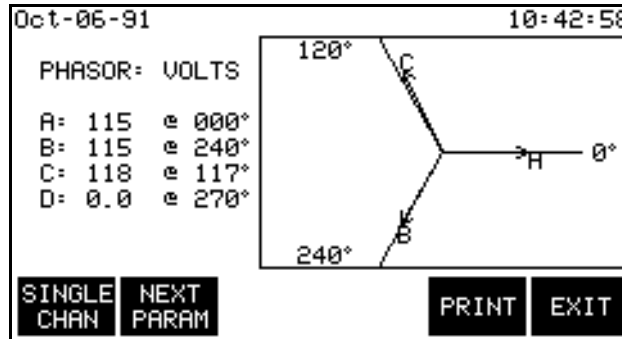
Three phase vectors are displayed as three lines, 120 degrees apart in a resistive load (unity power factor). Phase displacement will occur in a reactive load.

Continued on next page

Verifying Voltage and Current Connections, Continued

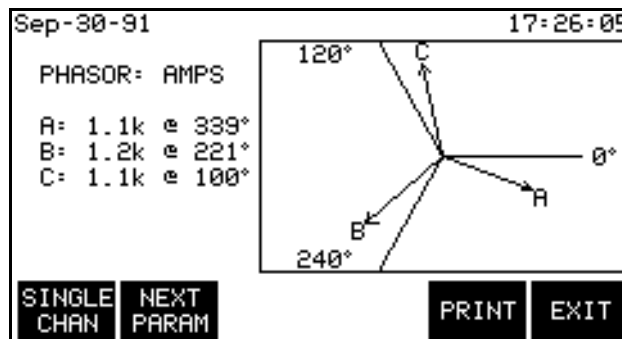
Correct 3-phase voltage phasor connections

The voltage phasor display shown below is for a three phase, four wire, wye connection.



Correct 3-phase current phasor connections

The current phasor display shown below is for a three phase, 4 wire wye connection.

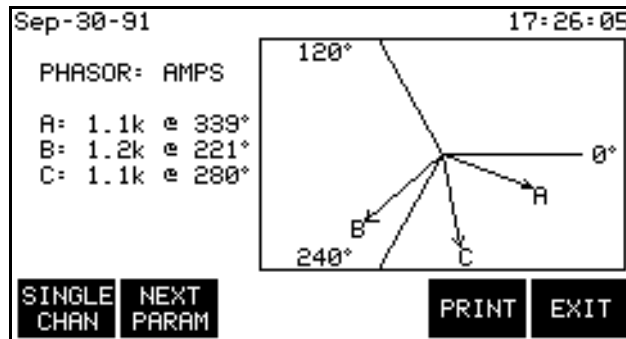


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Verifying Voltage and Current Connections, Continued

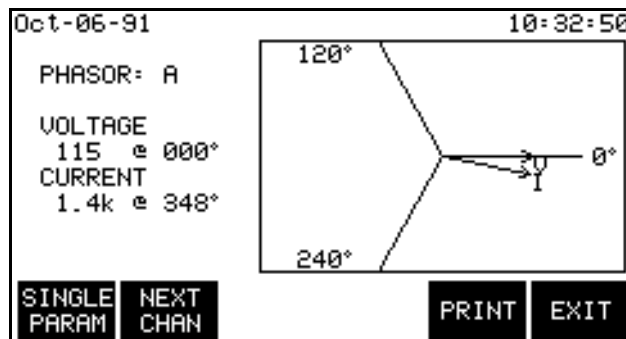
Incorrect current phasor diagram

The following phasor display shows an incorrect current probe connection. The phasor for channel C is 180° out of phase. This can be corrected by connecting the probe so that the arrow on the probe handle points toward the load.



Single channel phasor diagram

The following display shows the voltage and current phasors for channel A.



Section C

Circuit Diagrams for Power Measurements

Overview

Who should read this section

If you are making power measurements, follow these diagrams so that your ABC totals are calculated correctly.

If you are not making power measurements, you can skip this section and go to Section D.

Safety Precautions

Follow the safety precautions listed on page 4-12 when making connections.

Medidas de seguridad

Siga las medidas de seguridad listadas en la página 4-13 cuando efectúe todas las conexiones potenciales del transformador.

Mesures de sécurité

Suivez les mesures de sécurité données en page 4-13 lors de la réalisation de toutes les connexions du transformateur de tension.

Sicherheitsvorkehrungen

Folgen Sie den auf Seite 4-14 aufgeführten Sicherheitsvorkehrungen, wenn Sie an potentiellen Trafo-Verbindungen arbeiten.

Voltage and current connections

This section contains numerous drawings of both voltage and current probe connections that are required when power measurements are to be made.

Voltage: Voltage probes are connected to the individual source or load line and are referenced to the return (common) line voltage probe connection for greatest accuracy.

Current: Current probes are connected to each line and positioned to measure currents with reference to the voltage probe. Incorrectly positioned current probes may produce erroneous power measurement.

Continued on next page

Overview Continued

In this section The following power connection diagrams are shown in this section.

Diagram	See Page
Single Phase	4-39
Split Phase	4-40
3-Phase, 3-Wire (Delta) Circuits	4-41
Floating Delta, Two Probe Method	4-42
Floating Delta, Three Probe Method	4-43
Delta, One Leg Grounded, Two Probe Method	4-44
Delta, One Leg Grounded, Three Probe Method	4-45
Open Leg Delta	4-46
Four Wire Wye	4-47
High-Leg Delta	4-48
Wye, 2 1/2 Element Metering	4-49
Neutral-to-Ground	4-50
Phasor Diagrams for Standard Power Connections	4-51

Single Phase

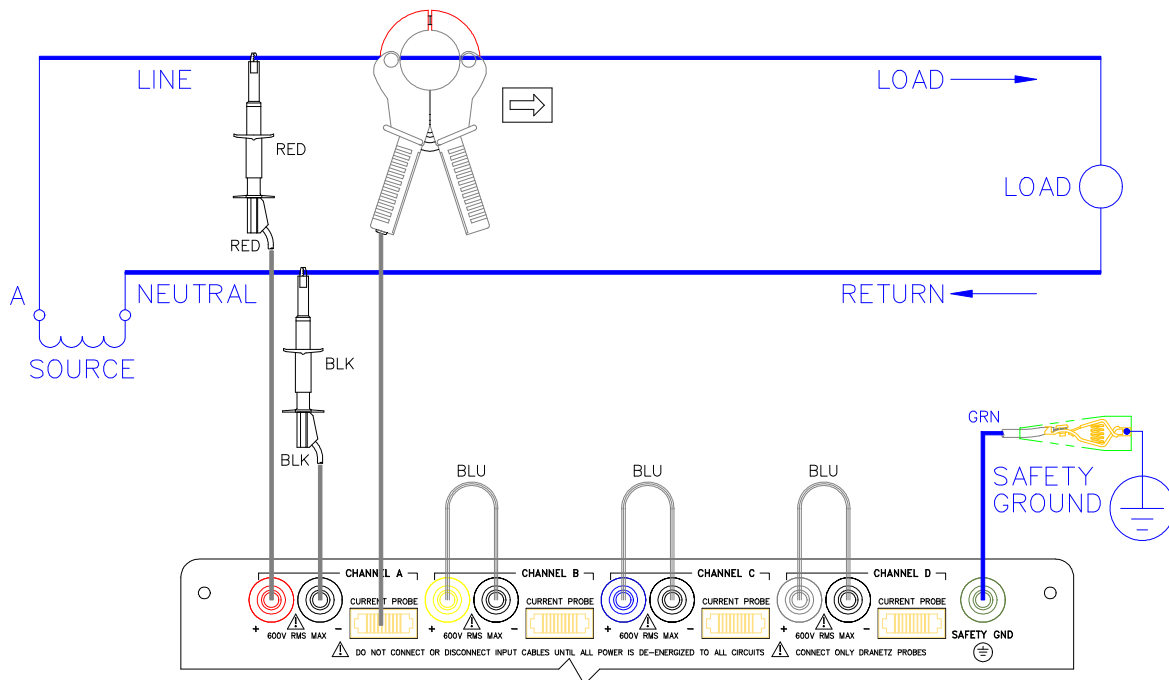
Introduction

When making voltage connections to a single phase circuit use channel A differential inputs as shown below. Connect both terminals of channels B, C, and D together to prevent erroneous data. Channels D should be turned off if not used.

Note

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

Diagram



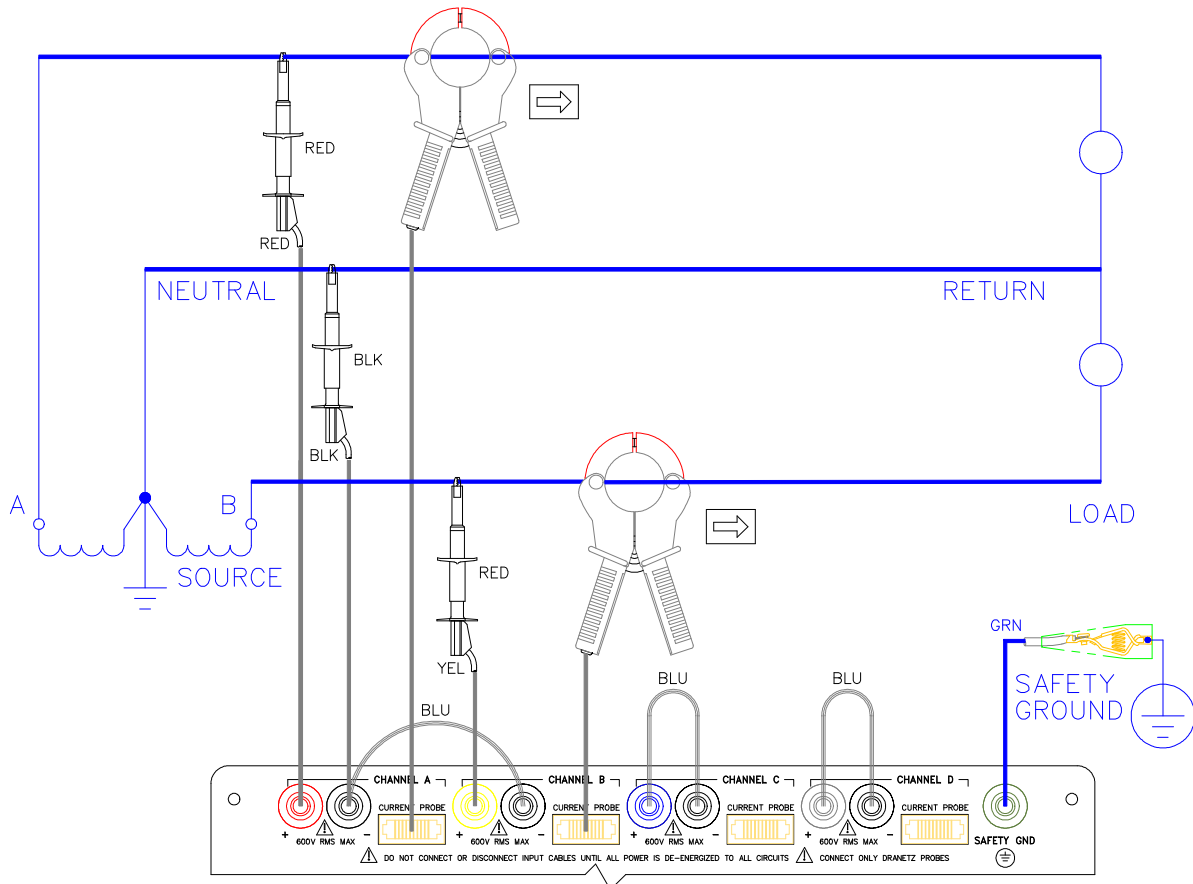
8600-6

Split Phase

Introduction

When making split phase measurements use both channels A and B for voltage and current connections. Connect both terminals of Channels C and D together to prevent erroneous data. The neutral is chosen as the reference for measurement purposes.

Diagram



8600-7

3-Phase, 3-Wire (Delta) Circuits

General

A typical 3-conductor circuit is the 240 V or 480 V 3-phase 3-wire (delta) power circuit. In a delta with one leg grounded, one phase is intentionally connected to ground. In a floating delta, none of the phases are grounded. In an open leg delta, there are only two phases. In a high-leg delta, one leg is center tapped. Connections for all three types of delta circuits are discussed in this subsection. Refer to the table in Appendix K for help in determining what type of circuit you have.

Because of the nature of delta configurations, monitoring connections normally measure line-to-line voltages and line currents. These two parameters are displaced from each other by a phase angle, even if the PF of the load is equal to 1. Therefore, a direct correspondence between one channel measurement and a particular part of the load would be extremely unusual.

Because of these phase relationships, the individual channel power measurements (W, VA, VAR, and PF) will normally not represent any useful information. (In fact, it is possible that individual channel PF's may be less than 0.5 and even negative.) This is particularly true if the three phase loads are not balanced.

However, the ABC power measurements will be proper representations of the data. Individual voltage and current measurements will represent the line-to-line voltage (A-C, B-C) and line currents (A, B). Harmonic values for individual voltage and current will be represented properly, but harmonic values for watts will not.

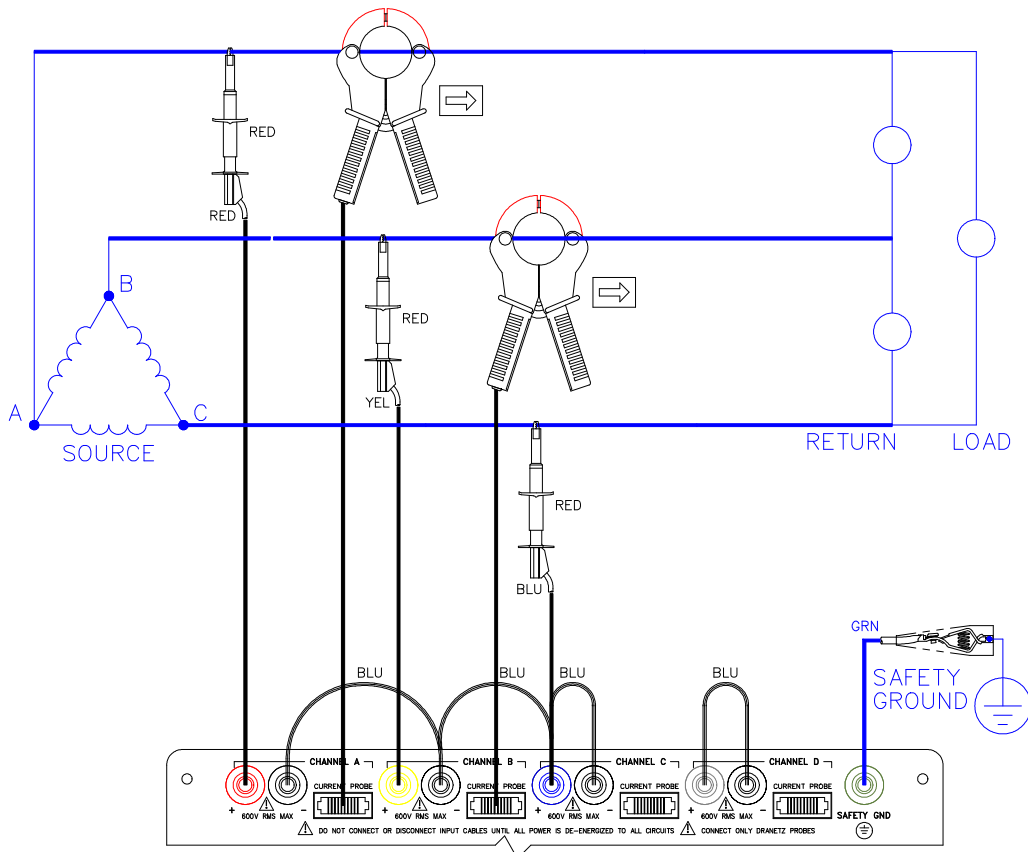
Power measurements for Delta circuits use voltage channels A, and B to measure V_{A-C} and V_{B-C} , along with current A and B.

Floating Delta, Two Probe Method

Introduction

In this power connection, Channel C is chosen as the neutral. The Power Platform uses channel C as its reference, so connect the phase that you chose as your neutral to channel C.

Diagram



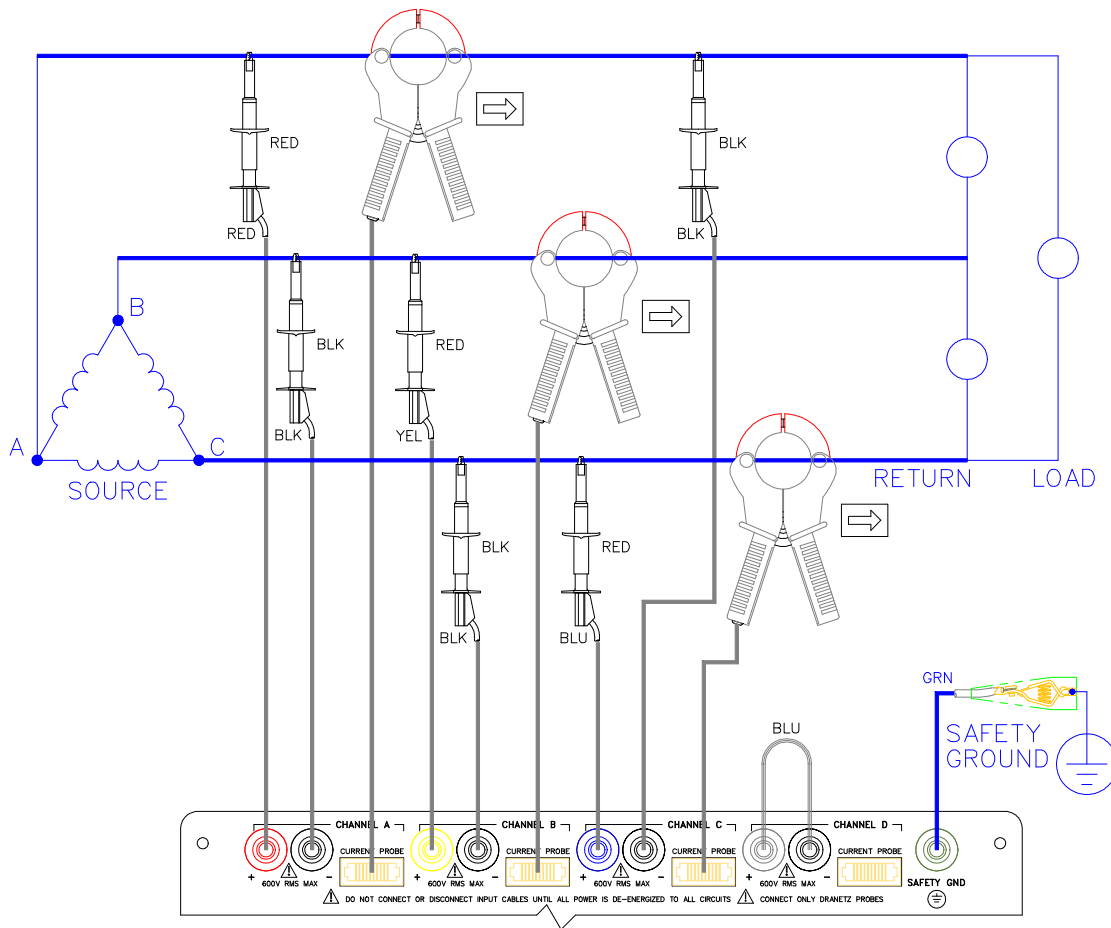
8600-48

Floating Delta, Three Probe Method

Introduction

In this power connection, the PP1-8000 uses voltage channels A, B, and C as differential inputs with channel A using source voltage A-B, channel B using B-C, and channel C using C-A as the reference. Current probes are connected to channels A, B, and C. Connect both terminals of Channel D together to prevent erroneous data.

Diagram



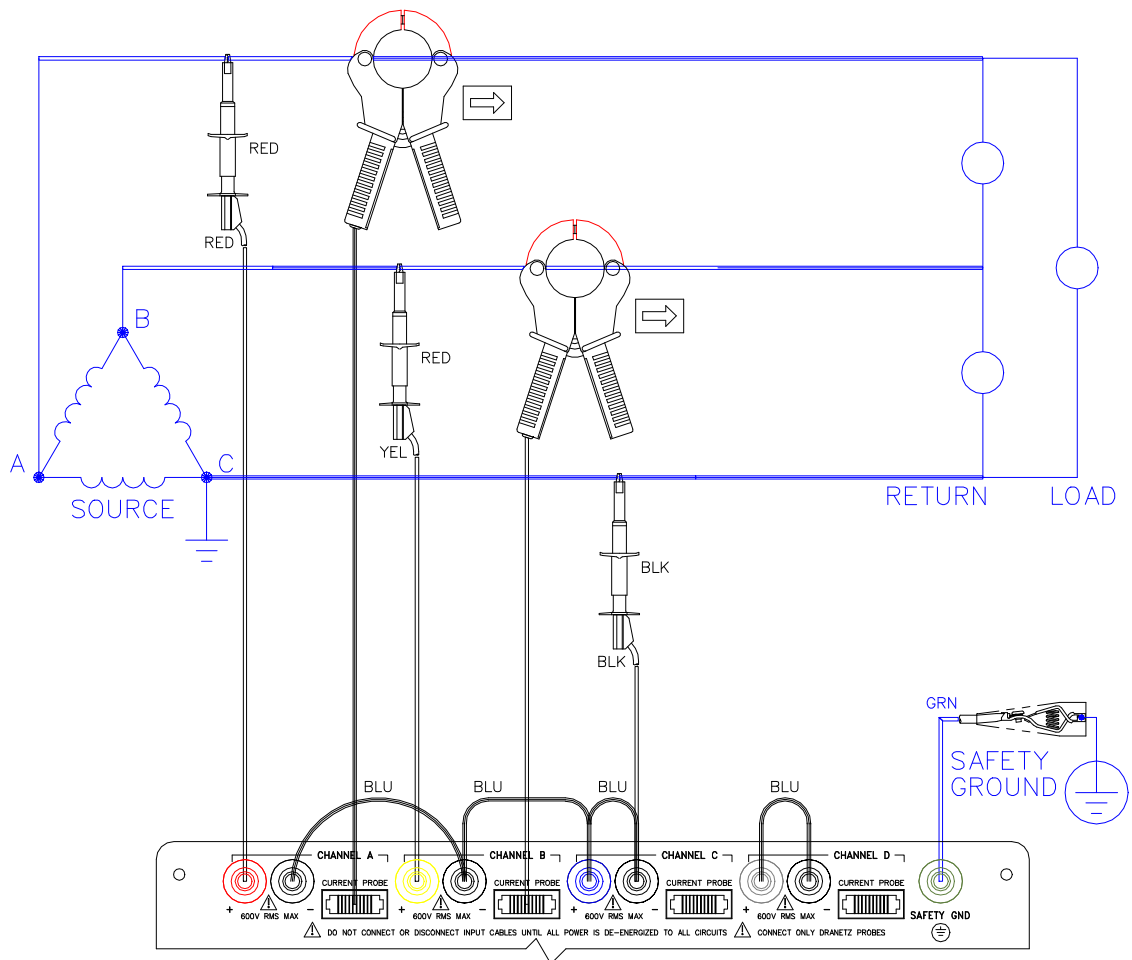
8600-9

Delta, One Leg Grounded, Two Probe Method

Introduction

In a delta circuit with one leg grounded, the grounded phase is the one determined to be at or near ground potential (by independent voltage measurements). Connect channel B to this phase.

Diagram



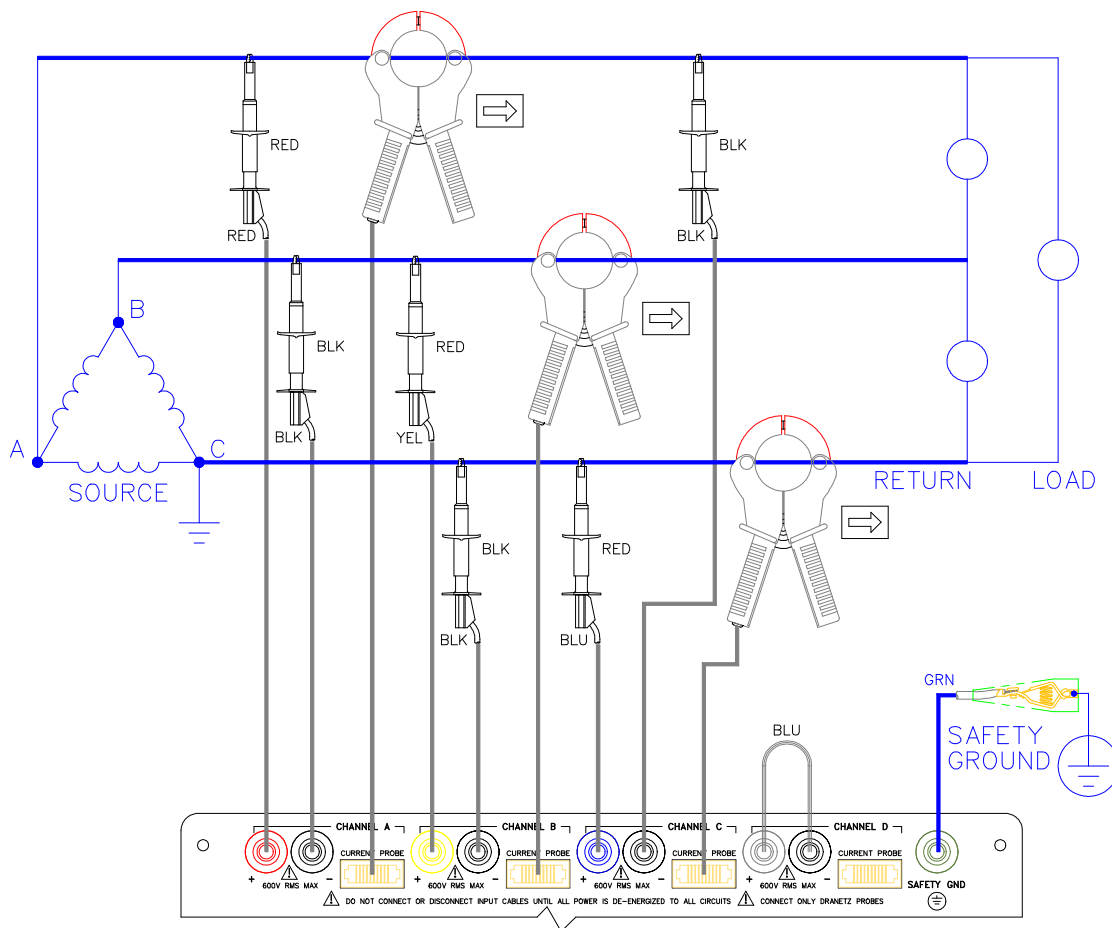
8600-38

Delta, One Leg Grounded, Three Probe Method

Introduction

In this power connection, the PP1-8000 uses voltage channels A, B, and C as differential inputs with channel A using source voltage A-B, channel B using B-C, and channel C using C-A as the reference. Current probes are connected to channels A, B, and C. Connect both terminals of Channel D together to prevent erroneous data.

Diagram



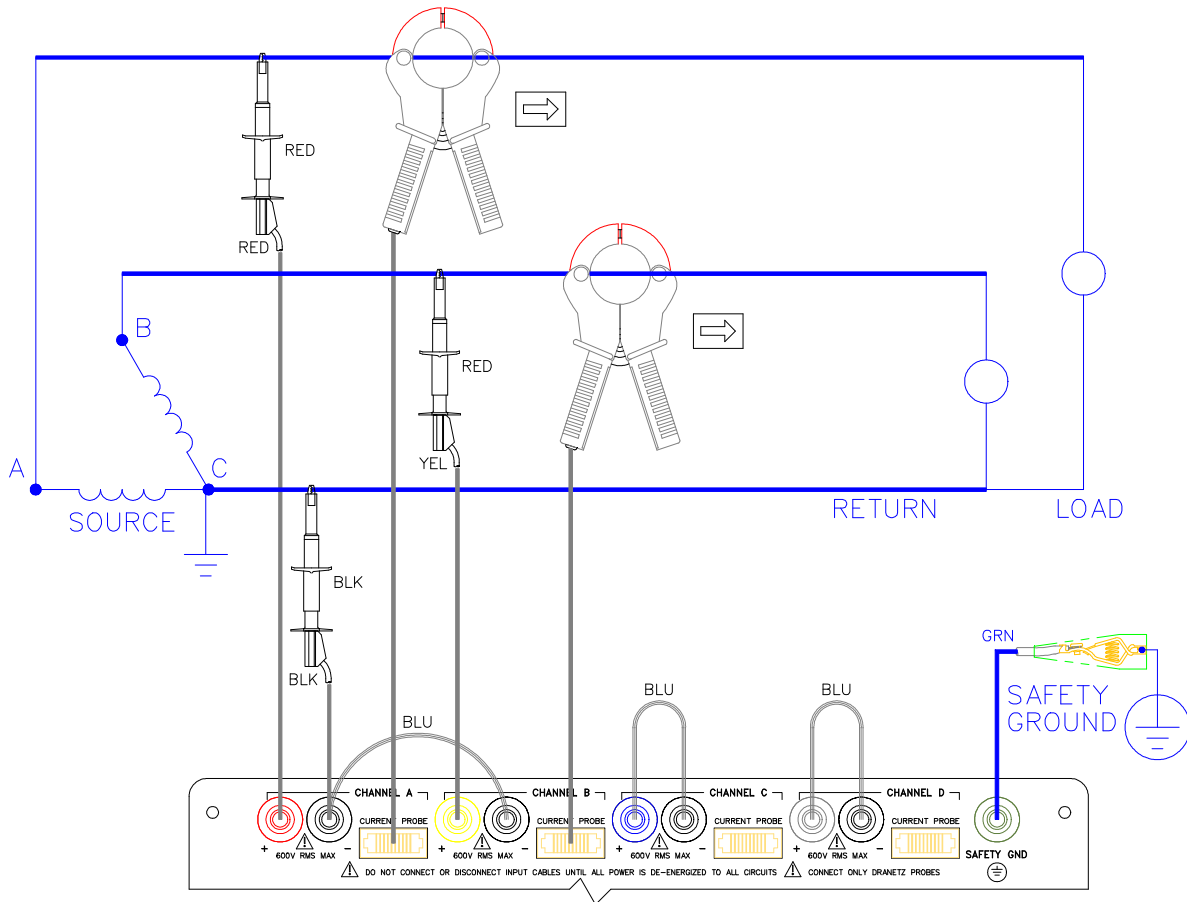
8600-8

Open Leg Delta

Introduction

The figure below shows the open leg delta with phase A-C connected to channel A and phase B-C connected to channel B. A jumper connects the A- and B-terminal. Current probes are connected to channels A and B.

Diagram



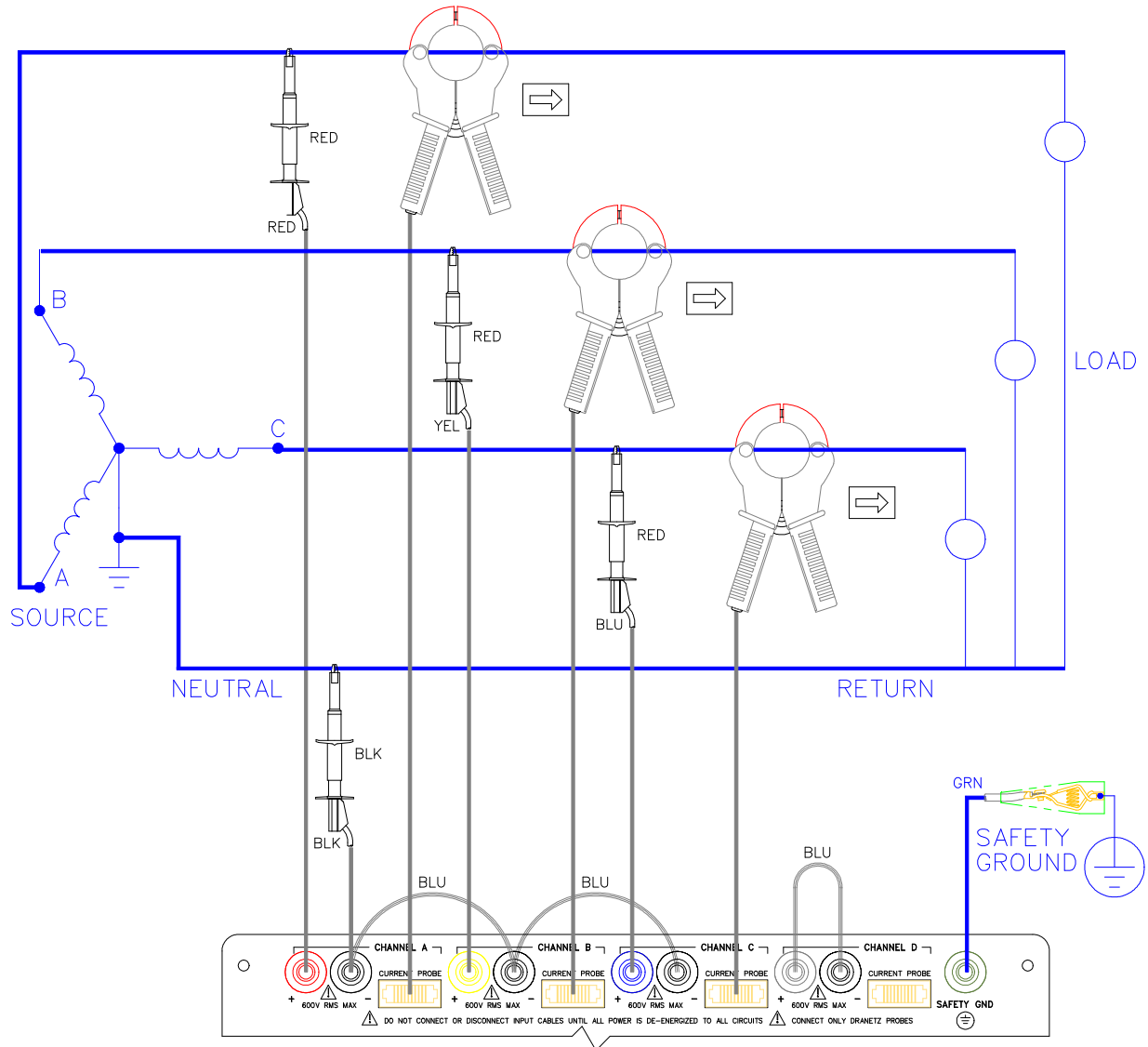
8600-10

Four Wire Wye

Introduction

Channels A, B, and C are connected to voltage and current probes. The neutral is connected to common and is the reference for the three channels. Connect both terminals of Channel D together to prevent erroneous data.

Diagram



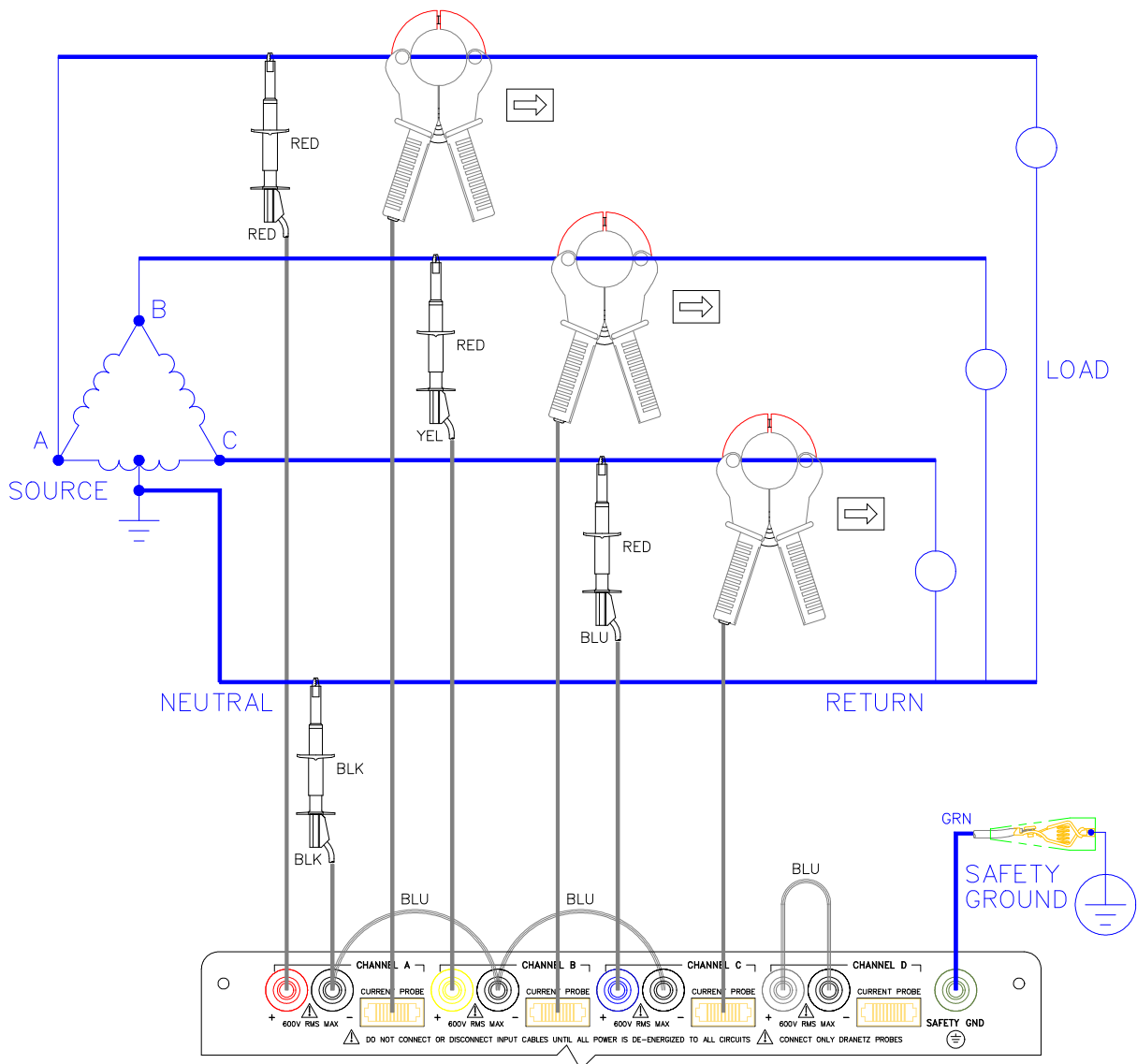
8600-12

High-Leg Delta

Introduction

The 4-wire delta connected 120/240V source shown in the figure on the next page is connected with one phase connected to ground at mid-point. This phase provides 120V at phases A and C to ground. Phase B is designated the high-leg connection and is measured at 208V ($120V \times 1.73 = 208V$) to ground. The National Electrical Code (NEC 215-8) identifies the high-leg phase as the Orange colored line. The input configuration selection for the high-leg delta connection is 3 phase, 4 wire.

Diagram



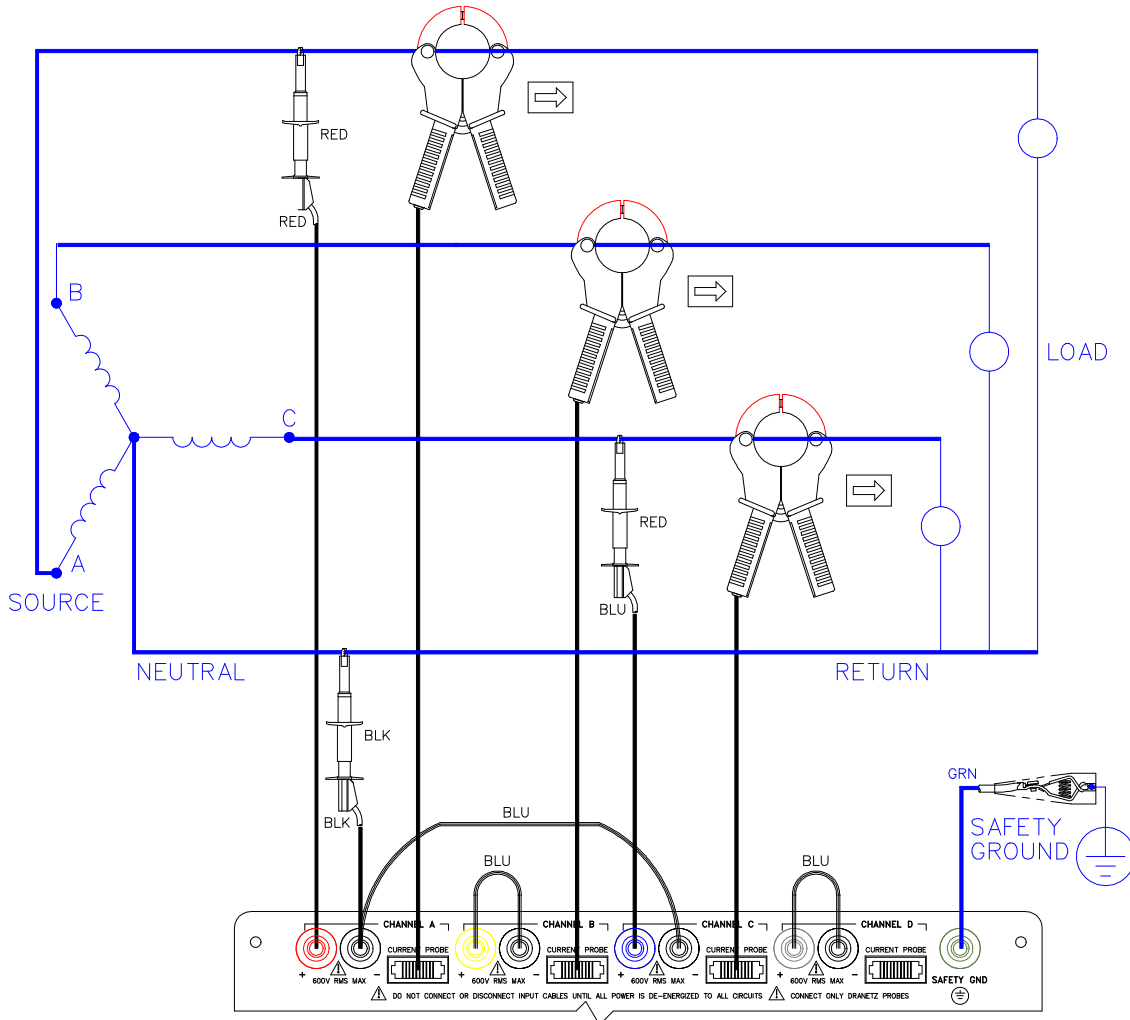
8600-11

Wye, 2 1/2 Element Metering

Introduction

For older type 2 1/2 element (stator) metering circuits the two voltage channels A and C are used, along with the three current channels as shown. Voltage channel B is not connected and is calculated by the Power Platform software.

Diagram



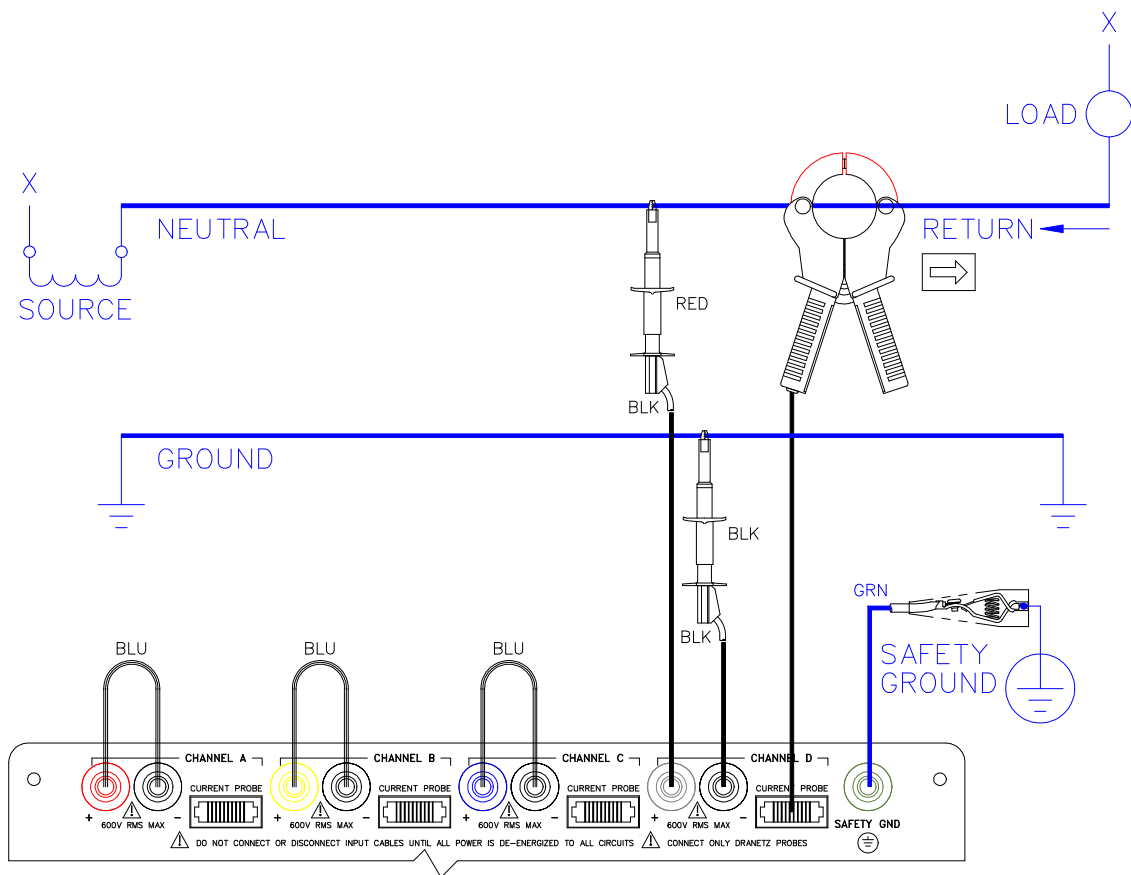
8600-13

Neutral-to-Ground

Introduction

Neutral to ground measurements can be made with any of the previously described circuit configurations (single, split, or 3 phase voltage and current) by jumpering channel D's positive voltage connector to the common and jumpering channel D's negative voltage connector to circuit ground. Channel D's current connector should be connected to neutral.

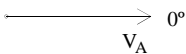
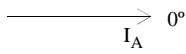
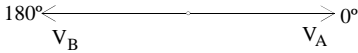
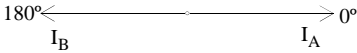
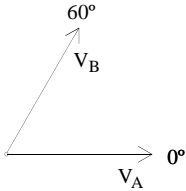
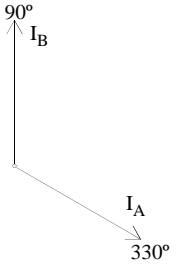
Diagram



8600-14

Phasor Diagrams for Standard Power Connections

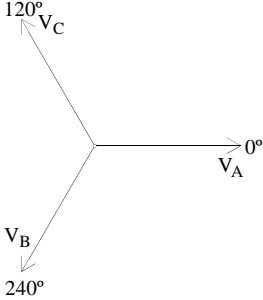
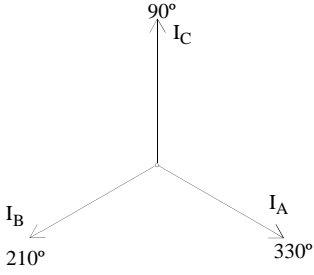
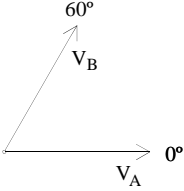
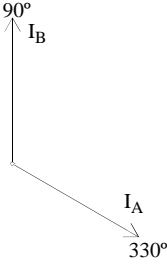
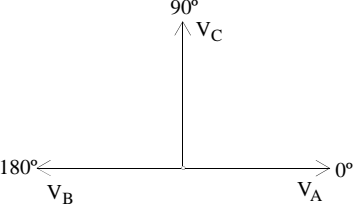
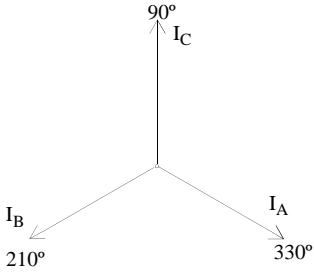
Diagrams The following diagrams describe the voltage and current phasors (for resistive loads) for the standard type of power connections when selected for viewing in meter mode. The page number for the related power connection diagram is given in the left column. Refer to Chapter 4, Section E, for information about viewing voltage and current phasors.

Power Connection Diagram	Voltage Phasor	Current Phasor
<p>Single Phase (See page 4-39)</p>		
<p>Split Phase (See page 4-40)</p>		
<p>Delta, One Leg Grounded (See page 4-44)</p>		

Continued on next page

Phasor Diagrams for Standard Power Connections, Continued

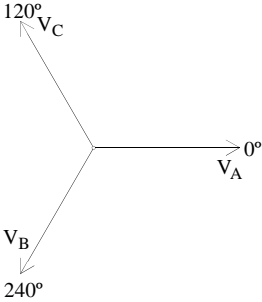
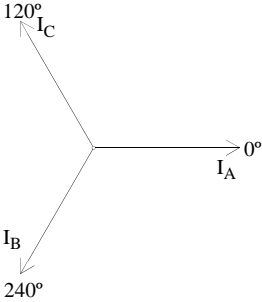
Diagrams (continued)

Power Connection Diagram	Voltage Phasor	Current Phasor
<p>Floating Delta (See page 4-43)</p>		
<p>Open Leg Delta (See page 4-46)</p>		
<p>High Leg Delta (See page 4-47)</p>		

Continued on next page

Phasor Diagrams for Standard Power Connections, Continued

Diagrams
(continued)

Power Connection Diagram	Voltage Phasor	Current Phasor
<p>Four Wire Wye (See page 4-41)</p>		

Section D

Monitoring Setup Procedures

Overview

Introduction This section describes the procedures required to select and activate a monitoring setup and start the monitoring process.

In this section The following topics are covered in this section.

Topic	See Page
Selecting and Activating a Setup	4-55
Reading Setups from a Memory Card	4-57

Selecting and Activating a Setup

Introduction

The following procedure is for selecting and activating a setup only. Screens show data related to the default setups. For details on how to modify a setup, see Chapter 6. Predefined setups are detailed in Appendix I.

A setup can be selected in two ways:

- From one of nine predefined setups.
 - From the preprogrammed setups stored on a memory card. See page 4-57.
-

Recording status setup

Before selecting a new setup for activation or editing, review the setup currently active and make a print record of the current setup status and thresholds in case you want to return to this setup.

To make a printed record proceed as follows:

- From the Main Menu, select 5, Analyzer Status, then 1 View Display (the Analyzer Status Display Screen appears).
- Press PRINT to print out the present status.
- Press EXIT to Main Menu.
- Press 3, Monitoring Setups.
- Press 2, Print Monitoring Setups.
- Select the setups to be printed.
- Press START PRINT.

The printout will provide you with a referable record and reminder of your present setup.

Continued on next page

Selecting and Activating a Setup, Continued

Selecting a Setup

To select a pre-defined setup:

Step	Action												
1	<p>Select 3,1 for the Monitoring Set-ups Programming screen to appear.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Oct-01-91 14:02:56</p> <p>MONITORING SET-UPS PROGRAMMING SCREEN</p> <p>SET-UP# 1 24 SETUPS AVAILABLE.</p> <p>TITLE: DEMAND & ENERGY-PLOT & MIN/MAX</p> <p>STATUS: ACTIVE</p> <p>INPUT CONFIG: SINGLE PHASE</p> <p>A TOTAL OF 4 REPORTS ARE PROGRAMMED FOR THIS SET-UP.</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>NEXT SET-UP</td> <td>CHANGE STATUS</td> <td>SET-UP TITLE</td> <td>INPUT CONFIG</td> <td>MORE</td> <td>EXIT</td> </tr> </table> <p style="text-align: center;">↕</p> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td>PRINT SET-UP</td> <td>COPY SET-UP</td> <td>DELETE SET-UP</td> <td>EDIT REPORT</td> <td>MORE</td> <td>EXIT</td> </tr> </table> </div>	NEXT SET-UP	CHANGE STATUS	SET-UP TITLE	INPUT CONFIG	MORE	EXIT	PRINT SET-UP	COPY SET-UP	DELETE SET-UP	EDIT REPORT	MORE	EXIT
NEXT SET-UP	CHANGE STATUS	SET-UP TITLE	INPUT CONFIG	MORE	EXIT								
PRINT SET-UP	COPY SET-UP	DELETE SET-UP	EDIT REPORT	MORE	EXIT								
2	Select [NEXT SETUP] until the desired setup is displayed.												
3	If the setup is not active, select [CHANGE STATUS] to activate it.												
4	Select [EXIT] until the MAIN MENU is displayed.												

Reading Setups from a Memory Card

Introduction


Setups stored on a memory card are usually preprogrammed setups that have been established as tried and true conditions. All setups on the card are read in and the one setup required for monitoring must be selected and activated. A setup file must exist on the memory card with the site name agreeing with the present 8000 siteID.

Note

Setups presently in memory will be overwritten.

Displaying the screen

Follow these steps to display the Memory Card Functions screen.

Step	Action
1	Select item 5, Analyzer Status, from the Main Menu.
2	Select item 5, Memory Card Functions, from the Status Menu. <u>Result:</u> The following screen will appear. 

Procedure

Follow these steps to read setups from a memory card.

Step	Action
1	Insert memory card.
2	Press READ CARD to display Read Data From Memory Card screen. Card size and card free space is shown. CAUTION: Reading card data will erase any events presently in memory!
3	Press READ SETUPS. Setups are displayed.
4	Select and activate the setup required as described on page 4-55.

Section E

Scope and Meter Mode

Overview

Introduction This section describes the operation of scope and meter mode, which allows you to view real-time parameter data.

In this section The following topics are covered in this section.

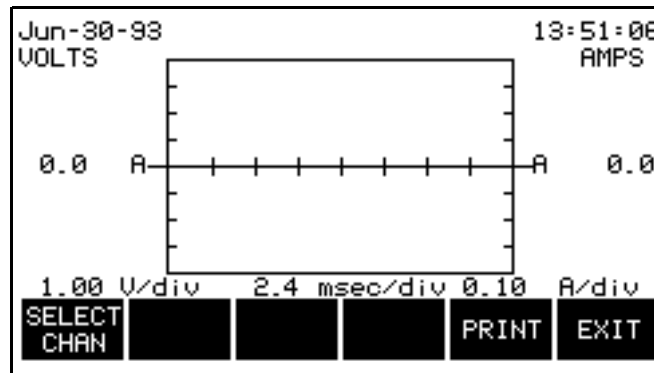
Topic	See Page
Viewing Scope Mode	4-59
Viewing Meter Mode, Continued	4-62
Viewing Voltage and Current Phasors	4-64
Viewing Voltage and Current Harmonics	4-65

Viewing Scope Mode

Introduction Scope Mode allows you to view the present voltage and current waveforms for up to four channels.

Displaying the screen From Meter Mode Menu, select item 3, Scope Mode.

Result: A screen similar to that shown below is displayed.



Screen description

Waveform labels: Voltage waveforms are labeled on the left at the point where they cross the vertical axis. Current waveforms are labeled on the right at the point where they cross the vertical axis.

When more than one waveform crosses the vertical axis at the same point (same phase angle), the channel identifier for the waveform with the highest amplitude is placed first, and the lower values follow below. If the amplitudes are also identical then the A-B-C order is used.

Vertical scale: Scaled relative to the waveform with the largest peak value. Voltage and current are scaled separately.

Horizontal scale: Scaled to display one cycle. Each tick mark is 45 degrees.

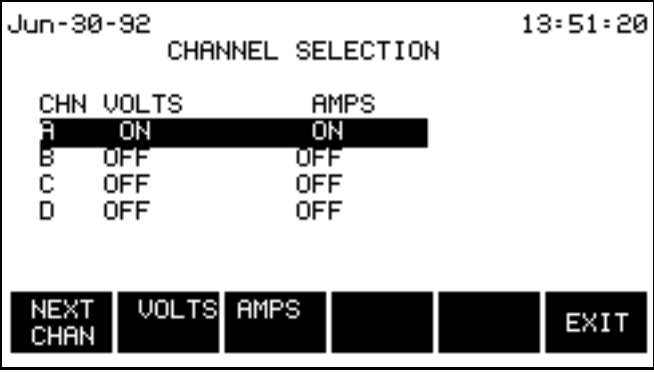
Update rate: The display is updated approximately once every two seconds.

Continued on next page

Viewing Scope Mode, Continued

How to select channels for display

Follow these steps to select channels for the Scope Mode display.

Step	Action
1	<p>In Scope Mode display, press SELECT CHAN. The Channel Selection screen is displayed as shown below.</p> <p><u>Result:</u> The following screen will appear.</p> 
2	Press VOLTS to toggle selected channel On or Off for voltage waveform display.
3	Press AMPS to toggle selected channel On or Off for current waveform display.
4	Press NEXT CHAN to select channels A, B, C, and/or D as shown below.
5	Repeat steps 2 through 4 for each channel to be selected.
6	Press EXIT to display the channels selected.

Viewing Meter Mode

Types of displays

You can select any one channel for viewing with all parameters displayed, or you can select an individual parameter for viewing with all channels displayed.

Channels that can be viewed

Channels A, B, C, or D can be viewed individually or collectively for single phase monitoring. For Delta mode the sequence is: A-B, B-C, C-A, D, and ABC.

Available parameters

The following table lists the parameters that can be viewed in meter mode.

Parameter	Symbol	Group
Volts RMS	V	1
Amps RMS	I	1
Watts	W	1
Volt-amps	VA	1
Volt-amps Reactive	VAR	2
Power Factor (True)	PF	2
Voltage Frequency	Hz	2
Voltage Crest Factor	Vcf	3
Current Crest Factor	Icf	3
Displacement Power Factor	DPF	3
Transformer Derating Factor	TDF	3
Voltage Harmonic Distribution	Vthd	4
Current Harmonic Distribution	Ithd	4
Voltage Telephone Influence Factor	Vtif	4
Current Telephone Influence Factor	Itif	4

Continued on next page

Viewing Meter Mode, Continued

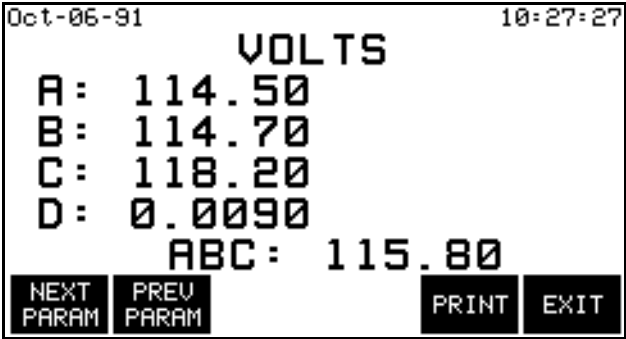
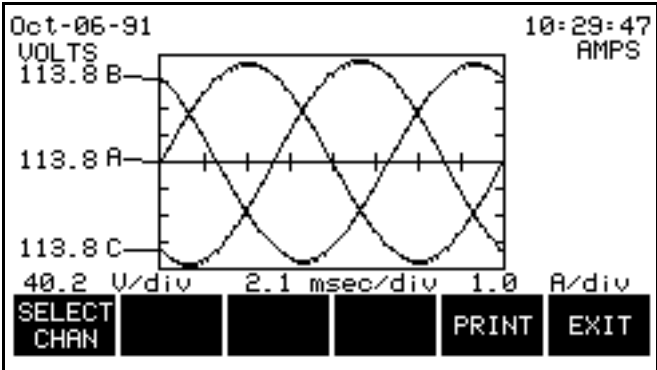
Procedure Follow these steps to view the meter mode displays.

Step	Action
1	<p>From Main Menu, select 1, METER MODE to view the Meter Mode Menu below.</p> <div data-bbox="659 539 1312 907" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <pre> Oct-06-91 10:26:26 METER MODE MENU 1. ONE CHANNEL, ALL PARAMETER METER 2. ALL CHANNEL, ONE PARAMETER METER 3. SCOPE MODE 4. VOLTAGE AND CURRENT PHASORS EXIT </pre> </div>
2	<p>Press 1 if one channel and all parameters are to be viewed.</p> <div data-bbox="659 1031 1312 1398" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <pre> Oct-06-91 10:26:56 CHANNEL: A 114.5 V 1.368kI 143.6kW 156.7kVA NEXT CHAN NEXT SET PRINT EXIT </pre> </div> <p>Press NEXT CHAN to display next channel parameters. Press NEXT SET to display the next group of data for the channel selected.</p>

Continued on next page

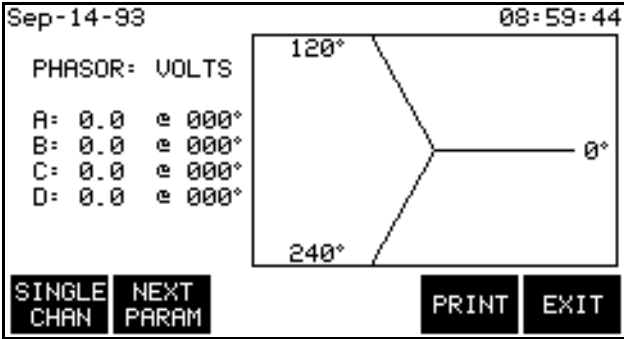
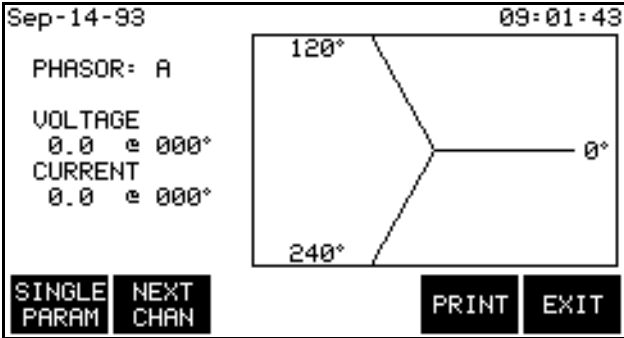
Viewing Meter Mode, Continued

Procedure
(continued)

Step	Action
3	<p>Press 2 if all channels and one parameter are to be viewed.</p> 
4	<p>Press 3 for Scope Mode.</p> 

Viewing Voltage and Current Phasors

Procedure Follow these steps to view the current and voltage phasors displays.

Step	Action
1	From Main Menu select 1, METER MODE.
2	<p>From Meter Mode menu press 4, Voltage & Current Phasors.</p> <p>The following screen will appear if no inputs are connected.</p> 
3	<p>Press SINGLE CHAN to display the Single Channel Phasors display.</p> 

Display symbols Phasor vectors are displayed clockwise from the zero degrees reference. Dependent on the phases being monitored, up to four channels may be displayed at any one time for either volts or amps, or a single channel for both volts and amps. An arrow head and channel label are displayed on the vector arm.

Viewing Voltage and Current Harmonics

Screen description

Viewing the voltage and current harmonics permits you to display harmonics in the form of a graph or a table.

Graph: The graph displays the magnitude of each harmonic as a percentage of the fundamental, rms, or maximum load current. The left edge of the graph represents the fundamental frequency.

Table: The table lists the magnitude and phase for each harmonic. This screen displays harmonic's magnitude and phase relative to fundamental, rms, or maximum load current of the channel and parameter selected.

Update rate: All displays are updated once every five seconds.

Harmonics displayed: The number of harmonics displayed is up to the 50th for 60Hz and up to the 8th for 400Hz.

Volts, Total Harmonic Distortion	Vthd
Amps, Total Harmonic Distortion	Ithd

Displaying the graph screen

Follow these steps to view the harmonics graph display.

Step	Action
1	From Main Menu select 2, View Reports.
3	From View Reports Menu, select 9, Harmonics. <u>Result</u> : A screen similar to the following will appear.

```

Oct-06-91          10:52:42
HARMONICS=CH A   REF  112.8  V, 60.0Hz
%FUND           Vthd
0.67
0.54
0.40
0.27
0.13
0.00
  5  10  15  20  25  30  35  40  45  50
NEXT  NEXT  SET  TEXT  PRINT  EXIT
CHAN  PARAM SCALES MODE
    
```

Continued on next page

Viewing Voltage and Current Harmonics, Continued

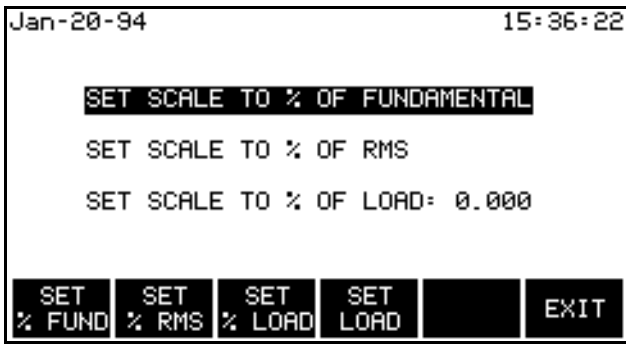

Changing the channel and parameter

Use the following keys to change the channels and/or parameter displayed.

- NEXT CHAN to select channels A, B, C, or D.
- NEXT PARAM for selection of V, A, or W.

Changing the vertical scale

Follow these steps to change the vertical scale of the harmonic graph display.

Step	Action
1	<p>Press SET SCALES.</p> <p><u>Result:</u> The following screen is displayed.</p>  <p><u>Note:</u> Scale based on following values and conventions:</p> <ul style="list-style-type: none"> •% of Fund - THD, North American convention •% of rms - THD, IEC 555-2, European convention •% of load - TDD, IEEE 519 recommendation
2	<p>Press one of the SET% keys.</p> <ul style="list-style-type: none"> • If you pressed SET% FUND or SET% RMS, go to step 5. • If you pressed SET% LOAD (current) go to step 3.
3	<p>Press SET LOAD</p> <p><u>Result:</u> The menu bar changes to the following.</p> 
4	Enter the value for maximum load current.
5	Press EXIT to return to harmonics graph.

Continued on next page

Viewing Voltage and Current Harmonics, Continued

Viewing the text display To view the harmonics text display, press the TEXT MODE key from the graph display.

Result: A screen similar to the following will appear.

```

Oct-06-91                               10:53:24
HARMONICS=CH A   REF   112.8 V, 60.0Hz
%FUND   Vthd
H# MAG%  PHS H# MAG%  PHS H# MAG%  PHS
02 0.000 000 09 0.288 000 16 0.000 000
03 0.288 180 10 0.000 000 17 0.000 000
04 0.000 000 11 0.000 000 18 0.000 000
05 0.672 000 12 0.000 000 19 0.000 000
06 0.000 000 13 0.000 000 20 0.000 000
07 0.000 000 14 0.000 000 21 0.000 000
08 0.000 000 15 0.000 000 22 0.000 000
NEXT  NEXT  NEXT  GRAPH  PRINT  EXIT
CHAN  PARAM SET  MODE
  
```

Note For the watts parameter only, harmonic power direction is indicated by a sign in front of the MAG% (watts magnitude) value. A minus sign (-) indicates that the harmonic power flows in the opposite direction of the source-load arrow on the CT. No sign indicates that the harmonic power flows in the same direction as the source-load arrow on the CT.

A load is indicated if the CT arrow is pointing at the physical load and there is no sign on the watts magnitude. This is the normal situation. If the sign on the watts magnitude is negative, then the load is actually a source (generator).

A negative sign on the fundamental watts usually indicates that the CT is on backwards, or the arrow is pointing in the wrong direction.

Function keys The following table provides a description of the function keys for the harmonics text screen.

Key	Function
NEXT CHAN	Displays the next channel of data.
NEXT PARAM	Displays the next parameter of data: V, A, or W.
NEXT SET	Displays the next set of harmonics: 02 to 22, 23 to 43, 44 to 50th harmonics for 60 Hz.
GRAPH MODE	Returns to the harmonics graph screen.
PRINT	Prints the screen.

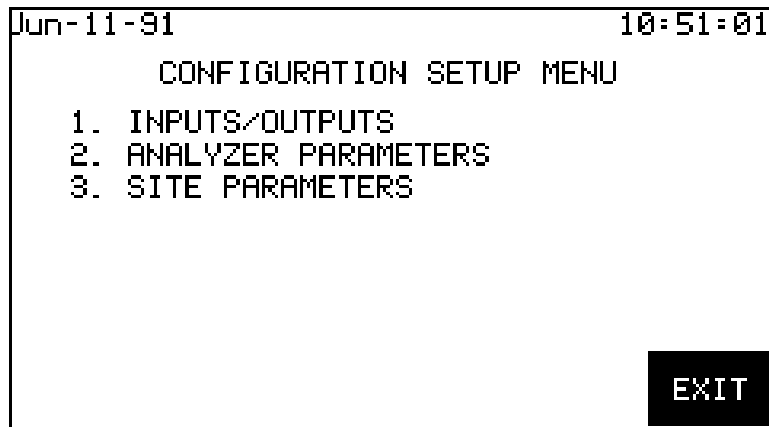
Chapter 5

Programming Configuration Setups

Overview

Introduction

Configuration settings are programmed through MAIN MENU selection 4, Configuration Setup. When this selection is chosen, the CONFIGURATION SETUP MENU appears.



This section also discusses several of the functions performed through MAIN MENU selection 5, Analyzer Status. When this selection is chosen, the ANALYZER STATUS MENU appears (displayed on page 5-38).

The functions performed through the CONFIGURATION SETUPS MENU and the ANALYZER STATUS MENU are listed, along with their Quick Access Code and the page number where the function is described.

The Quick Access Code indicates the keys that have to be selected to reach the screen where that function is programmed from the MAIN MENU.

The functions described on the following pages appear in the order that they appear in the PP1-8000's menu structure. Configuration Functions that pertain to communication (Configure RS232 Port and Configure Internal Modem/Fax) are described in the "Communication" section of this manual (Section 10). Configuration Functions that pertain to the front panel printer (turn printer on/off and set printer battery operation) are described in the Chapter "Printer Operation".

Printing options

Refer to page 1-11 for printing options if you have any questions about using the print functions in this chapter.

Continued on next page

Overview, Continued

In this chapter

The following configuration menus are covered in this chapter.

Function	Quick Access Code	Page
Analog (Voltage and Current) Configurations	4,1,1 and 4,1,2	5-4
Enter Scale Factors	4,1,1	5-6
Program Assumed Values	4,1,1	5-8
Program Digital Input Setting	4,1,2	5-10
Setting Relays	4,1,5	5-14
Enable/Disable LCD Backlight Auto-Shutoff	4,1,6	5-16
Disable/Enable Audible Alarm	4,1,6	5-17
Print All Configurations	4,1,7	5-17
Set Time and Date	4,2,1	5-19
Select Language	4,2,2	5-20
Redirect Error Messages	4,2,3	5-21
Select Memory Storage Type	4,2,4	5-22
Program Site Identifier	4,3,1	5-25
Program Billing Dates	4,3,2	5-26
Program Time of Use Periods	4,3,3 F5,1	5-30
Program Rate Schedule	4,3,3	5-28
Set Demand Interval Criteria	4,3,4	5-34
Analyzer Status Menu Functions	5,1	5-38
Clear Memory	5,3	5-39
Reset Configuration	5,3	5-41
View Digital Input Status	5,4	5-42

Section A

Input and Output Devices

Overview

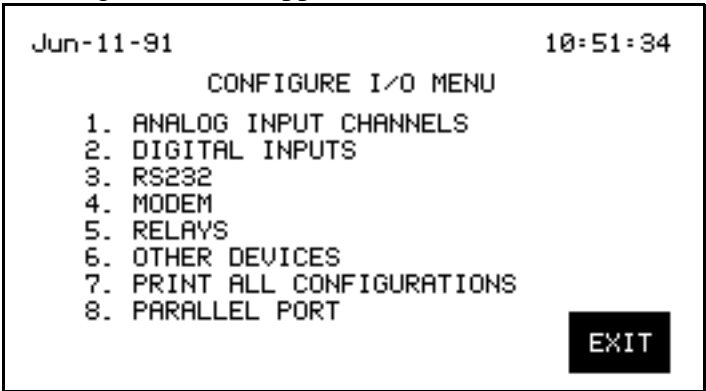
General

Input and output devices are:

- Analog and digital input channels
- RS232 port
- Internal modem (optional) (not available on Model PP1E)
- Relays
- Liquid Crystal Display (LCD)
- Printer
- Alarm.

Procedure

Follow these steps to configure one of these devices.

Step	Action
1	Select item #4, Configuration Setup, from the Main Menu.
2	Select item #1, Configure I/O Menu, from the Configuration Setup Menu. The following screen will appear: 

Select Wiring Configuration Type

General

Before you can begin monitoring with your PP1-8000, you must select the type of wiring configuration you are monitoring.

The PP1-8000 can be connected to single, split, or three phase power circuits using the analog (voltage and current) inputs. Or, the PP1-8000 can be connected to a pulse initiating device using the digital inputs.

Additionally, the PP1-8000 allows you to select a current only ("NO VOLTAGE") configuration selection. If monitoring a delta configuration, the PP1-8000 uses a two-wattmeter method of monitoring.

Analog (Voltage and Current) Configurations

The configuration selections indicate the type of circuit configuration the PP1-8000 is connected to, as well as the type of connection. The possible configuration selections are:

Measured Circuit	Present Configuration Setting
Single phase	Single phase
Split phase	Split phase
Floting Delta	3 phase, 4 wire, 3 probe
Four Wire Wye	3 phase, 4 wire, 2 or 3 probe (wye)
Delta, One Leg Grounded	3 phase, 3 wire, 2 or 3 probe (delta)
Open Leg Delta	Split Phase
High Leg Delta	3 phase, 4 wire, 3 probe
Wye, 2 1/2 Element Metering	2 1/2 element
Current Only	NO VOLTAGE INPUT (see programming assumed values, page 5-8)
KYZ	NONE: DIGITAL INPUT (see programming KYZ, page 5-12).

When monitoring a delta configuration, the 2 probe (two-wattmeter) method may be selected. It is important to note that measurements of a three phase delta configuration do not provide the same information as a three phase wye, because of the phase relationships in a delta system.

Continued on next page

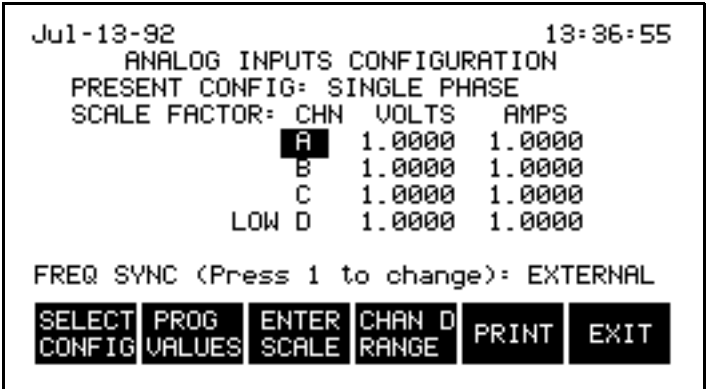
Select Wiring Configuration Type, Continued

Analog (Voltage and Current) Configurations (continued)

If monitoring KYZ pulse, you must select "NONE: DIGITAL, KYZ" for your present configuration, and also select "KYZ" on the Digital Input Configuration Screen. (Refer to page 5-12.)

To program the proper monitoring configuration, select QAC 4,1 from the MAIN MENU.

Follow these steps to configure an analog device.

Step	Action
1	Select item #4, Configuration Setup, from the Main Menu.
2	Select item #1, Configure I/O Menu, from the Configuration Setup Menu.
3	<p>From the Configure I/O Menu, select item 1, Analog Input Channels.</p> <p>The following screen will appear:</p> 

The screen displays the present configuration setting for the analog inputs. If the proper configuration isn't displayed, select [SELECT CONFIG] to cycle through the available configuration settings until the desired configuration is displayed. When "NO VOLTAGE" or "KYZ PULSE INPUT" is displayed, the rest of the screen changes to accommodate these settings. The setting that is displayed when the screen is exited is the setting the PP1-8000 accepts and uses.

Continued on next page

Select Wiring Configuration Type, Continued

Analog (Voltage and Current) Configurations (continued)

The bottom line on the screen shows the frequency sync mode. This can be set to external or internal. When it is set to external, the PP1-8000 will try to sync to an incoming voltage signal, if it can't, it will switch to an internal sync. When the sync mode is set to internal, the PP1-8000 will sync internally. To change the frequency sync mode, press 1 on the keypad. To change the internal sync frequency, refer to page 5-8.

If the "NO VOLTAGE" configuration is selected, assumed values must be entered for voltage, PF, and frequency. (Refer to page 5-8).

If "KYZ PULSE INPUT" is selected, an energy-per-pulse ratio must be entered, and the digital inputs must be configured for KYZ. (Refer to page 5-9).

Enter Scale Factors

The scale factors discussed in this subsection are those programmable through the Analog Inputs Configuration Screen.

The scale factor compensates for the use of potential transformers, current transformers, and/or adapter assemblies, ensuring that the PP1-8000 properly interprets the current or voltage signal received at its analog inputs to reflect the actual signals being monitored.

If voltage and current connections are made without using intermediate transformers, all scale factors should be set to 1.

Scale factors other than 1 must be entered if the following conditions exist:

- The Power Platform current probes are connected to the secondary of another CT
- The Power Platform is connected to the monitored current using an isolated transformer box
- The voltage connections are made using a potential transformer (PT)

The ratio of input to output in decimal form is the scale factor for a particular CT or PT. For example, if a CT has a step-down ratio of 1000:5, a 1000-amp input produces a 5 amp output and the scale factor is $1000/5$, or 200. Setting the AMPS scale factor to 200 causes the PP1-8000 to multiply the CT outputs by 200, thus enabling all displays and printouts to read properly.

Continued on next page

Select Wiring Configuration Type, Continued

Enter Scale Factors (continued)

The PP1-8000 automatically compensates for the step-down ratio of Dranetz-BMI Current Probes (CT-10, CT-150, CT-300, CT-1000, and CT-3000). Therefore, the scale factor for these probes is 1. (Additional scale factors can still be entered, if desired.)

Dranetz-BMI Isolated Termination Box ISO-1 has a scaling factor of 0.333, ISO-1A has a scaling factor of 0.500, and ISO-5 has a scaling factor of 1.667. For each channel using any of these termination boxes, the appropriate scale factor must be entered.

When a CT and a Dranetz-BMI Isolated Termination Box are used together, the required combined scale factor is the product of the two individual scale factors.

Example: A CT with a 5 amp secondary has an input to output ratio of 1000 to 5. The scale factor is thus 200. When this CT is used in combination with Dranetz-BMI Isolated Termination Box (ISO-5), the correct combined scale factor is 200×1.667 , or 333. In other words, Total Scale Factor = CT scale factor X termination box scale factor.

Scale factors for voltage and current are programmable in a range of 0.001 to 999,900. Different scale factors can be entered for voltages and currents and for different channels. However, in most systems, the three phase values are usually identical. (When assumed voltages are used, scale factors can still be entered for amps and channel D.)

If the scale factor for any of the channels needs to be changed, select [PROG VALUES] to move the highlight to the channel to be changed.

Select [ENTER SCALE]. The options at the bottom of the screen change and the volts entry is highlighted. Enter a value for the voltage scale and select [ENTER]. The Amps entry is highlighted. Enter a value for the amps scale and select [ENTER]. The previous options are displayed.

Values should be entered as complete numbers, up to four significant digits (give example), PP1-8000 automatically includes multiplier.

Values should be entered as complete numbers. They are limited to four significant digits and are displayed using multipliers (u, m, k, M, G, T, etc.). For KYZ input, this option allows you to enter the pulses to power ratio. [ENTER SCALE] is not available when the "NO VOLTAGE" configuration is selected.

Repeat until all the required scale values are programmed.

Select Wiring Configuration Type, Continued

Set Channel D Channel D can monitor in one of two ranges. HI range is 10-600, LO range is 1-60.

Select [CHAN D RANGE] to cycle this setting between "HI RANGE," "LO RANGE," and "OFF". Channel D is displayed only when it is on.

Channel D does not affect total (ABC) values.

NOTE If not monitoring Channel D, turn it off to avoid erroneous data appearing on the screen and in reports.

Selecting "NO VOLTAGE" Configuration When selecting a current only ("NO VOLTAGE") configuration, first select the appropriate wiring configuration (single, split, or one of the three phase configurations), and select [EXIT] to return to the CONFIGURE I/O MENU. Then re-enter the Analog Inputs Configuration Screen and select "NO VOLTAGE". The PP1-8000 remembers the wiring configuration, and allows you to program in the assumed values and any current scale factors. Select [EXIT] when the proper values and scale factors are displayed.

The "NO VOLTAGE" configuration can also be used to program the internal sync frequency. This value will be used to produce an internally generated synchronization signal (at that frequency) in the unlikely event that the PP1-8000 cannot synchronize to the external signal. when there is a lot of disturbance on the line (such as from a high harmonic content)

Program Sync Frequency To program the internal sync frequency, first select the "NO VOLTAGE" configuration and enter a value for the frequency. Select [EXIT] to return to the CONFIGURE I/O MENU. Then re-enter the Analog Inputs Configuration Screen and select the appropriate wiring configuration. Program in any necessary scale factors and select [EXIT].

Program Assumed Values The PP1-8000 allows you to monitor single, split, or three phase configurations without connecting voltage inputs. To program the PP1-8000 to compensate for the absence of voltage connections, select "NO VOLTAGE INPUT" as the present configuration and program in an assumed value for voltage, power factor, and frequency.

Continued on next page

Select Wiring Configuration Type, Continued

Program Assumed Values (continued)

From the Analog Inputs Configuration Screen, select [ENTER VALUES] (this option is only available when the "NO VOLTAGE" configuration is selected). This causes the numeric entry menu bar to appear, allowing values for the highlighted fields on the screen to be programmed using the keypad.

Digital (KYZ Pulse) Configuration

When monitoring KYZ pulse (using the digital inputs), the Configure Analog Input Channels Screen must be set to reflect that the analog inputs A, B, and C are not being used, and channels 1 and 2 on the Configure Digital Input Channels Screen must be configured for KYZ. Also, an input ratio scale factor (energy-per-pulse) must be entered on the Configure Analog Input Channels Screen.

Program Analog Input Setting

To program the Present Configuration when using digital inputs, the analog inputs must first be set to reflect that they are not being used. To do this:

Step	Action
1	Select item 1, Inputs/Outputs, from the CONFIGURATION SETUP MENU.
2	Select item 1, Analog Input Channels, from the CONFIGURE I/O MENU.
3	Select [SELECT CONFIG] to cycle through the configuration settings until "KYZ PULSE INPUT" is displayed.

Program Energy-per-Pulse Ratio

When monitoring a KYZ configuration, each pulse received at the digital inputs represents a discrete amount of energy. Your utility company should provide you with the information as to how much energy is represented by each pulse. This number must be programmed into the PP1-8000 so that energy consumption reported by the PP1-8000 accurately reflects the amount actually consumed.

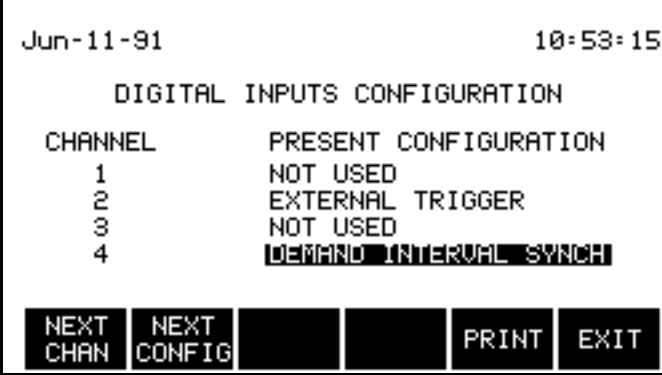
This value is displayed as the scale factor on the Program Analog Inputs Screen when "KYZ PULSE INPUT" is the selected configuration. To change the value, select [ENTER SCALE]. Use the numeric keypad to enter a value for the energy-per-pulse ratio. Select [ENTER].

Select [EXIT] to return to the CONFIGURE I/O MENU.

Select Wiring Configuration Type, Continued

Program Digital Input Setting To program channels 1 and 2 of the digital inputs for KYZ pulse monitoring:

Select 4,1,2 from the MAIN MENU for the Digital Inputs Configuration screen.



The screenshot shows a terminal window with the following content:

```
Jun-11-91                               10:53:15
                                     DIGITAL INPUTS CONFIGURATION
CHANNEL      PRESENT CONFIGURATION
  1          NOT USED
  2          EXTERNAL TRIGGER
  3          NOT USED
  4          DEMAND INTERVAL SYNCH
NEXT CHAN  NEXT CONFIG  [ ]  [ ]  PRINT  EXIT
```

With the highlight on either channel 1 or 2, select [NEXT CONFIG] until "KYZ" is displayed on the screen. Since both channels are paired together for this configuration, KYZ appears next to each channel.

After the KYZ configuration is selected, select [EXIT] until the MAIN MENU is displayed.

Program Digital Input Channels

Overview

To program the digital input channels, choose item 2 from the CONFIGURATION SETUPS MENU.

This screen displays the present configuration of each of the four input channels located on the rear panel of the analyzer. Not all settings are available for each channel. The configuration settings available for the different channels are listed the following table.

Setting	Channel
KYZ	1 & 2
START/STOP	1 & 2
External Trigger	1, 2, 3, or 4
Pulse Interval*	1
Pulse Duration	2
Pulse Count	2
Pulse Rate	2
Demand Interval Synchronization	4
Not Used	1, 2, 3, or 4
* Can't be selected at the same time as Pulse Duration or Pulse Rate.	

NOTE: The state (high or low) of these inputs can be viewed on the "Status of Digital Inputs Screen" (QAC 5,4). This screen also displays information pertaining to the pulse interval, pulse duration, or pulse count, if these configurations are selected.

Program Digital Input Channels, Continued

Procedure To change the configuration setting for any of the digital channels, first select [NEXT CHAN] to move the highlight to the desired channel. Then, select [NEXT CONFIG] until the desired setting is displayed.

NOTE:When "KYZ" or "START/STOP" is selected for channel 1 or 2, the two channels are paired together and take on the same setting. If one of the two channels are changed from KYZ or START/STOP to an unpaired configuration, the other channel will revert back to its previous state before it was paired up.

[PRINT] generates a printout of the input configuration.

[EXIT] accepts the displayed settings and returns to the CONFIGURE I/O MENU.

The configurations settings displayed when [EXIT] is selected are the settings that are accepted and used by the PP1-8000.

Configuration settings are not accepted/changed until the screen is exited.

Each type of configuration setting is explained below and on the following pages. Wiring connections for each configuration are described in Section 3.

KYZ This configuration is used when the PP1-8000 is monitoring inputs from a pulse initiating device connected to a revenue meter. This type of configuration is NOT USED when voltage cables or current probes are connected to analog inputs A, B, and/or C. Both channels 1 and 2 are used for KYZ configuration.

Start/Stop This type of configuration is used to record measurements only during some external event. An electrical signal at input channel 1 clears memory and starts monitoring. An electrical signal at input channel 2 stops monitoring. Both channels 1 and 2 are used for START/STOP configuration.

Continued on next page

Program Digital Input Channels, Continued

NOTE	This type of configuration ONLY MONITORS during the time between when the start signal and the stop signal are received.
Pulse Interval Timing	This type of configuration is used to measure the time between two sequential electrical signals received at input channel 1. The interval duration and ending time is displayed on the Status of Digital Inputs Screen (QAC 5,4).
Pulse Duration Timing	This type of configuration is used to measure the duration of an interval during which an electrical signal is received at input channel 2. The interval duration and ending time is displayed on the Status of Digital Inputs Screen (QAC 5,4).
Pulse Count	This is used for the two wire KYZ mode.
Pulse Rate	This type of configuration is used to count electrical signals received at input channel 2 and compute the rate per second. The rate is displayed on the Status of Digital Inputs Screen (QAC 5,4).
External Triggers	<p>This type of configuration is used as a trigger for report generation. Any of the four digital input channels can be connected to an external trigger. When an electrical signal is received at that channel (and the channel is configured as an external trigger), an event is recorded in the PP1-8000's memory. If the channel is programmed as a trigger for one or more active reports, the report(s) is generated. The external trigger can be caused by an external event and the programmed reports can help to analyze how that external event affects specific components of your power consumption or quality.</p> <p>There is a way to disable all reports that are generated by an external trigger without making the reports "inactive".</p>
Demand Interval Synch	This type of configuration is used to coordinate the start of the demand interval used by the PP1-8000 with that of the demand interval used by the utility company. If the utility company supplies a pulse at the start of the interval, that pulse should be connected to input channel 4 and the input should be programmed as such.

Continued on next page

Setting Relays

Configure Relays

Relays are alarm contacts that open (or close) when a certain condition is met. These conditions are programmed for automatic operation through the Monitoring Setups Screen (refer to "Report Triggers" on page 6-9) or through the Redirect Error Messages Screen.

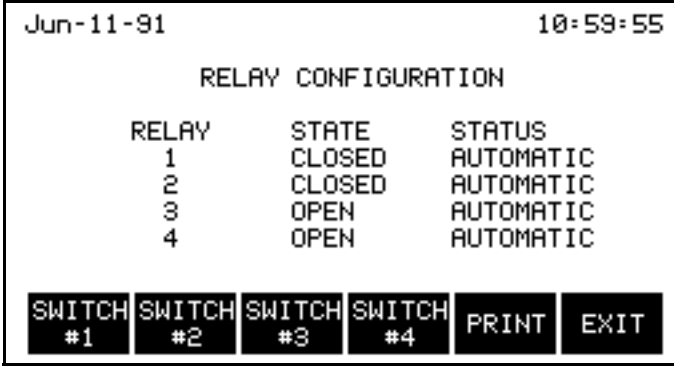
A relay can be connected to an alarm to indicate when this condition occurs. The relay can also be connected in such a way as to initiate a control function to automatically turn off discretionary loads when the demand is too high. (That is, the Power Platform's relay can be used to activate another relay to perform this or some other function.)

Four relays are available for use in reports. Relay 1 can also be used for error messages.

The relays can be set to either normally open or normally closed operation through the Relay Configuration Screen.

This screen displays the present state (vs. programmed state) and status of the four relays.

To modify the relay configuration, select 4,1,5 from the MAIN MENU.



The screenshot shows a terminal window with the following content:

```
Jun-11-91 10:59:55
RELAY CONFIGURATION
RELAY STATE STATUS
1 CLOSED AUTOMATIC
2 CLOSED AUTOMATIC
3 OPEN AUTOMATIC
4 OPEN AUTOMATIC
SWITCH SWITCH SWITCH SWITCH PRINT EXIT
#1 #2 #3 #4
```

The STATUS displays whether the relay is AUTOMATIC or MANUAL.

- AUTOMATIC means that the relay is presently configured in another of the PP1-8000's screens. It could be programmed in the Monitoring Setups Report Screen (as a destination for the report) or it could be used as an output for certain error messages (relay 1 only).

Continued on next page

Setting Relays, Continued

Configure Relays (continued)

- **MANUAL** means that the relay is not presently configured through a different screen.

The **STATE** indicates whether the present condition of the relay is **OPEN** or **CLOSED**. To change the state of the relay, select the **[SWITCH #]** option that corresponds to the relay you wish to change. (This toggles the state between **OPEN** and **CLOSED**).

Changing the state is one way to test the relay after hook-up, to ensure that the connection was made properly.

NOTE

If the Power Platform is powered off and powered back on, the relays are in the open position during initialization. Once the system self tests are complete, the relays return to their programmed state.

Enable/Disable LCD Backlight Auto-Shutoff

Description

The LCD's EL backlight can be programmed to stay on continuously or to automatically shut itself off when the PP1-8000's keys have not been pressed for more than 15 minutes. When in the auto-shut off mode, the backlight returns as soon as any of the keys are pressed. This feature is designed to prolong the life of the EL backlight and is recommended for use. The screen is still visible without the backlight, except in dark environments.

To enable or disable this feature (or to view its setting) select 4,1,6 from the MAIN MENU.



Select [BACK LIGHT] to toggle the setting between ENABLED and DISABLED.

Disable/Enable Audible Alarm

Description The PP1-8000 sounds a 0.1 second alarm when an error or warning message appears, or a 1 second alarm when a report trigger generates a report. This alarm can be suppressed through the PP1-8000's configuration screens.

To enable or disable the alarm (or to view its setting) select 4,1,6 from the MAIN MENU.

Select [ALARM ON/OFF] to toggle the setting between ON and OFF.

Print All Configurations To print the present configurations of all items programmable through the CONFIGURE I/O MENU, select 4,1,7 from the MAIN MENU.

The items are printed in the order that they appear in the menu.

Section B

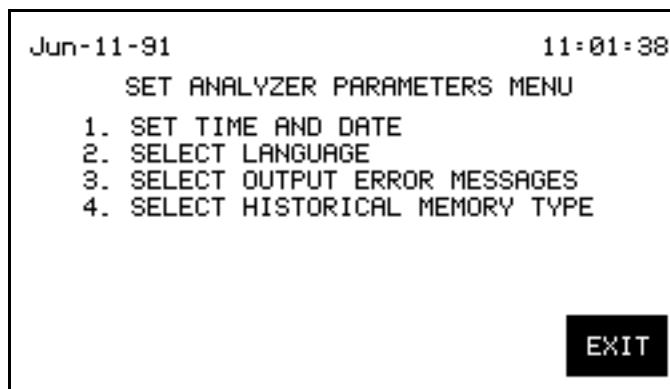
Analyzer Parameters

Overview

Introduction Analyzer parameters are:

Topic	See Page
Set Time and Date	5-19
Select Language	5-20
Redirect Error Messages	5-21
Select Memory Storage Type	5-22

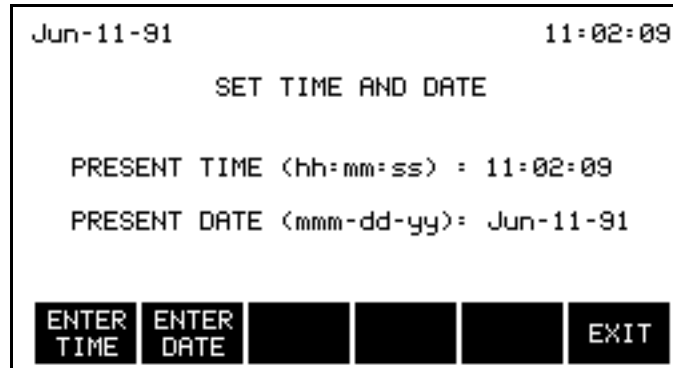
These parameters can be configured through the SET ANALYZER PARAMETERS MENU (select 4,2 from the MAIN MENU).



Set Time and Date

Introduction

The current time and date appear on the top line of the PP1-8000's screen. The settings can be changed through the Set Time and Date Screen (item 1 from the SET ANALYZER'S PARAMETERS MENU).



Procedure

To change the time, select [ENTER TIME]. The options at the bottom of the screen change and the hour portion of the time is highlighted. Use the numeric keypad to enter the hour. Select [ENTER]. The highlight moves to the minute portion of the time. Enter the minutes and select [ENTER]. If desired, enter the seconds. Select [ENTER].

To change the date, select [ENTER DATE]. The options at the bottom of the screen change and the month portion of the date is highlighted. Use the numeric keypad to enter the month (for example, enter "1" for January). The number entered is converted to three-character format (for example, "Jan") when the complete date has been entered. Select [ENTER]. The highlight moves to the day portion of the date. Enter the day and select [ENTER]. The highlight moves to the year portion of the date. Enter the year and select [ENTER].

The new date and time appear on the screen. Select [EXIT] until the MAIN MENU is displayed.

Select Language

Note

The TASKCard 8000 v2.3 is available in English only.

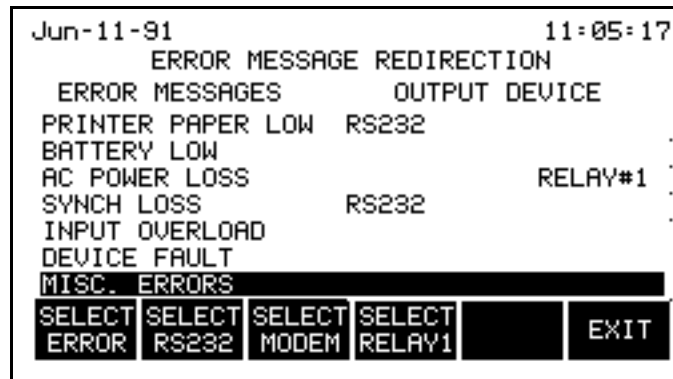
Redirect Error Messages

Introduction

Error messages are always sent to the LCD display. If the front panel printer is on and operating properly, most error messages are also printed out. Additional outputs (RS232, modem, relay #1) can be selected for specific error messages.

Procedure

To select (or deselect) these additional outputs, select 4,2,3 from the MAIN MENU.



The error messages are listed on the left side of the screen. (These error messages are discussed in Appendix F). Any selected output devices appear to the right of the message list. The available devices are RS232 port, modem, and relay number 1.

Each device can be selected or deselected using the menu options at the bottom of the screen, as described below.

[SELECT ERROR] moves the highlight to the next error message type in the list.

[SELECT RS232] alternately selects and deselects the RS232 port as an output device for the highlighted error message.

[SELECT MODEM] alternately selects and deselects the modem port as an output device for the highlighted error message.

[SELECT RELAY1] alternately selects and deselects relay number 1 as an output device for the highlighted error message.

[EXIT] accepts the settings displayed and returns to the SET ANALYZER'S PARAMETERS MENU.

Select Memory Storage Type

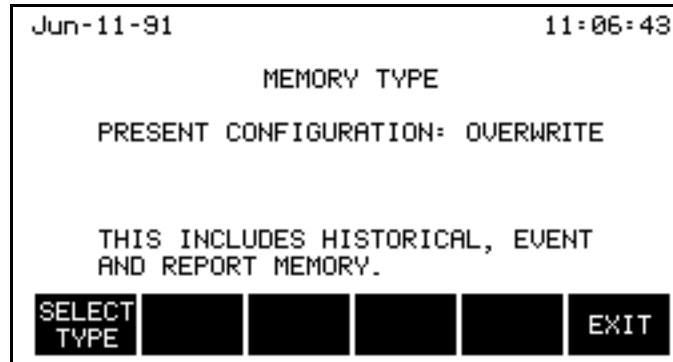
Introduction The two available types of memory storage are Fill and Stop and Overwrite. The difference is in how the analyzer handles a memory full condition.

Fill and Stop mode When in Fill and Stop mode, the PP1-8000 saves events until memory is full, then stops saving new events. All events in memory will be preserved.

Overwrite mode When in Overwrite mode, the PP1-8000 will save events normally until memory is full. After that, the PP1-8000 will replace the oldest events in memory with new events. This mode sacrifices old data in order to continuously save the most recent events.

Procedure To determine the storage type for the analyzer's memory, select 4,2,4 from the MAIN MENU. The screen is shown below.

The screen displays the type of storage presently selected for the analyzer's memory. The same type of storage is used for all three areas of memory (Event Memory, Report Memory, and Historical Memory).



NOTE The three areas of memory will not write over each other. They are each allocated a set amount of space and will not exceed their individual limits. When one area of memory becomes full, it has no affect on the other two areas of memory.

Continued on next page

Select Memory Storage Type, Continued

Procedure
(continued)

The historical memory can hold up to 31 days worth of data, using a 15 minute demand interval. The number of reports that can be stored in the report memory depends on the size and type of the individual reports.

Select [SELECT TYPE] to toggle the memory type selection between Overwrite and Fill and Stop.

NOTE

The default memory type is Fill and Stop.

Section C

Site Parameters

Overview

Introduction Site parameters are:

Topic	See Page
Program Site Identifier	5-25
Program Billing Dates	5-26
Program Rate Schedule	5-28
Program Time of Use Periods	5-30
Set Demand Interval Criteria	5-34

These parameters can be configured through the SET SITE PARAMETERS MENU (item 3 from the CONFIGURATION SETUP MENU).

```
Jun-30-92                               13:55:30
      SET SITE PARAMETERS MENU
1. ENTER SITE I.D.
2. SET BILLING DATES
3. SET RATE SCHEDULE/TIME-OF-USE
4. SET DEMAND CRITERIA
5. PRINT SITE PARAMETERS

                                     EXIT
```

Program Billing Dates

Introduction

The billing dates define when one billing month ends and the next one begins. These dates can be programmed, changed, or cleared from the Program Billing Dates Screen, item 2 from the SET SITE PARAMETERS MENU.

The screenshot shows a terminal window with the following content:

```
Jun-11-91                               11:08:42
PROGRAM BILLING DATES
#   DATE      #   DATE
1   [REDACTED] 7   Aug-13
2   Mar-10    8   Sep-14
3   Apr-08    9   Oct-16
4   May-11   10  Nov-16
5   Jun-11   11  Dec-18
6   Jul-13   12  Jan-18
NEXT  SELECT  SELECT  CLEAR  PRINT  EXIT
ENTRY MONTH  DAY   DATES
```

Clear Dates

If more than the required number of dates are programmed, or to use month-long billing periods starting with the present date, select [CLEAR DATES].

If you clear the billing dates and exit this screen without programming any new dates, the PP1-8000 uses the present date as the first date of the billing month, and subsequent billing dates are set to be the same date each month.

NOTE

If the present day is after the 28th of the month, the PP1-8000 inserts a valid day for each month as close to the present day as possible. For example, if the present day is March 31, the next two month's billing dates will be April 30 and May 31.

Programming Dates

Step	Action
1	If necessary, select [NEXT ENTRY] to move the cursor to the date to be programmed. (The highlight won't move beyond the first blank space, but will jump to the first entry in the list.)
2	Select [SELECT MONTH]. The options at the bottom of the screen change and the month portion of the date is highlighted.

Continued on next page

Program Billing Dates, Continued

Programming Dates (continued)

Step	Action
3	Use the numeric keypad to enter the month (for example, enter "1" for January). Select [ENTER]. The number entered is converted to three-character text format (for example, "Jan") and the previous options are displayed.

NOTE

When you program a month, the PP1-8000 enters a day for you, which you can change. The month **MUST** be programmed before you can enter a day. If entry is too high the PP1-8000 beeps and doesn't accept the entry.

Step	Action
4	Select [SELECT DAY]. The options at the bottom of the screen change and the day portion of the date is highlighted. Use the numeric keypad to enter the day and select [ENTER]. The previous options are displayed.
5	Select [NEXT ENTRY] to move the highlight to the next programmable date.

NOTE

The PP1-8000 won't let you enter a date that is more than 12 months after the earliest billing date (that is, the billing dates cannot span more than one year).

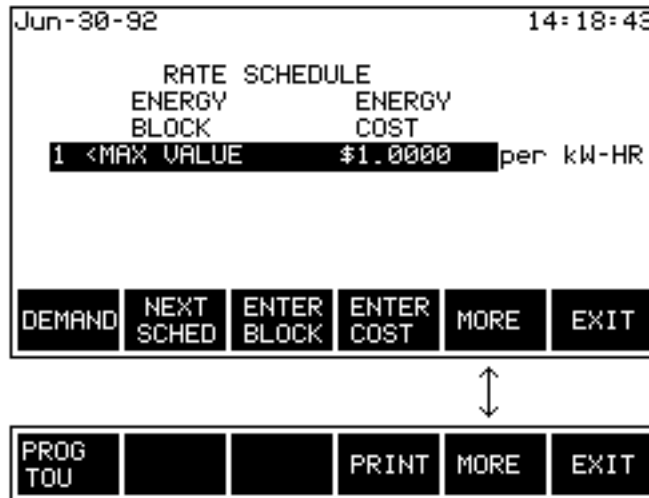
Step	Action
6	After the billing dates are programmed, select [EXIT] until the MAIN MENU is displayed.

Program Rate Schedule

Introduction

The information that the PP1-8000 needs to calculate your electric bill is programmed through the Set Rate Schedule/Time-of-Use screen, item 3 on the SET SITE PARAMETERS MENU. The complete electric bill can then be viewed as part of the Rate Schedule/Time-of-Use report (QAC 2,5).

The Rate Schedule screen allows you to enter block and cost information for up to seven schedules for both demand and energy.



Procedure

Step	Action
1	<p>To enter a new schedule, or change the value of an existing one, press [ENTER BLOCK]. The menu bar changes to the one shown in the figure.</p> <p>The screenshot shows a terminal window with the following content:</p> <pre> Jun-30-92 14:21:31 RATE SCHEDULE DEMAND DEMAND BLOCK COST 1 <MAX VALUE \$1.0000 per kW </pre> <p>At the bottom of the screen is a menu bar with the following options: NEXT BLOCK, SET TO MAX, ENTER NUMBER, [blank], [blank], EXIT.</p>

Continued on next page

Program Rate Schedule, Continued

Procedure (continued)

Step	Action
2	Pressing [ENTER NUMBER] causes the Numeric Entry menu bar to appear. You can now enter a demand or energy block value which will be displayed in kilowatts or kilowatt-hours. Pressing [SET TO MAX] causes that schedule to be designated as the highest rate you will be billed at, and therefore, the last rate in your schedule.

NOTE

Pressing [SET TO MAX] will delete all schedules that follow. For example, if you have seven schedules entered and the highlight is on schedule 4, pressing [SET TO MAX] will delete schedules 5 through 7.

Step	Action
3	To enter a corresponding demand or energy cost, press [ENTER COST]. The menu bar changes to the one shown below. <div data-bbox="652 1010 1317 1379" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre> Jun-30-92 14:21:45 RATE SCHEDULE DEMAND DEMAND BLOCK COST 1 <MAX VALUE \$1.0000 per kW NEXT COST FLAT RATE ENTER NUMBER [] [] EXIT </pre> </div>
4	Pressing [ENTER NUMBER] causes the Numeric Entry menu bar to appear. You can now enter a per kW or per kW-hr dollar value for the corresponding block, or you can enter a flat rate that is to be charged for that block. If you are entering a flat rate, the [FLAT RATE] key must be pressed to change per kW to flat rate.

Program Time of Use Periods, Continued

Procedure (continued)	<p>The screen display indicates the period designation displayed (OFF-PEAK, MID-PEAK, ON-PEAK, or HOLIDAY) and lists all the entries presently included in that period. (Up to 24 entries can be included in each Time-of-Use period.)</p> <p>An entry consists of a selected date or selected day(s) of the week, and a time span that holds for each day in the entry.</p>
Next Period	<p>To change the display to the next Time-of-Use period, select [NEXT PERIOD] from the options at the bottom of the screen. The order they appear are: OFF-PEAK, MID-PEAK, ON-PEAK, HOLIDAY, and then back to OFF-PEAK.</p>
Clear the display	<p>To clear all the entries in the displayed period, select the [CLEAR PERIOD] option at the bottom of the screen.</p>
Print	<p>To print the list of entries programmed for the displayed Time-of-Use Period, select the [PRINT PERIOD] option.</p>
Next Entry	<p>To move the highlight to the next entry in the list, select the [NEXT ENTRY] option . (The highlight won't move beyond the first blank space, but will jump to the first entry in the list.)</p>
Edit entry	<p>To program a new entry, or to edit an existing entry, move the highlight to the appropriate entry and select [EDIT ENTRY] from the options at the bottom of the screen. A new set of menu options appear allowing you to enter either a day or date, and a specific time frame. To return to the previous menu bar, select [EDIT PERIOD].</p>
NOTE	<p>Any entries containing incomplete or invalid dates and time frames will be discarded when the screen is exited.</p>

Continued on next page

Program Time of Use Periods, Continued

To Program a Time Frame

To enter a time frame, first select the [TIME FROM] option at the bottom of the screen. The Numeric Entry menu bar appears. Enter the starting time in 24 hour format. Then select the [TIME TO] option; again, the Numeric Entry menu bar appears. Enter the ending time in 24 hour format.

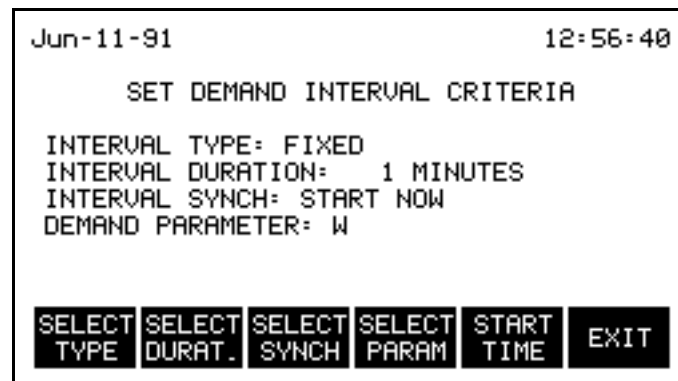
NOTE

The time frame has to be contained in one day (it can't cross midnight). For example, from 10 pm to 8 am would be from 22:00 to 23:59 of one day, and from 00:00 to 08:00 of the next day.

Set Demand Interval Criteria

Introduction

Your utility company should provide you with information about the interval duration and demand parameter used by your system. These criteria can be programmed through the Set Demand Interval Criteria Screen (item 4 from the SET SITE PARAMETERS MENU).



Any changes made to the demand criteria do not go into effect until the screen has been exited.

NOTE

Interval Synchronization changes require that the [START TIME] option is selected before exiting the screen.

Select Demand Parameter

Your utility bill indicates the parameter used for calculating your demand and energy use (watts, va, or var). In order to accurately reflect this in the PP1-8000's reports and calculations, the demand parameter that the utility company uses must be programmed into the PP1-8000.

To change the demand parameter, select [SELECT PARAM] until the desired parameter is displayed.

Select Interval Type

Most interval types are "FIXED", meaning that the next one starts when the current one ends. Some utilities, however, use "SLIDING" intervals. This means that the intervals occur in progressive "steps," essentially overlapping each other.

Continued on next page

Set Demand Interval Criteria, Continued

Select Interval Type (continued) For example, if the interval duration is 15 minutes with 5 minute steps, the first interval measures from 9:00 to 9:15, the second measures from 9:05 to 9:20, and the third measures from 9:10 to 9:25. The demand over each interval is used when determining your peak interval and calculating your bill.

The [SELECT TYPE] option at the bottom of the screen toggles this selection between "FIXED" and "SLIDING".

NOTE SLIDING intervals are fixed at 5 minute steps.

Set Interval Duration The interval duration is the time period the utility company uses when determining demand. Power (real, apparent, or reactive) used during this time period is averaged to determine demand for the interval. Usually the period with the highest demand (peak demand) affects the rate which your utility company charges.

To change the interval duration to match that used by your utility company, select [SELECT DURAT.]. The Numeric Entry menu bar appears, and the interval duration field is highlighted. Enter the appropriate duration.

NOTE If using a fixed interval, the duration must be between 1 and 120 minutes. The duration for sliding intervals must be between 5 and 60.

Set Interval Synchronization Ideally, it is best to synchronize the PP1-8000's demand intervals with those used by the utility. This way, the PP1-8000 would use the same data when calculating demand as the utility company uses. However, that is normally not possible.

When the PP1-8000 is turned on, it immediately begins monitoring and uses the moment that it is powered on as the beginning of its demand interval. This can be changed by using a combination of the [SELECT SYNCH] and [START TIME] options at the bottom of the screen.

Continued on next page

Set Demand Interval Criteria, Continued

Set Interval Synchronization (continued)

If the utility company provides a signal or pulse at the start of every interval, you can synchronize the PP1-8000's demand interval to the pulses. To do this, digital input channel #4 must be connected to the pulse initiating device, and configured as "DEMAND INTERVAL SYNCH" in the Digital Inputs Configuration Screen.

If the pulse is not provided, the interval can be set to start at a specific time of day or when the Set Demand Interval Criteria Screen is exited.

NOTE

If the PP1-8000 is turned off and then on (or, if it loses power, including battery backup, and then power is restored), it resync's the demand interval to the time when the unit is turned on, even if the interval synchronization had previously been set.

The exception to this is when the unit is set to synchronize to an external trigger. In this case, the unit waits (monitoring does not restart) until the next external trigger is received.

Select synchronization

To change the interval synchronization, select [SELECT SYNCH] from the options at the bottom of the screen, until the desired synchronization setting is displayed. The available choices are:

- START NOW
 - START AT hh:mm:ss
 - START AT EXTERNAL SYNCH
-

NOTE

Interval Synchronization changes are not accepted unless the [START TIME] option is selected before exiting the screen.

Start

"START NOW" starts the interval from the moment [EXIT] is selected from the options at the bottom of the screen, provided the [START TIME] option has been selected while this setting is displayed.

Continued on next page

Set Demand Interval Criteria, Continued

Start
(continued)

"START AT hh:mm:ss" starts at the first occurrence of the designated starting time (hour-minute-second). The time is entered through the [START TIME] option at the bottom of the screen. You must exit this screen before the starting time occurs in order for the new synchronization to be accepted for the present day. (Otherwise it will begin at the programmed time on the day after the screen is exited.)

"START AT EXTERNAL SYNCH" starts with the first impulse received at digital input #4 after [START TIME] has been selected and the screen has been exited.

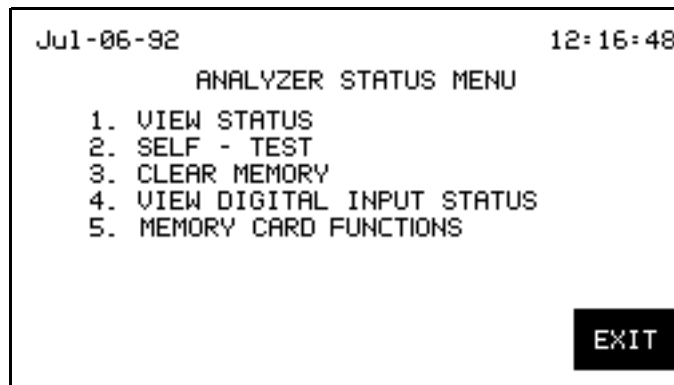
Section D

Analyzer Status Menu Functions

Overview

Introduction The ANALYZER STATUS MENU appears when item 5 is selected from the MAIN MENU.

The functions reached from this screen which are discussed in this section are Clear Memory, Reset Configuration, View Digital Input Status and Memory Card Functions.



Clear Memory

CAUTION Clearing memory deletes all events that are currently saved. To avoid losing data, save all events to a memory card before proceeding.

PRECAUCIÓN Si se despeja la memoria se suprimen todos los sucesos actualmente guardados. Para evitar perder datos, guarde todos los eventos en una tarjeta de memoria antes de proceder.

MISE EN GARDE La fonction d'effacement de mémoire supprime tous les événements sauvegardés au fur et à mesure. Pour éviter toute perte de données, avant de poursuivre sauvegardez tous les événements sur une carte à mémoire.

VORSICHT Durch das Löschen des Arbeitsspeichers werden alle aktuell gespeicherten Ereignisse entfernt. Um einen Datenverlust zu vermeiden, sollten Sie alle Ereignisse vor dem Fortfahren auf einer Speicherkarte speichern.

Introduction There are several situations where you may want to clear memory.

- When you begin monitoring
- At the end of the month when the selected memory type is "Fill and Stop"
- When a certain area of memory becomes full and the selected memory type is "Fill and Stop"

The PP1-8000 starts recording data from the moment it is powered on; data recorded before the programming and installation steps were completed should be cleared from memory. In this case you would want to clear all areas of memory.

When the "Fill and Stop" type of memory is selected, each area of memory stops recording when it becomes full. In order to record more data, the affected area of data must be cleared, or the memory storage type must be changed (refer to page 5-22). You may want to save the data by printing it out before clearing memory.

Memory is cleared through the Clear Analyzer's Memory Screen (item 3 from the ANALYZER STATUS MENU).

Continued on next page

Clear Memory, Continued

```
Oct-01-91                               14:15:35
      CLEAR ANALYZER'S MEMORY
WARNING: SELECTING ANY OR ALL OF
THE CLEAR MEMORY FUNCTIONS WILL
IRREVOCABLY DESTROY THE DATA IN
THAT MEMORY AREA.
PRESS 'EXIT' TO RETURN TO PREVIOUS
MENU WITHOUT EXECUTING ANY FUNCTION.

CLEAR CLEAR CLEAR CLEAR RESET
ALL  HISTOR REPORT EVENT CONFIG EXIT
```

To clear only one area of memory, select the appropriate option from the bottom of the screen. To clear all three areas of memory, select the [CLEAR ALL] option. A warning message appears asking for confirmation of the requested action. Select [YES] to confirm clearing the memory.

Reset Configuration

Introduction The PP1-8000 is shipped from the factory with certain default settings. (These settings are listed in Appendix G.) If the PP1-8000 has been used for a previous application, it may be desirable to reset the programmable configurations to these default settings, so that they are all in a known state. These configurations are reset through the Clear Analyzer's Memory Screen (item 3 from the ANALYZER STATUS MENU).

Procedure To change the programmable configurations to their factory settings, select [RESET CONFIG] from the options at the bottom of the screen. A screen appears asking for confirmation before resetting the configuration settings. Select [YES] to confirm.

NOTE Monitoring setups, programmed reports, and date and time settings are not affected by this option.

View Digital Input Status

Introduction

A digital input is in a high state while an electrical signal (pulse) is received at that input, and in a low state otherwise. These states are displayed on the Status of Digital Inputs Screen (item 4 from the ANALYZER STATUS MENU).

```
Oct-09-91                               07:59:14
STATUS OF DIGITAL INPUTS
INPUT #:  1    2    3    4
STATE:   LOW  LOW  LOW  LOW
PULSE INTERVAL:      0 SEC
PULSE DURATION:     0 SEC
PULSE RATE:         0 /SEC
[ ] [ ] [ ] [ ] [ PRINT ] [ EXIT ]
```

The screen also provides information about the following selectable digital input configurations:

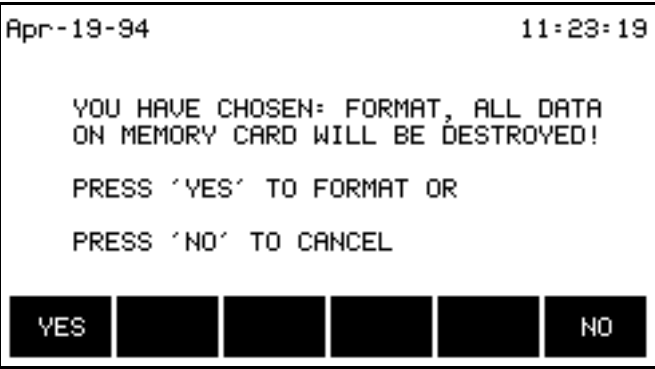
- Pulse interval
- Pulse demand
- Pulse rate - Two screen update rates are used. Pulse rates less than 1000 pulses/second are updated approximately once a minute. Faster rates are updated approximately once a second.

These configurations are programmed through the Digital Inputs Configuration Screen (refer to page 5-11).

Formatting a Memory Card

Formatting a card

Follow these steps to format a card.

Step	Action
1	Insert a memory card.
2	From the Main Menu, select item 5, Analyzer Status.
3	Select item 5, Memory Card Functions.
4	Press FORMAT CARD. <u>Result:</u> The following screen will appear. 
5	Press YES. <u>Result:</u> The message “Formatting and Verifying Data Card. Please Wait.” will be displayed until formatting is complete. The time it takes to format the card depends on the card size.

Writing to a Memory Card

Introduction Events and setups can be written to a memory card. Information about the card size, card free space, whether the card is write protected or not, and the condition of the memory card battery, is displayed.

Procedure To write to a memory card perform the following steps.

Step	Action
1	Insert memory card
2	From the Main Menu, Select item 5, Analyzer Status.
3	Select item 5, Memory Card Functions, from the Memory Functions Menu. the following screen will appear. <div data-bbox="673 829 1295 1161" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre> Dec-29-93 13:37:59 MEMORY CARD FUNCTION CARD SIZE= 1024K CARD FREE SPACE= 302K WRITE PROTECT= ON MEMORY CARD BATTERY= OK WRITE READ FORMAT FREE EXIT CARD CARD CARD SPACE </pre> </div>
4	Press WRITE CARD. <p>The following screen will appear.</p> <div data-bbox="657 1304 1312 1671" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre> Apr-19-94 11:22:32 WRITE DATA TO MEMORY CARD CARD SIZE= 512K CARD FREE SPACE= 105K MEMORY CARD BATTERY= MEMORY CARD WRITE MODE= APPEND SELECT THE INFORMATION TO BE SAVED ONTO THE MEMORY CARD OR A COMMAND. MEMORY TIME EVENTS CHANGE SETUPS EXIT REPORT PLOT MODE MODE </pre> </div>

Continued on next page

Writing to a Memory Card, Continued

Procedure (continued)

Step	Action
5	Press the desired write key. The following message will appear during write operations. Writing data into the memory card. Please wait.

Error messages The following error message will be displayed if there is insufficient space on the memory card.

Not enough free space on the memory card.
Data can not be written.

Note The name of the files are taken from the site ID.

Files that don't exist If a file selected to be written does not exist, it will be created. If the file already exists it will be overwritten.

Writing events Selecting WRITE EVENTS will write all events in internal memory to the card.

Writing setups Selecting WRITE SETUPS will write all configurations and threshold setups to the card. Configurations and setups include the following:

- Present monitoring (Analog input) configuration
- Present wiring configuration (for ABC totals)
- Present scale factors
- Threshold setups for setups 1 - 10
- Interval for timed readings
- Easy start and tolerance
- Site name
- Error message output
- Programmed report settings
- Memory auto-transfer option
- Memory type (Overwrite or Fill and Stop)
- All I/O device settings (Fax/Modem, RS232, parallel port, relays, and other devices)

Chapter 6

Programming Monitoring Setups

Overview

General

The monitoring setups menu allows you to program setups and to select the various types of reports to be automatically generated. These reports can be sent to one of the output devices (i.e., the front panel printer, RS232 port, modem port, memory card, report memory, or parallel port), at specific times or when certain user selected conditions are met. This section also allows a relay output to be activated under certain conditions.

Monitoring setups are programmed through MAIN MENU selection 3, Monitoring Setups. The following screen appears.

```
Jul-06-92                               12:16:28
      MONITORING SETUPS MENU
1. PROGRAM MONITORING SETUPS
2. PRINT MONITORING SETUPS
3. CREATE USER REPORTS
4. PRINT USER REPORTS
5. EDIT TIME PLOT PARAMETERS
EXIT
```

Procedure

Select menu item 1 and the following screen appears.

```
Oct-01-91                               14:02:56
MONITORING SET-UPS PROGRAMMING SCREEN
SET-UP# 1    24 SETUPS AVAILABLE.
TITLE: DEMAND & ENERGY-PLOT & MIN/MAX
STATUS: ACTIVE
INPUT CONFIG: SINGLE PHASE

A TOTAL OF 4 REPORTS ARE PROGRAMMED
FOR THIS SET-UP.
NEXT CHANGE SET-UP INPUT MORE EXIT
SET-UP STATUS TITLE CONFIG
```

↑↓

```
PRINT COPY DELETE EDIT MORE EXIT
SET-UP SET-UP SET-UP REPORT
```

Continued on next page

Overview, Continued

Procedure
(continued)

A setup consists of a number, title, and up to 32 reports. A total of 32 setups are available (24 programmable, 8 pre-defined), although only one setup can be active at a given time.

To simplify programming, the Dranetz-BMI PP1-8000 contains 8 pre-defined setups. If one suits your needs exactly, just select it. If you wish to modify a pre-defined setup, copy it and then edit the new setup. Or, if you prefer, you can create your own setup.

If you wish to review the pre-defined setups, refer to Appendix I for a complete description of these setups, including their associated reports.

Another way to view these setups is to have the unit print them out for you. To do this, select 3,2 from the MAIN MENU and the Print Monitoring Setups screen appears. Select [ALL PREDEF] and press [START PRINT].

To proceed, select [EXIT], then select item #1, Program Monitoring Setups, from the MONITORING SETUPS MENU.

When the Monitoring Set-ups Programming Screen appears, select [NEXT SET-UP] to step to the desired setup. The menu options at the bottom of the screen allow you to activate, name, print, copy, or delete a set-up, and you can select to edit an associated report.

NOTE: You cannot edit a pre-defined setup or its reports. You must first copy the setup, and then you can edit the copy.

For more information about a description of the reports you will be programming, refer to the next chapter.

[NEXT SETUP] cycles through all the available setups. After the last available setup, a blank setup screen appears (if less than 32 setups exist), allowing you to create a new setup. If viewing the last setup screen, this option "wraps around" and starts over again at Setup number 1. (Blank setups are displayed with all fields blank.)

[CHANGE STATUS] toggles the status of the setup screen on the display between "active" and "inactive". Only one setup can be active at a time. If a new setup is activated, the previously active setup becomes inactive when this screen is exited.

Continued on next page

Overview, Continued

Procedure
(continued)

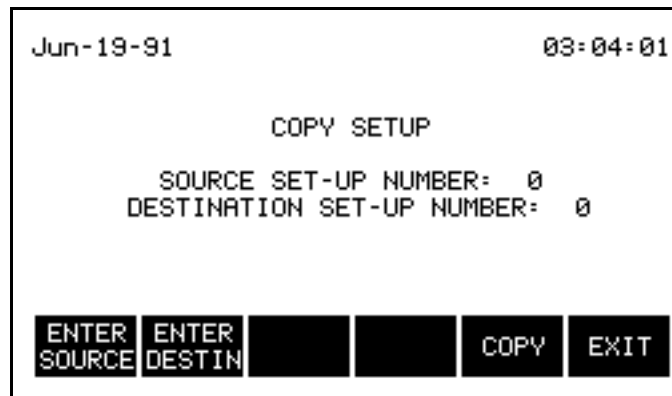
NOTE: A setup cannot be activated unless at least one report contained in that setup is programmed and activated.

[SETUP TITLE] causes the Alphabetic Entry Screen to appear, which allows you to type in a title consisting of up to 30 alphanumeric characters. This option is not available for pre-defined setups.

[INPUT CONFIG] cycles through the possible input configurations. The configuration is not part of the setup; it is included here for convenience, but it is recommended that it be programmed through the CONFIGURE I/O MENU because scale factors and assumed voltages may need to be programmed.

[PRINT SETUP] prints the setup information (including the programming of each of the associated reports).

[COPY SETUP] allows any existing setup (including all associated reports) to be copied to a new setup number. This is useful when two or more setups are similar; the new setup only needs to be modified slightly rather than completely re-programmed. The following screen appears.



The default source setup number is the number of the setup just viewed. This can be changed to any programmed setup.

The default destination setup number is the number of the first "empty" setup (including previously deleted setups). This can be changed to any number from 9-32, including one already assigned to a different setup (the existing setup will be overwritten).

The source and destination setup numbers can be changed using the menu options at the bottom of the screen, as described below.

Continued on next page

Overview, Continued

Procedure (continued)

Once the desired setup numbers are displayed on the screen, and copy is selected, the screen displays the copied setup, allowing it to be edited.

[ENTER SOURCE] causes the Numeric Entry menu bar to appear, allowing the number corresponding to the desired setup to be entered using the keypad.

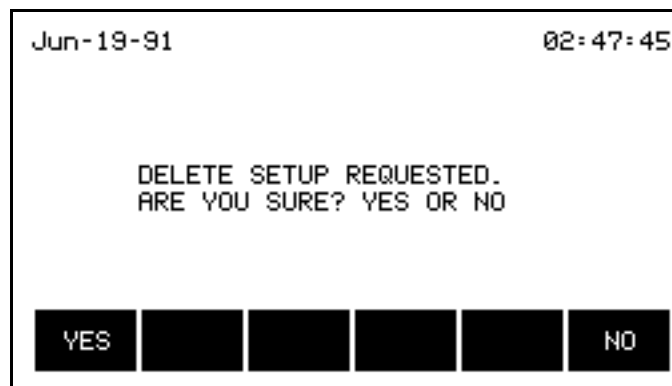
[ENTER DESTIN] causes the Numeric Entry menu bar to appear, allowing the number corresponding to the desired setup to be entered using the keypad.

[COPY] executes the copying process and then displays the newly created setup.

[EXIT] returns the display to the Monitoring Setups Programming Screen without copying the setup.

[DELETE SETUP] deletes the displayed setup. A prompt appears to confirm the deletion. After the deletion, the display returns to the Monitoring Setups Programming Screen. This option is not available for pre-defined setups. The following screen appears.

When a setup is deleted, all its fields become blank. If setups exist with numbers higher than that of the deleted setup, the blank setup remains in the sequence so that the number of the other setups do not change



Continued on next page

Overview, Continued

Procedure
(continued)

[EDIT REPORT] causes the monitoring setups report screen to appear, from which all the reports associated with this setup can be viewed. Also, from this screen, new reports can be added or existing reports can be edited. (Though reports for pre-defined setups can be viewed through this option, these reports can not be edited. Also, new reports cannot be added to pre-defined setups.) This screen is described in the Monitoring Setups Report Screen section below.

[MORE] toggles between the two sets of menu options available with this screen.

[EXIT] returns the display to the Monitoring Setups Programming Screen.

Programming Reports

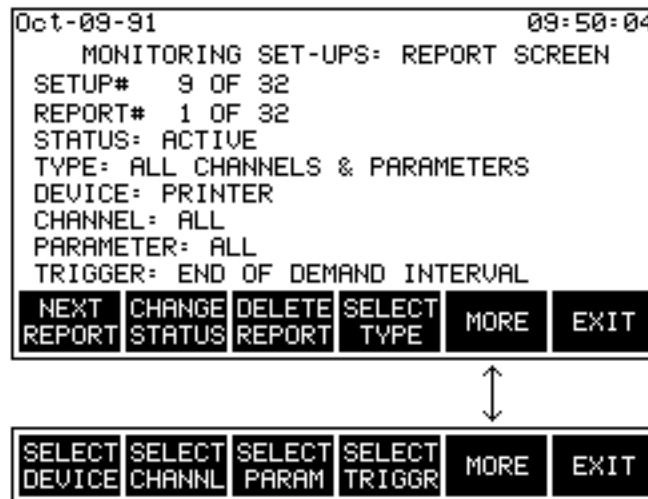
Report Types The following table lists all report types and the available contents for each field. To activate a report all fields must be programmed.

Report Type	Output Device	Available Channels	Available Parameters	Trigger Conditions
All channel, All Parameter	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	Fixed at all	Fixed at all	All triggers Available for all reports: Hi/Lo Limits Four Times a Day Time Interval End of Demand Interval End of billing Period External Trigger
Demand	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	ABC	Demand	
Energy	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	ABC	Energy	
Min/Max	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	A, B, C, D, ABC	V, I, W, VA, VAR, PF, Hz, DPF, Vthd, Ithd, TDF, Vitf, Itif	
Rate Schedule	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	ABC	Demand and Energy	
Time-of-Use	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	ABC	Demand and Energy	
Time Plot: Daily and Monthly	Printer, Fax	A, B, C, D, ABC	V, I, W, VA, VAR, PF, Hz, DPF, Vthd, Ithd, Vcf, Icf, TDF, Vitf, Itif, Demand, Energy	
Event	Printer, RS-232, Modem, Memory Card, Parallel Port	Fixed at all	Fixed at all	
User Formats A to H	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	User Specified	User Specified	
Harmonics Graph	Printer, Modem, Memory Card, Memory, Fax, Parallel Port	A, B, C, D	V, I, W	
Harmonics Text	Printer, RS-232, Modem, Memory Card, Memory, Fax, Parallel Port	A, B, C, D	V, I, W	
Harmonics Distribution		A, B, C, D	V, I, W	
Relay	Relay 1 to 4	N/A	N/A	

Monitoring Setups Report Screen

Overview

The report screen displays the programmed conditions for individual reports associated with the indicated setup. One report is displayed at a time; up to 32 reports can be programmed for each setup.



Procedure

The status of the report can either be "ACTIVE" or "INACTIVE", and determines whether the report is generated when the trigger condition is met. The device where the report is to be sent is indicated below the type of report it is. The selected channels or parameters are displayed when appropriate for the type of report indicated. The TRIGGER is the condition that must be met for the report to be generated. Only one report per device can be backlogged. If multiple triggers send more than two reports to the same device, at the same time, the subsequent trigger conditions will not cause reports to be generated. All of the above conditions can be programmed using the menu options at the bottom of the screen, as described below.

[NEXT REPORT] cycles the displayed report through all the programmed reports. From the last programmed report, this option displays a "blank" report (if the total reports has not reached 32) which can be edited to create a new report. ("Blank" reports are displayed with all fields blank.) From the "blank" report, this option returns to the first report in the sequence.

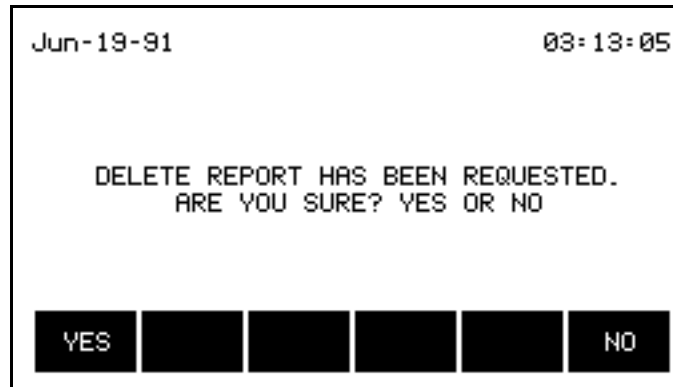
[CHANGE STATUS] toggles the report's status between "ACTIVE" and "INACTIVE."

Continued on next page

Monitoring Setups Report Screen, Continued

Procedure
(continued)

[DELETE REPORT] deletes the displayed report. The following screen appears to confirm the deletion.



After the report is deleted, the display returns to the Monitoring Setups Programming Screen. Once a report is deleted, any reports with a higher report number are automatically renumbered.

[SELECT TYPE] cycles the display through the various report types available. (Refer to Chapter 7).

[SELECT DEVICE] cycles the report destination selection through the available output devices.

NOTE: When the device is set to FAX, the time between triggers should be set to 5 minutes or greater due to the time and system resources required to generate a FAX.

[SELECT CHAN] cycles the channel selection through the available choices.

[SELECT PARAM] cycles the parameter selection through the available choices.

[SELECT TRIGGER] allows programming of the condition that causes a report to be generated. A new screen appears for each trigger type; the menu bar at the bottom of the screen changes to allow you to cycle through the various triggers available.

[MORE] toggles between the two sets of menu options available with this screen.

[EXIT] returns the display to the Monitoring Setups Programming Screen.

Trigger Screens

General

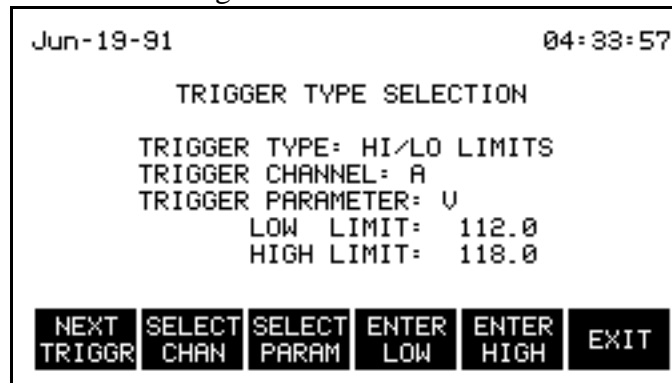
For all trigger screens:

[NEXT TRIGGER] cycles to the next trigger type in the sequence.

[EXIT] accepts the displayed trigger conditions and returns to the Report Screen.

Hi/Lo Limits Trigger

This trigger type causes a report to be generated when the selected parameter on the selected channel goes outside the user-set limits.



A limit crossing triggers a report when the selected parameter goes out of limits (above the higher limit, or below the lower limit), and also on the "return-to-normal" condition.

NOTE: The lack of a negative sign means that POWER FACTOR limit crossings and all other negative going values will use the absolute value of the present value to determine if a limit crossing has occurred.

The menu options at the bottom of the screen are described below.

[SELECT CHAN] cycles through the available channels.

[SELECT PARAM] cycles through the available parameter selections: V, I, W, VA, VAR, TDF, Hz, Vcf, Icf, DPF, TDF, Vthd, Ithd, Demand, Proj. Demand, Accum. Energy, Energy Rate.

[ENTER LOW] causes the Numeric Entry menu bar to appear, allowing the low limit for the trigger condition to be programmed.

[ENTER HIGH] causes the Numeric Entry menu bar to appear, allowing the high limit for the trigger condition to be programmed using the keypad.

Trigger Screens, Continued

Four Times Per Day Trigger This type of trigger causes a report to be generated at the times specified on the screen. The times are programmed using the menu options at the bottom of the screen.

Jun-19-91	04:28:01				
TRIGGER TYPE SELECTION					
TRIGGER TYPE: 4 TIMES PER DAY					
TIME 1: 02:00:00					
TIME 2: 08:00:00					
TIME 3: 14:00:00					
TIME 4: 20:00:00					
NEXT TRIGGR	ENTER TIME 1	ENTER TIME 2	ENTER TIME 3	ENTER TIME 4	EXIT

Selecting one of the [ENTER TIME #] options causes the Numeric Entry menu bar to appear, allowing the time of day that a report is to be generated to be programmed using the keypad. Enter the time in 24 hour format.

Time Interval Trigger This type of trigger generates a report at specified intervals. The first report is generated at the programmed start time; each successive report is generated after the specified time interval has elapsed from the previous report of this type.

Jun-19-91	04:31:33				
TRIGGER TYPE SELECTION					
TRIGGER TYPE: TIME INTERVAL					
INTERVAL DURATION: 02:00:00					
INITIAL START TIME: 09:30:00					
NEXT TRIGGR	ENTER INTRUL	ENTER START			EXIT

Continued on next page

Trigger Screens, Continued

Time Interval Trigger (continued)

The start time and interval duration are programmed using the menu options at the bottom of the screen, as described below.

[ENTER INTRVL] causes the Numeric Entry menu bar to appear allowing the interval duration to be programmed using the keypad.

[ENTER START] causes a new set of menu options to appear allowing the start time to be programmed using the keypad.

End of Demand Interval Trigger

This type of trigger generates a report at the end of each demand interval, as programmed through the SET SITE PARAMETERS MENU.

```
Jun-19-91                                04:35:35
                                     TRIGGER TYPE SELECTION
                                     TRIGGER TYPE: END OF DEMAND INTERVAL
                                     NEXT TRIGGR [ ] [ ] [ ] [ ] EXIT
```

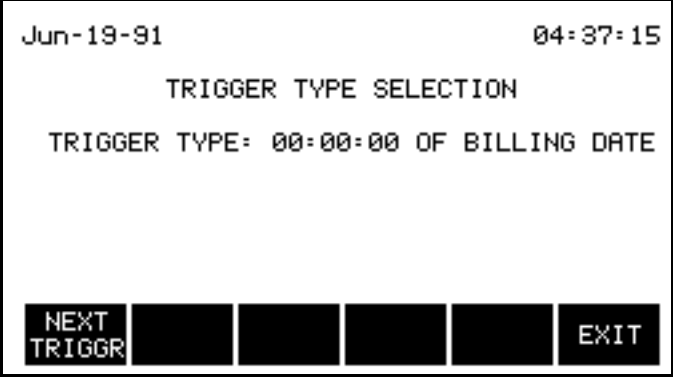
NOTE: If a demand interval has not been programmed through the SET SITE PARAMETERS MENU a default value of 15 minutes is used.

Continued on next page

Trigger Screens, Continued

Billing Date Trigger

This type of trigger generates a report at 00:00:00 on the first day of the billing month. Reports that display cumulative data (such as min/max or time plot reports) contain data from the previous billing month.

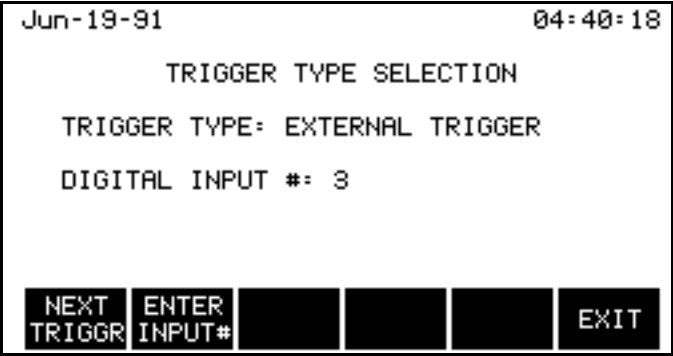


A terminal-style screenshot of a menu. At the top left is the date 'Jun-19-91' and at the top right is the time '04:37:15'. The center text reads 'TRIGGER TYPE SELECTION' followed by 'TRIGGER TYPE: 00:00:00 OF BILLING DATE'. At the bottom, there is a row of six buttons: 'NEXT TRIGGR', a blank button, a blank button, a blank button, a blank button, and 'EXIT'.

If billing dates have not been programmed through the SET SITE PARAMETERS MENU, the billing month defaults to 31 days. The initial billing month would start the day the unit begins to store data in memory, subsequent billing months start 31 days after the previous billing month began.

External Trigger

This type of trigger generates a report when the selected digital input is activated. This input must presently be configured as an EXTERNAL TRIGGER through the CONFIGURE I/O MENU, and the corresponding input on the rear of the unit must be connected to an appropriate voltage source.



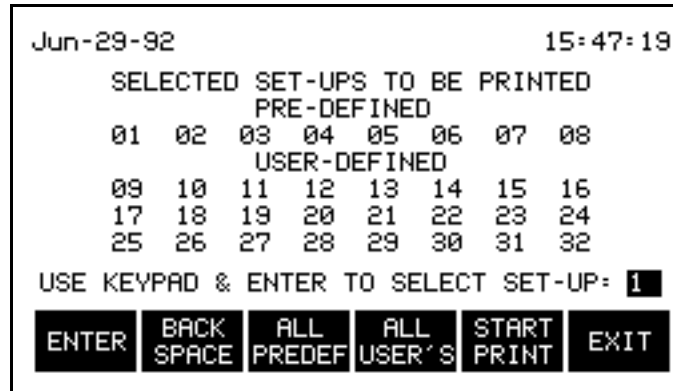
A terminal-style screenshot of a menu. At the top left is the date 'Jun-19-91' and at the top right is the time '04:40:18'. The center text reads 'TRIGGER TYPE SELECTION' followed by 'TRIGGER TYPE: EXTERNAL TRIGGER' and 'DIGITAL INPUT #: 3'. At the bottom, there is a row of six buttons: 'NEXT TRIGGR', 'ENTER INPUT#', a blank button, a blank button, a blank button, and 'EXIT'.

[ENTER INPUT#] causes the Numeric Entry menu bar to appear, allowing the programming of the digital input number using the keypad.

Print Monitoring Setups

Introduction

The numbers of all defined setups are displayed on the screen (shown below). The 8 pre-defined setups are always displayed along with any user-defined setups.



Selecting setups

Setups selected for printing are highlighted. The setups can be selected either one of two ways:

1. All pre-defined setups or all user-defined setups can be selected simultaneously using the menu options at the bottom of the screen.
2. An individual setup can be selected (or deselected) by typing its number (using the keypad) and then using the [ENTER] option at the bottom of the screen.

If an incorrect number is typed, use the [BACKSPACE] option to delete it (deletes one digit at a time). The number appearing when [ENTER] is chosen is the setup number that is affected.

It is possible to select all existing setups by selecting both the [ALL PREDEF] and [ALL USER'S] options.

Printing Procedure

Printing is initiated using the menu options at the bottom of the page.

[ENTER] toggles the highlight on or off for the report corresponding to the number displayed in the box on the lower portion of the screen.

[ALL PREDEF] selects all 8 pre-defined setups.

Continued on next page

Print Monitoring Setups, Continued

**Printing
Procedure**
(continued)

[ALL USER'S] selects all the listed user-defined setups.

[START PRINT] prints the selected setups in sequential order.

[EXIT] returns the display to the MONITORING SETUPS MENU.

Create User Reports

Introduction

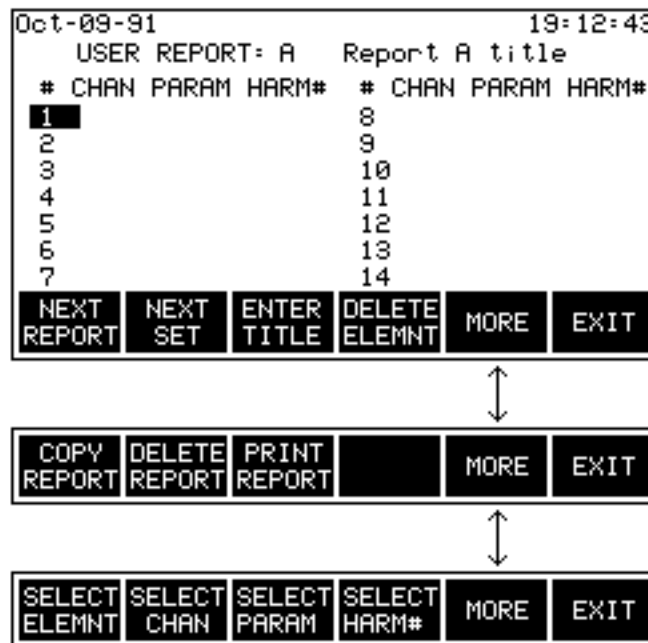
Choose this selection to program custom reports. These reports can contain harmonic information, as well as information on all the other available parameters.

This screen enables the creation of user-defined (or "customized") reports. The report "type" created here can be selected using [SELECT TYPE] on the Monitoring Setups Report Screen.

Each user-specified report can include up to 28 "elements"; each element consists of a channel, parameter, and if applicable, a harmonic number.

If the selected parameter is Volts, Amps, or Watts, the magnitude of a specified harmonic for that parameter can be included in the report.

The elements are divided into two sets, and are displayed 14 at a time. Up to eight user reports (labeled A, B, C, D, E, F, G, H) can be programmed.



Continued on next page

Create User Reports, Continued

Options

The options at the bottom of the screen are described below.

[NEXT REPORT] cycles to the next report in the sequence. Reports range from report "A" to report "H".

[NEXT SET] toggles between the two sets (pages) of elements (parameter/channel combinations) for this report. Each set contains up to 14 elements.

[ENTER TITLE] allows a title (up to 15 characters long) to be entered. The Alphabetic Entry Screen appears to facilitate entering the string of characters.

[DELETE ELEMENT] deletes the element presently highlighted.

[MORE] cycles between the different sets of menu options available with this screen.

[COPY REPORT] causes a new screen to appear which allows the report to be copied to a new letter. This is useful when creating two similar reports; the differences in the second report can easily be edited.

[DELETE REPORT] deletes the report. A separate screen (see below) appears confirming the deletion before it is carried out. After the report is deleted, the MONITORING SETUPS MENU is displayed. If a report is deleted that is numbered with a value that is less than the highest numbered report, the PP1-8000 keeps that report number blank and doesn't renumber the higher numbered reports.

[PRINT REPORT] prints all the parameters contained in the report.

[SELECT ELEMNT] moves the highlight to the next element in the report. The highlighted element is the one affected by the editing options.

[SELECT CHAN] cycles the channel selection of the highlighted element through the available choices.

[SELECT PARAM] cycles the parameter selection of the highlighted element through the available choices.

Continued on next page

Create User Reports, Continued

Options (continued)

[SELECT HARM#] causes The Numeric Entry menu bar to appear allowing a harmonic number for the highlighted element to be programmed using the keypad. This option is only available for Volts, Amps, or Watts, and is not available for channel selection (ABC).

[EXIT] returns the display to the MONITORING SETUPS MENU.

Copy Report

```
Oct-09-91                               19:15:39

      COPY USER-DEFINED REPORT

      SOURCE REPORT NUMBER:  1
      DESTINATION REPORT NUMBER:  2

      1=A 2=B 3=C 4=D 5=E 6=F 7=G 8=H

      ENTER  ENTER  [ ]  [ ]  COPY  EXIT
      SOURCE DESTIN
```

The default source report number is the number corresponding to the letter of the report just viewed. This can be changed to any defined report.

The default destination report number is the number corresponding to the letter of the first undefined report. This can be changed to any number from 1-8, including one already assigned to a different report (the existing report will be overwritten).

The source and destination report numbers can be changed using the menu options at the bottom of the screen.

After copy is selected, the screen displays the newly created report, allowing it to be edited.

[ENTER SOURCE] causes a new set of menu options to appear at the bottom of the screen, allowing the number corresponding to the desired report to be entered using the keypad.

Continued on next page

Create User Reports, Continued

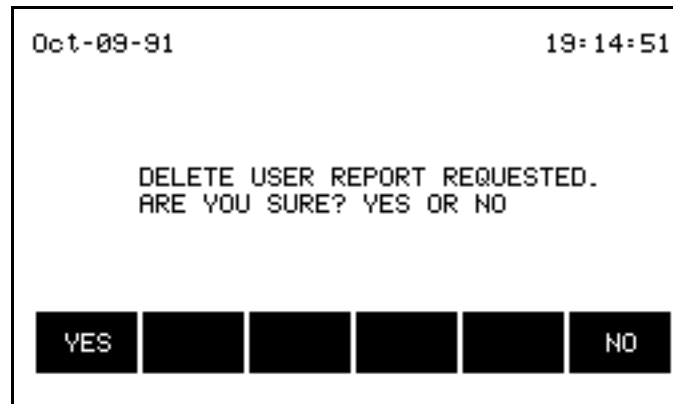
Copy Report (continued)

[ENTER DESTIN] causes a new set of menu options to appear at the bottom of the screen, allowing the number corresponding to the desired report to be entered using the keypad.

[COPY] executes the copying process. After [COPY] is selected, the newly created report is displayed, allowing it be edited.

[EXIT] returns the display to the Program Monitoring Setups Screen.

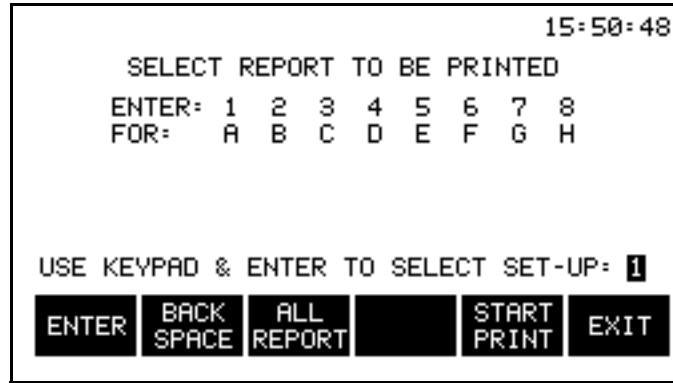
Delete Report Screen



Print User Reports

Introduction

Select 3,4 from the MAIN MENU to print out the programmed configuration for all or selected user reports.



Procedure

Select [EXIT] to return to the previous screen.

The letters corresponding to the defined user-programmed reports appear on the screen with a number below each. (Reports that are not defined are not listed.) Reports selected for printing are highlighted. The reports can be selected either one of two ways:

1. All listed reports can be selected simultaneously using the menu options at the bottom of the screen.
2. Individual reports can be selected (or deselected) by typing the number underneath it (using the keypad) and then using the [ENTER] option at the bottom of the screen.

If an incorrect digit is pressed, use the [backspace] option. Only one number at a time is displayed and the new one replaces the old. The number appearing when [ENTER] is chosen is the setup number that is affected.

Printing is initiated using the menu options at the bottom of the page, which are described below.

[ENTER] toggles the highlight on or off for the report corresponding to the number displayed in the box on the lower portion of the screen.

[ALL REPORT] highlights all listed reports.

[START PRINT] prints the selected reports in sequential order.

[EXIT] returns the display to the MONITORING SETUPS MENU.

Edit Time Plot Parameters

Introduction

Selection 5, Edit Time Plot Parameters on the MONITORING SETUPS MENU (QAC 3,5) permits editing of the time plot parameters that are stored in historical memory. Time plot parameters are displayed on the time plot reports, QAC selection 2,6.

The table lists all the time plot parameters available for storage in historical memory. Thirty parameters are automatically stored. User programmable parameters consist of an additional possible 40 parameters, 28 of which can be stored, including individual harmonics 1 through 50 of V, I, and W for channels a, b, c, and d. The number of parameters selected determines the storage time.

Parameter	Standard Parameters	User Programmable Parameters*	Individual Harmonic Parameters
Demand	X		
Energy	X		
DPFa,b,c,d		X+	
Hz(sync chan)		X+	
Ia,b,c,d	X		X
Iabc	X		
Icfa,b,c,d		X	
Icfabc		X	
Ithda,b,c,d		X	
Ithdabc		X+	
Itifa,b,c,d		X	
Itifabc		X	
PFa,b,c,d	X		
PFabc	X		
TDFa,b,c,d		X	
TDFabc		X	

Continued on next page

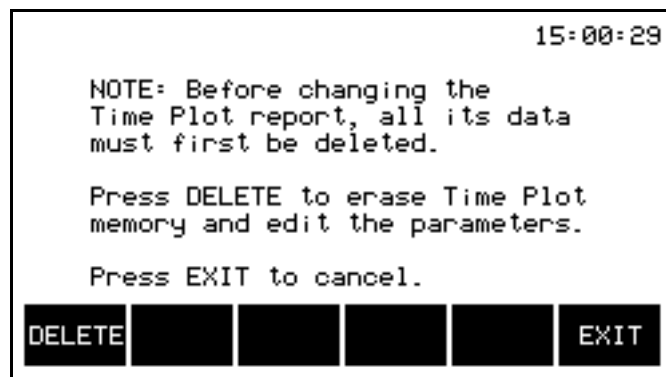
Edit Time Plot Parameters, Continued

Introduction (continued)

Parameter	Standard Parameters	User Programmable Parameters*	Individual Harmonic Parameters
Va,b,c,d	X		X
Vabc	X		
VAAa,b,c,d	X		
VAabc	X		
VARa,b,c,d	X		
VARabc	X		
Vcfa,b,c,d		X	
Vcfabc		X	
Vtifa,b,c,d		X	
Vtifabc		X	
Vthda,b,c,d		X	
Vthdabc		X+	
Wa,b,c,d	X		X
Wabc	X		
* Maximum selectable parameters of 9 (includes 7 default) for storage time of 31 days.			
+ Default parameters (7 total).			

Procedure

Select 5, Edit Time Plot Parameters from the MONITORING SETUPS MENU and the following screen appears.



The note message displayed above informs you that the time plot data must first be deleted before editing of the time plot report can be accomplished.

Edit Time Plot Parameters, Continued

CAUTION Clearing memory deletes all events that are currently saved. To avoid losing data, save all events to a memory card before proceeding.

PRECAUCIÓN Si se despeja la memoria se suprimen todos los sucesos actualmente guardados. Para evitar perder datos, guarde todos los eventos en una tarjeta de memoria antes de proceder.

MISE EN GARDE La fonction d'effacement de mémoire supprime tous les événements sauvegardés au fur et à mesure. Pour éviter toute perte de données, avant de poursuivre sauvegardez tous les événements sur une carte à mémoire.

VORSICHT Durch das Löschen des Arbeitsspeichers werden alle aktuell gespeicherten Ereignisse entfernt. Um einen Datenverlust zu vermeiden, sollten Sie alle Ereignisse vor dem Fortfahren auf einer Speicherkarte speichern.

Procedure (continued) [DELETE] erases all time plot data from the historical memory.

[EXIT] returns the display to the MONITORING SETUPS MENU.

The following Time Plot Report display immediately follows [DELETE] selection.

TIME PLOT REPORT				15-01-09	
#	CHAN	PARAM	HARM#	#	DAYS AVAILABLE
1	A	Hz		8	11
2	A	DPF		9	
3	B	DPF		10	
4	C	DPF		11	
5	D	DPF		12	
6	A	Vthd		13	
7	A	Ithd		14	

SELECT ELEMNT	SELECT CHAN	SELECT PARAM	SELECT HARM#	MORE	EXIT
------------------	----------------	-----------------	-----------------	------	------

↕

	NEXT SET		DELETE ELEMNT	MORE	EXIT
--	-------------	--	------------------	------	------

Continued on next page

Edit Time Plot Parameters, Continued

Procedure
(continued)

The Time Plot Report display provides selection and editing of up to 28 parameters. The number of selections, however, affect the number of days the parameters can be stored before memory is full, as shown in the table below.

Maximum storage time is the number of days that the PP1-8000 can collect data before running out of memory. This number is directly related to the number of parameters selected. Normally, the seven default parameters permit 33 days of storage time (at 15 minute intervals). Selecting two more parameters, for a total of nine parameters, permits 31 days (one month) of storage. Selecting more reduces the available storage time; selecting less increases it.

**Time Plot
Storage Time/
Parameter
Selection**

(15 Minute Intervals)

Parameters Selected	Maximum Storage Time (Days)	Parameters Selected	Maximum Storage Time (Days)
0	49	15	25
1	46	16	24
2	43	17	23
3	41	18	22
4	39	19	22
5	37	20	21
6	35	21	20
7	33	22	20
8	32	23	19
9	31	24	19
10	29	25	18
11	28	26	17
12	27	27	17
13	26	28	17
14	25		

Continued on next page

Edit Time Plot Parameters, Continued

Procedure
(continued)

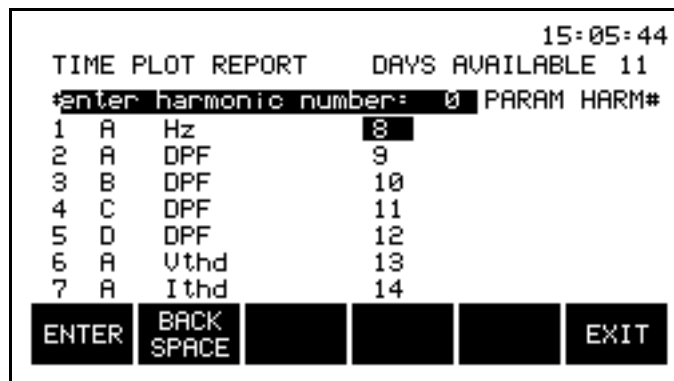
The channel, parameter, and harmonic number selection can be changed using the menu options at the bottom of the screen.

[SELECT ELEMNT] highlights the element number in the # column of rows 1 through 14 on one screen and 15 through 28 on the second screen. This highlighted element is the one effected by the editing option.

[SELECT CHAN] selects channels A, B, C, D, or ABC, in sequence, in the CHAN column of the selected element row. Selection of HZ and DPF parameter permits only channels A, B, C, and D selection. Channel ABC will appear in the HZ parameter selection if no external sync is connected to the unit.

[SELECT PARAM] selects parameter to be recorded and to be displayed as Time Plot reports in QAC 2,6 selection. Selectable user programmable parameters are listed in Table 7-2 and consist of DPF, Hz, Icf, Ithd, Itif, TDF, Vcf, Vtif, Vthd, and individual harmonic parameters for I, V, and W. Standard parameters are selectable but are redundant since these are saved automatically and selection has no effect on their storage.

[SELECT HARM #] causes the Numeric Entry menu bar to appear (illustrated below), allowing for the selection of harmonics 1 through 50 of the parameters I, V, and W. This option is not available when channel ABC is selected.



[MORE] toggles between the two sets of menu options.

[NEXT SET] selects next set of 14 parameter selection screen, if more than 14 elements have been programmed.

Continued on next page

Edit Time Plot Parameters, Continued

Procedure
(continued)

[DELETE ELEMNT] deletes the highlighted element data row selected by the [SELECT ELEMNT] key. Deleting an element within the sequence causes all following elements to move up one level. To delete all elements, select element 1, then press this key repeatedly until all elements are blank.

[MORE] toggles between the two sets of menu options.

[EXIT] returns screen to Monitoring Setups Menu.

Chapter 7

Understanding Reports

Overview

What is a Report?

The PP1-8000 presents recorded and calculated data in the form of different types of reports. A report is a pre-defined format for presenting the data.

The present values for the parameters contained in the reports can be seen through the View Reports selection from the MAIN MENU. The values of these parameters at the time that a programmed trigger condition is met can be "captured" and sent to one of the PP1-8000's output devices (printer, serial port, modem, memory card, report memory, or parallel port). When the information is sent to one of these devices, a report is said to be "generated." The destination of the report and the trigger condition that caused it to be generated are programmed through the monitoring setups.

(Refer to "Programming Monitoring Setups," for more information.)

When reports are sent to memory, they can be viewed through the "View Reports" selection from the MAIN MENU.

NOTE: If monitoring KYZ circuits, or if a "NO VOLTAGE" configuration is selected, the data available on certain reports is affected.

Report Types

Overview

The viewable report types are listed and described in the following table. These reports record parameter information and send it to one of the PP1-8000's output devices (memory, printer, RS232 port, memory card, modem/fax, or parallel port). Relay reports are not included in the table since they do not record parameter information.

PP1-8000 Report Types

Report Type	Description
All Channels, All Parameters	The All Channels, All Parameters report lists the values of all available parameters for each channel. The parameters are grouped in sets of up to four for display purposes.
Demand	The Demand report displays the demand in units chosen through the SET SITE PARAMETERS MENU. Three different periods are available (present interval, daily peak, and monthly peak); each is displayed on a separate screen.
Energy	The Energy report displays the present, daily, and monthly energy usage. The unit-hrs displayed is selected through the SET SITE PARAMETERS MENU.
Min/Max	The Min/Max report displays the minimum and maximum values reached for the indicated parameter. Daily, weekly, and monthly minimums and maximums are displayed with the time and date of occurrence.
Rate Schedule	The Rate Schedule report displays a summary electric bill showing total use and cost for both energy and demand, as well as the total electric cost. Detailed reports of energy and demand costs are also available.
Time-of-Use	The Time-of-Use report displays the peak average demand and accumulated energy so far this billing month for the Time-of-Use periods (programmed through the SET SITE PARAMETERS MENU).
Time Plot	The Time Plot report displays a graph of the selected parameter values* over one day or one billing month. A smaller section of the graph can be expanded to cover the full graph-space for more detailed viewing.

Continued on next page

Report Types, Continued

PP1-8000
Report Types
(continued)

Report Type	Description
Events	The Events report displays recorded events, beginning with the last event in memory. Events are recorded when an out-of-limit trigger or an external trigger cause a report to be generated.
User	User reports are defined by the user through the MONITORING SETUPS MENU. They can contain data on any channel and any parameter, including information on particular harmonics for Watts, Volts, or Amps. Up to eight different report formats can be defined at one time.
Harmonics	Harmonic reports consists of two graphs and one table. The first graph displays the magnitude of each harmonic as a percentage of: the fundamental, rms, or maximum load current. The second graph displays a distribution curve of the %THD versus percent of time at each 1% increment, as per IEEE 519. The table lists the magnitude and phase for each harmonic.
* The parameters available for time plot reports are demand, energy, V, I, W, Hz, DPF, VA, VAR, PF, VTHDabc, and ITHDabc.	

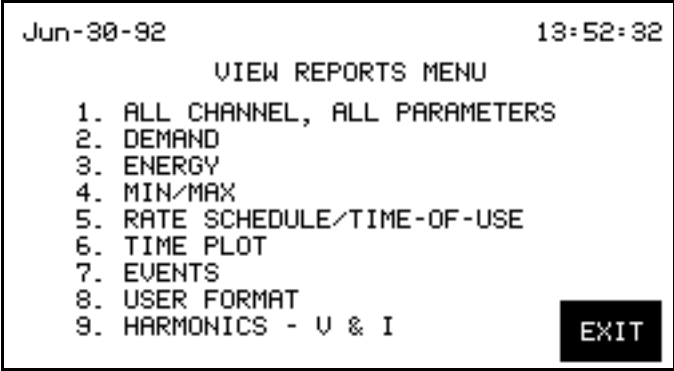
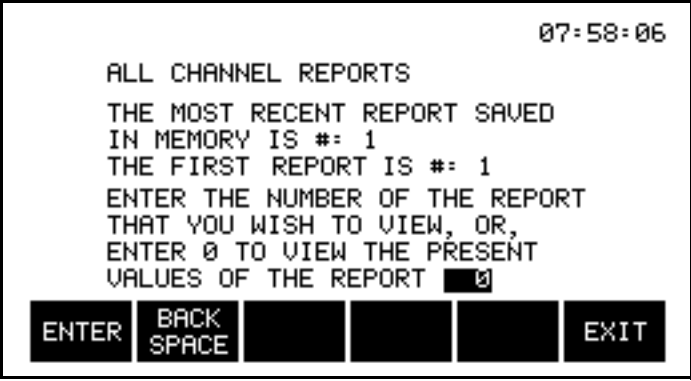
Relay Reports

Description

Relay reports are a special type of report. Like the other types of reports, they are programmed through the Monitoring Setups Report Screen to be generated when a specified trigger condition is met. Unlike the other types of reports, relay reports do not record information. Instead, they trip one of four relays when the programmed trigger condition is met. This relay can be connected to an alarm (such as a light or a buzzer) or to some other type of device.

Viewing Reports

Procedure

Step	Action
1	<p>To view a report, select 2, View Reports from the MAIN MENU. The VIEW REPORTS MENU lists all the viewable types of reports.</p> 
2	<p>Select the type of report you wish to view. If there are no reports of this type stored in memory, the present values are displayed. If reports of this type do exist in memory, the following screen comes up, letting you know how many reports are stored.</p> 
3	<p>Reports are numbered in order as they occur. Choose the number of the report to view by pressing the keys on the numeric keypad. To view the present values, press 0. Select [ENTER] when the number for the report you wish to view is displayed on the screen.</p>

Report Memory

Introduction The report memory in the PP1-8000 consists of 100k of RAM. All reports except time plots and events, which have their own areas of memory, can be stored in report memory.

Storage Time To calculate the number of days worth of data that you can store in report memory, the following equation is used:

$$d = 102400 / ((s \times (24/i))_1 + (s \times (24/i))_2 + \dots + (s \times (24/i))_n)$$

Where: d = the memory storage time in days
 s = the report size in bytes (see table)
 i = the recording interval between reports in hours

For example, if you want to store four reports in memory:
 An All Channels, All Parameters report every 15 minutes
 A Demand report every 30 minutes
 An Energy report every 30 minutes
 A Harmonic Text report every hour

The maximum number of days of recorded data that the PP1-8000 can store is calculated as follows:

$$d = 102400 / ((150 \times (24/0.25)) + (165 \times (24/0.5)) + (100 \times (24/0.5)) + (370 \times (24/1))) = 2.84 \text{ days}$$

Report Memory Storage Times

Report Type	Size (bytes)	Maximum Stored If Exclusive	Maximum Storage Time (Days)*
All Channels, All Parameters	150	682	7.1
Demand	165	620	6.46
Energy	100	1024	10.67
Min/Max	100	1024	10.67
Rate Schedule	134	764	7.96
Time-of-Use	110	930	9.68
User Format	300	341	3.55
Harmonic Graph	290	353	3.67
Harmonic Text	370	276	2.87

* At 15 Minute Intervals

All Channels, All Parameters Report

Introduction

The All Channels, All Parameters report lists all the channels and the values of all available parameters for each channel. The parameters are grouped in sets of up to four parameters for display purposes. The set of parameters being displayed can be changed using the options at the bottom of the screen.

The values displayed are valid for the time and date at the top of the screen (present time and date or time and date that the report was saved). When monitoring three-phase power circuits, channel ABC is derived as shown in the table for the indicated parameter.

Channel ABC Derivations

Parameter	Derivation
Volt	Average of A, B, and C
Amps	Sum of A, B, and C
Watts	Sum of A, B, and C
VA	Vector addition of ABC for VAR and Watts
VAR	Sum of A, B, and C
THD	Average of A, B, and C
PF	ABC for Watts divided by ABC for VA
Demand	Sum of A, B, and C (only ABC exists)
Energy	Sum of A, B, and C (only ABC exists)
TDF	Max of ABC
Vthd	Max of ABC
Ithd	Max of ABC
Vcf	Max of ABC
Icf	Max of ABC
Vtif	Max of ABC
Itif	Max of ABC

Continued on next page

All Channels, All Parameters Report, Continued

All Channel Report Screen

Oct-06-91		10:37:07		
ALL CHANNEL REPORT				
CHAN	VOLT	AMP	WATT	VA
A	114.5	1.368k	143.6k	156.7k
B	114.7	1.478k	160.3k	169.5k
C	118.2	1.411k	155.1k	166.8k
D	0.000	0.000	0.000	0.000
ABC	115.8	4.258k	459.0k	492.7k
NEXT SET			PRINT	EXIT

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT SET] cycles the displayed parameter set through all the available choices.

[PRINT] generates a printout of the report, including all parameters and channels.

[EXIT] returns the display to the VIEW REPORTS MENU. (If records exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Demand Report

Introduction

The Demand report displays demand data for three different periods: the present interval, the daily peak, and the monthly peak.

The values displayed are relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

The present interval includes the Present Demand and the Projected Demand (predicted average for the present interval, which would represent the billable demand over the interval). The bottom line of text indicates how far the monitoring period is into the billing interval.

```
Oct-06-91                               10:37:46
CHANNEL ABC PEAK DEMAND REPORT
PRESENT INTERVAL
PRESENT DEMAND:      4.371 kW
PROJECTED DEMAND:   4.513 kW
0 MINUTES INTO 15 MINUTE INTERVAL
NEXT PERIOD [ ] [ ] [ ] [ ] PRINT EXIT
```

The daily and monthly summaries list the four highest demand measurements that have occurred so far during the day or month, along with the time (or date and time) of the occurrence. The power factor value at the time the peak occurred is also given for reference.

```
Oct-06-91                               10:38:09
CHANNEL ABC PEAK DEMAND REPORT
DAILY PEAK DEMAND:  Oct-06-91
TIME      W      PF
9:30     257.9k  0.94
10:15    240.8k  0.94
8:30     237.6k  0.94
10:00    236.8k  0.94
NEXT PERIOD [ ] [ ] [ ] [ ] PRINT EXIT
```

The units of demand as well as the demand interval duration are programmed through the SET SITE PARAMETERS MENU. (Refer to page 5-28).

Continued on next page

Demand Report, Continued

Options

The functions performed by the options at the bottom of the screen are described below.

Select [NEXT PERIOD] to cycle through the PRESENT, DAILY, and MONTHLY demand displays.

[PRINT] generates a printout of the Peak Demand Report, including all three periods.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Oct-06-91				10:39:02
CHANNEL ABC PEAK DEMAND REPORT				
MONTHLY PEAK DEMAND: Oct-91				
DATE	TIME	W	PF	
Oct-13-91	12:35	436.8k	0.93	
Sep-25-91	12:50	432.7k	0.93	
Oct-09-91	14:50	431.6k	0.93	
Oct-01-91	11:05	427.9k	0.92	
NEXT PERIOD			PRINT	EXIT

Min/Max Report

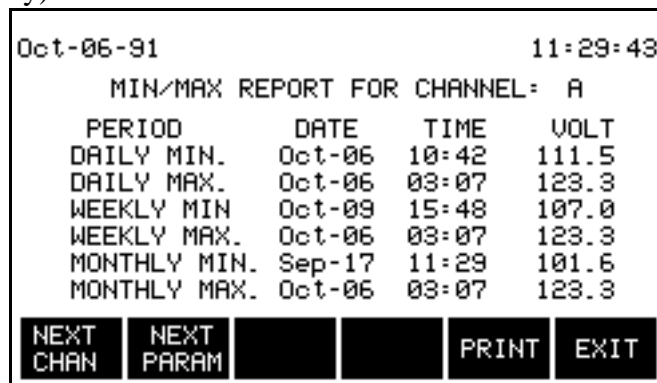
Introduction

The Min/Max report displays the highest and lowest values reached for the selected parameter and the selected channel along with the date and time the value was recorded.

The minimum and maximum values displayed are relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

The DAILY Min/Max values are since midnight (at 00:00:00 of today or the day the report was saved).

The WEEKLY Min/Max values are since the week began (at 00:00:00 on Sunday).



```
Oct-06-91                               11:29:43
MIN/MAX REPORT FOR CHANNEL: A
PERIOD      DATE      TIME      VOLT
DAILY MIN.  Oct-06   10:42    111.5
DAILY MAX.  Oct-06   03:07    123.3
WEEKLY MIN. Oct-09   15:48    107.0
WEEKLY MAX. Oct-06   03:07    123.3
MONTHLY MIN. Sep-17   11:29    101.6
MONTHLY MAX. Oct-06   03:07    123.3
NEXT CHAN  NEXT PARAM  PRINT  EXIT
```

The MONTHLY Min/Max values are since the beginning of this billing month (at 00:00:00 on the first day of the billing month).

When viewing the present readings, the parameter and channel displayed can be changed using the options at the bottom of the screen.

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT CHAN] cycles through the available channels. This option is only available when viewing the present values.

[NEXT PARAM] cycles through the available parameters. This option is only available when viewing the present values.

[PRINT] generates a printout of the Min/Max Report, including all available channels and parameters.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Rate Schedule Report

Introduction

The Rate Schedule report displays a summary electric bill showing total energy use and cost, the peak average demand and cost, and the combined costs. Detailed reports of energy and demand costs are also available. These reports show the block, cost, and total use for each schedule that was programmed in the Rate Schedule screen.

Aug-06-92	13:24:12
ELECTRIC BILL	
TOTAL ENERGY USED	: 100.55MW-HR
TOTAL ENERGY COST	: \$ 100.55k
PEAK AVG. DEMAND	: 10.001kW
TOTAL DEMAND COST	: \$ 76.308
TOTAL ELECTRIC COST	: \$ 100.63k
ENERGY COST	DEMAND COST
TIME OF USE	PRINT
	EXIT

The use and cost is relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

Options

[ENERGY COST] will change the display to provide detailed information on the energy cost breakdown for each rate block, as programmed by the user in the SET SITE PARAMETERS Menu.

[DEMAND COST] will change the display to provide detailed information on the demand cost breakdown for each rate block, as programmed by the user in the SET SITE PARAMETERS Menu.

[TIME OF USE] will change the display to provide detailed information on the energy and demand use and costs for the Time of Use periods, as programmed by the user in the SET SITE PARAMETERS Menu.

[PRINT] generates a report of the entire Rate Schedule report.

[EXIT] returns to the View Reports Menu.

Energy Cost Report

Introduction

The Energy Cost report displays the energy use and cost for each rate schedule that was programmed in the SET SITE PARAMETERS Menu. When [ENERGY COST] is selected, the following screen is displayed.

Aug-06-92	ENERGY COST		11:37:46
	BLOCK	COST	TOTAL ENERGY
1	10.000kW-HR	\$2.9000	100.55MW-HR
2	100.00kW-HR	\$8.1180	
3	1.5000MW-HR	\$49.420	
4	12.000MW-HR	\$154.35	
5	MAX VALUE	\$770.39	
			TOTAL ENERGY COST
			\$ 985.17
COST SUMRY			PRINT

Options

[COST SUMRY] returns you to the Electric Bill report.

[PRINT] generates a printout of the entire Rate Schedule report

[EXIT] returns you to the View Reports Menu.

Demand Cost Report

Introduction

The Demand Cost Report displays the peak average demand and cost for each rate schedule that was programmed in the SET SITE PARAMETERS Menu. When [DEMAND COST] is selected, the following screen is displayed.

Aug-06-92		13:22:32	
DEMAND COST			
	BLOCK	COST	TOTAL DEMAND
1	1.0000MW	\$76.308	10.001kW
2	10.000MW	\$0.0000	
3	50.000MW	\$0.0000	
4	MAX VALUE	\$0.0000	
			TOTAL DEMAND COST \$ 76.308
COST SUMRY			PRINT

Options

[COST SUMRY] returns you to the Electric Bill report.

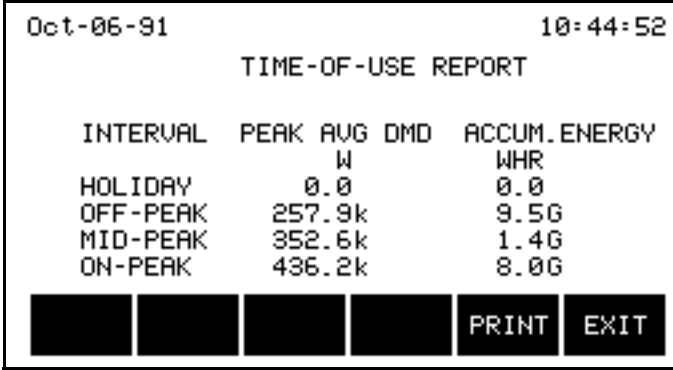
[PRINT] generates a printout of the entire Rate Schedule report

[EXIT] returns you to the View Reports Menu.

Time-of-Use Report

Introduction

The Time-of-Use report displays the peak average demand and the accumulated energy usage so far this billing month for each programmed Time-of-Use period.



INTERVAL	PEAK AVG DMD	ACCUM. ENERGY
	W	WHR
HOLIDAY	0.0	0.0
OFF-PEAK	257.9k	9.5G
MID-PEAK	352.6k	1.4G
ON-PEAK	436.2k	8.0G

PRINT EXIT

The values displayed are relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

The PEAK AVERAGE DEMAND is the highest measured average demand, over a demand interval, during the Time-of-Use period.

ACCUMULATED ENERGY is the total unit-hours used so far this billing month for each of the Time-of-Use periods.

The Time-of-Use intervals, the units measured, and the billing dates are programmed through the SET SITE PARAMETERS MENU.

When viewing the present readings, the screen display is updated every demand interval.

Options

The functions performed by the options at the bottom of the screen are described below.

[PRINT] generates a printout of the Time-of-Use Report.

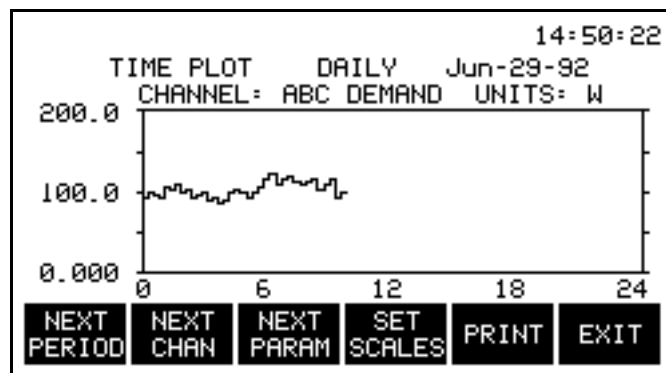
[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Time Plot Reports

Introduction

Time Plot Reports provide a parameter/time display of standard, calculated, default, and user programmable parameters of 17 different types of data. The parameters can be selected for individual channel (A, B, C, or D) or total channel (ABC) related time plots. The table on page 6-20 references all the parameters that can be displayed in time plot form.

Two types of Time Plot Reports are available: a daily plot and a monthly plot. The type of plot displayed can be changed using the menu options at the bottom of the screen. Time plots are edited at the Edit Time Plot Parameters screen.



The daily time plot report displays the selected parameter values recorded since midnight (at 00:00:00 of today) for the selected channel.

The monthly time plot displays the selected parameter values recorded for the selected channel since the beginning of the present billing month (at 00:00:00 on the first day of the month). If the billing month is longer than 31 days, only up to the last 31 days are displayed.

To view data from the previous billing month, the following conditions must be met: the memory storage type must be set to wrap mode, the demand interval must be 15 minutes or longer, and the billing dates must be cleared. The monthly time plot will then display data from the previous 31 days.

NOTE: If the monthly time plot data is viewed using the method described above, the billing dates must be reprogrammed.

Continued on next page

Time Plot Reports, Continued

Introduction (continued)

The initial plot is scaled to the full time span; intervals and days not yet recorded are left blank. The vertical and horizontal dimensions of the plot can be changed using the menu options at the bottom of the screen. The minimum resolution of the display is one demand interval equal to one hour on the daily plot, or one day on the monthly plot.

The time plot is up-dated once every demand interval.

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT PERIOD] toggles the display between the daily (0 to 24 hours) and monthly (0 to 31 days) time plots.

[NEXT CHAN] cycles the display through the available choices.

[NEXT PARAM] cycles the selected parameters through the available choices.

[SET SCALES] allows you to change the vertical and/or horizontal scales for the time plot, to essentially "zoom-in" or "zoom-out." This option is described in more detail in the following subsection.

[PRINT] generates a printout of the Time Plot Report. Only the information displayed on the screen is printed.

[EXIT] returns the display to the VIEW REPORTS MENU.

Set Scales, Continued

Options (continued)

[HIGHER HORIZ] causes a different set of menu options to appear, allowing the upper limit for the time displayed (across the bottom of the time plot) to be programmed using the keypad.

[LOWER HORIZ] causes a different set of menu options to appear, allowing the lower limit for the time displayed (across the bottom of the time plot) to be programmed using the keypad.

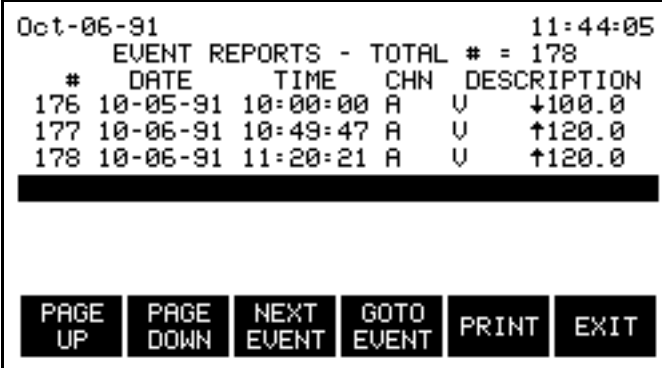
[EXIT] accepts the scales displayed and returns to the Time Plot display.

Events

Introduction

Events are recorded when an out-of-limit trigger, return-to-normal trigger, or an external trigger causes a report to be generated. Also, power on/off conditions are recorded as events.

The event report displays up to seven events at one time, although it can contain up to 300 events. A description of the event is displayed with the date and time the event occurred.



```
Oct-06-91 11:44:05
EVENT REPORTS - TOTAL # = 178
# DATE TIME CHN DESCRIPTION
176 10-05-91 10:00:00 A U ↓100.0
177 10-06-91 10:49:47 A U ↑120.0
178 10-06-91 11:20:21 A U ↑120.0

PAGE PAGE NEXT GOTO PRINT EXIT
UP DOWN EVENT EVENT
```

When the memory is set to the Fill and Stop mode, the PP1-8000 stops recording events once 300 events are listed.

When the memory is set to the Overwrite mode, new events are recorded over old events once 300 events have been listed. New events will be numbered up to 9999, at which point the numbering will start over at 1.

You can scroll through the events sequentially, or jump to a particular event number using the menu options at the bottom of the screen. The highlight is always on the event in the middle of the screen.

Options

The functions performed by the options at the bottom of the screen are described below.

[PREV PAGE] scrolls the list of events down so that the previous seven events are displayed.

[NEXT PAGE] scrolls the list of events up so that the subsequent seven events are displayed.

Continued on next page

Events, Continued

Options (continued)

[NEXT EVENT] scrolls the list of events up one so that the subsequent event becomes highlighted.

[GOTO EVENT] allows an event number to be entered, and then jumps to the that event in the list, placing the selected event at the highlighted position.

[PRINT] generates a printout of the Event Reports, including all the listed events.

[EXIT] returns the display to the VIEW REPORTS MENU.

User Format Reports

Introduction

User reports are custom-made reports programmed by the user through the MONITORING SETUPS MENU. The report displays the values on user-specified channels for user-specified parameters.

```
Oct-09-91                                07:55:19
USER REPORT: A
CHN PARA HARM VALUE CHN PARA HARM VALUE
A   V   H03  2.427
B   V   H03  3.032
C   V   H03  1.116
ABC V   TOT  7.591
A   DPF          0.881

NEXT SET  NEXT REPORT  PRINT  EXIT
```

The values displayed are relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

In addition to the parameters that the other reports can record or display, User reports can contain information about specific harmonics for volts, amps, or watts on selected channel(s).

Each user-specified report can include up to 28 "elements"; each element consists of a channel, parameter, and if applicable, a harmonic number.

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT SET] toggles between the two sets (pages) of elements (parameter/channel combinations) for this report. Each set contains up to 14 elements. This option is not available if only one set was programmed into the report.

[NEXT REPORT] cycles you through the various user reports. This option is only available when viewing the present values.

[PRINT] generates a printout of the User Report. If more than one set exists, both are printed.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Harmonics Reports

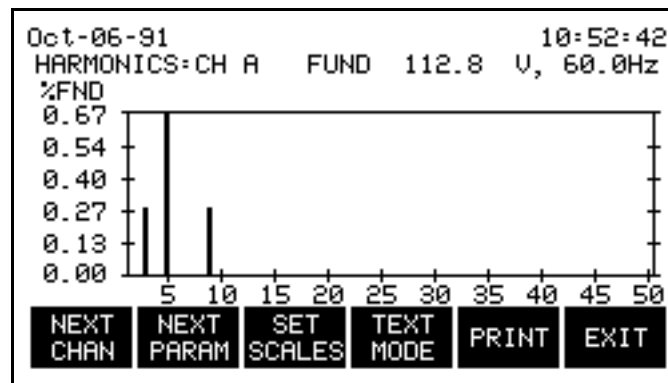
Introduction

Harmonic reports consists of two graphs and one table. The first graph displays the magnitude of each harmonic as a percentage of: the fundamental, rms, or maximum load current. The second graph displays a distribution curve of the %THD versus percent of time at each 1% increment, as per IEEE 519. The table lists the magnitude and phase for each harmonic. All displays are updated once every five seconds.

NOTE: The distribution graph is only available if Vthd or Ithd is programmed to be stored in time plot memory. See “Programming Monitoring Setups” for the procedure for selecting parameters to be stored.

The number of harmonics displayed is dependent on the fundamental frequency. If the fundamental frequency is 45 to 65Hz, the PP1-8000 displays up to the 50th harmonic. If the fundamental frequency is 400Hz, the PP1-8000 displays up to the 8th harmonic.

Graphic Display The graph displays the magnitude of the harmonics as a percent of: the fundamental, rms, or maximum load current, for the indicated parameter and channel.



The values displayed are relative to the time and date at the top of the screen (present time and date or time and date that the report was saved).

Continued on next page

Harmonics Reports, Continued

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT CHAN] cycles the display through the available channels. This option is only available when viewing the present values.

[NEXT PARAM] cycles the display through the available parameters. This option is only available when viewing the present values.

[SET SCALE] allows you to select the harmonic information in percentage based on the following values and conventions:

 % of fundamental frequency - THD, North American convention

 % of rms voltage - THD, IEC 555-2, European convention

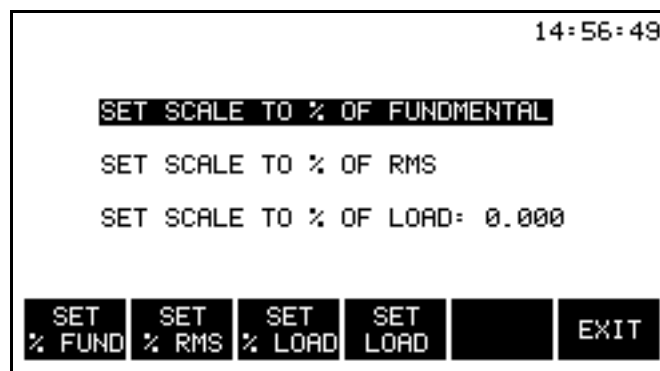
 % of maximum load current - TDD, IEEE 519 recommendation.

[TEXT MODE] switches the display to a tabular presentation of the harmonics' magnitude and phase. This option is only available when viewing a graphic display.

[PRINT] generates a printout of the Harmonic Report. When in graph mode, the entire graph is printed.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

When [SET SCALES] is selected, the following screen is displayed.



[SET % FUND] moves the highlight to the first line of the display.

Continued on next page

Harmonics Reports, Continued

Options (continued)

[SET % RMS] moves the highlight to the second line of the display.

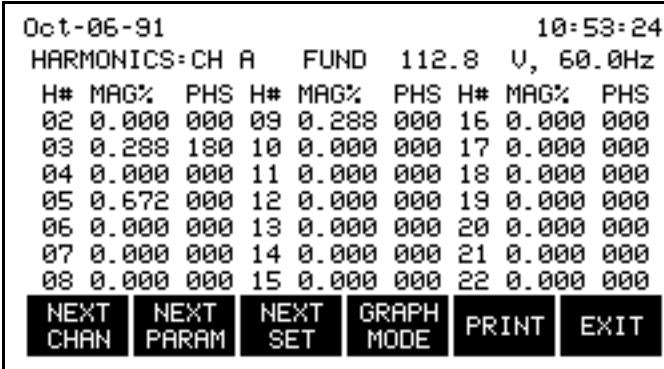
[SET % LOAD] moves the highlight to the third line of the display.

[SET LOAD] displays the Numeric Entry menu bar, allowing you to enter a value for the maximum load current.

[EXIT] returns you to the harmonic graph display.

Text Display

The reference screen displays tabulated data listing each harmonic's magnitude and phase relative to the fundamental, rms, or maximum load current of the channel and parameter selected.



```
Oct-06-91 10:53:24
HARMONICS: CH A FUND 112.8 V, 60.0Hz
H# MAG% PHS H# MAG% PHS H# MAG% PHS
02 0.000 000 09 0.288 000 16 0.000 000
03 0.288 180 10 0.000 000 17 0.000 000
04 0.000 000 11 0.000 000 18 0.000 000
05 0.672 000 12 0.000 000 19 0.000 000
06 0.000 000 13 0.000 000 20 0.000 000
07 0.000 000 14 0.000 000 21 0.000 000
08 0.000 000 15 0.000 000 22 0.000 000
NEXT NEXT NEXT GRAPH PRINT EXIT
CHAN PARAM SET MODE
```

The number of harmonics that are computed and displayed depends upon the frequency being monitored. When more than one screen's worth of harmonics are computed, the harmonic data is divided into different sets, each on a separate screen. The set of harmonics displayed at a given time is changed using the menu options at the bottom of the screen.

Note

For the watts parameter only, harmonic power direction is indicated by a sign in front of the MAG% (watts magnitude) value. A minus sign (-) indicates that the harmonic power flows in the opposite direction of the source-load arrow on the CT. No sign indicates that the harmonic power flows in the same direction as the source-load arrow on the CT.

A load is indicated if the CT arrow is pointing at the physical load and there is no sign on the watts magnitude. This is the normal situation. If the sign on the watts magnitude is negative, then the load is actually a source (generator).

A negative sign on the fundamental watts usually indicates that the CT is on backwards, or the arrow is pointing in the wrong direction.

Harmonics Reports, Continued

Options

The functions performed by the options at the bottom of the screen are described below.

[NEXT CHAN] cycles the channel selection through the available choices. This option is only available when viewing the present values.

[NEXT PARAM] cycles the parameter selection through the available choices. This option is only available when viewing the present values.

[NEXT SET] is available only when viewing a tabular display. This option cycles the display to the next set of harmonics.

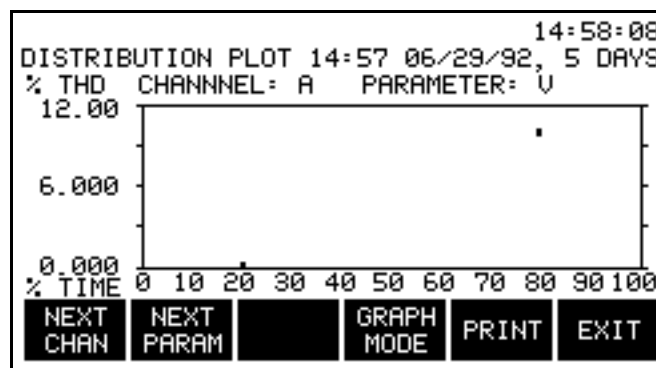
[DISTB MODE] switches the display to a distribution presentation of the %THD versus percent time at each level.

[PRINT] generates a printout of the Harmonic Report. When in text mode, all the harmonic values are printed in a tabular display.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Distribution Display

This report graphs the distribution of the %THD versus percent of time at each level, as per IEEE 519. The percent of monitoring time at each of the average THD Values (as computed over each demand interval) can be plotted for either Vthd or Ithd of each channel.



The values displayed begin at the time and date at the top of the screen, and cover the duration also displayed.

Continued on next page

Harmonics Reports, Continued

Options

[NEXT CHAN] cycles through the available choices and displays a graph of the selected channel's distribution. This option is only available when viewing the present values.

[NEXT PARAM] cycles between Vthd and Ithd, and displays a graph of the selected parameter's distribution. This option is only available when viewing the present values.

[GRAPH MODE] toggles the display to a graph of the harmonic magnitude from the fundamental up to the 50th harmonic for the channel and parameter displayed on the reference screen.

[PRINT] generates a printout of the Harmonic Report.

[EXIT] returns the display to the VIEW REPORTS MENU. (If reports exist in memory, [EXIT] returns the display to the Select Report Number Screen.)

Chapter 8

Transferring Data

Overview

Introduction The PP1-8000 transfers reports and error messages automatically (when configured) to the peripheral devices such as an external terminal, personal computer (PC), printer, or facsimile (Fax) machine. Transferring data also consists of writing data to a memory card.

Types of communication Data can be transferred by serial or parallel data transmission. Serial data transfer is accomplished through an RS-232D direct connection or through internal or external modems. Parallel data transmission is available through a parallel data port and is used only for a local external parallel printer.

Device connection description The table below shows the devices and their related connection description.

Device	Location	Port	Data	Connection
Terminal, PC, Printer	Local	RS232D	Serial	Direct
Terminal, PC, Printer	Remote	RS232D	Serial	External Modem
Printer only	Local	Parallel Port	Parallel	Direct
Terminal, PC, Printer	Remote	RJ-11C*	Serial	Internal Modem
Facsimile (Fax)	Remote	RJ-11C*	Serial	Internal Modem

* An RJ-11C jack is not available on the model PP1E.

CAUTION This equipment has been tested and found to comply with emissions and/or immunity requirements. Shielded cables and shielded connectors must be used when connecting external devices to the main or auxiliary ports. Only certified Class A or B peripherals, applicable to the national regulations of the user, are recommended for use with this equipment. The use of non-certified peripherals is likely to result in undesired interference.

Continued on next page

Overview, Continued

PRECAUCIÓN Este equipo ha sido probado y se ha encontrado en conformidad con los requisitos de emisiones y/o inmunidad. Deben utilizarse cables blindados y conectores blindados cuando se conecten dispositivos externos a los puertos principal o auxiliar. Con este equipo, se recomienda utilizar sólo periféricos certificados de Clase A o B, aplicables a las regulaciones nacionales del usuario. Es probable que el uso de periféricos sin certificación produzca una interferencia indeseable.

MISE EN GARDE Ce matériel a été testé et déterminé conforme aux règlements relatifs à la pollution de l'air et/ou à l'immunité. Des câbles et des connecteurs blindés doivent être utilisés lors de la connexion de dispositifs extérieurs au port principal ou aux ports auxiliaires. Seuls des périphériques homologués Classe A ou Classe B, applicables dans le cadre des règlements nationaux de l'utilisateur, sont recommandés pour être utilisés avec ce matériel. L'utilisation de périphériques non homologués produira vraisemblablement des parasites.

VORSICHT Dieses Gerät wurde getestet und entspricht Emissions- bzw. Störfestigkeitsanforderungen. Bei der Verbindung externer Geräte mit den Haupt- bzw. Zusatzanschlüssen müssen abgeschirmte Kabel und Stecker verwendet werden. Für die Verwendung mit diesem Gerät werden nur genehmigte Peripheriegeräte der Klasse A oder B, die den Vorschriften im jeweiligen Land des Benutzers entsprechen, empfohlen. Die Verwendung nicht genehmigter Peripheriegeräte führt voraussichtlich zu unerwünschten Störungen.

In this chapter This chapter describes how each device is configured, connected, then verified to ensure correct operation. The following topics are covered in this chapter.

Topic	See Page
Connecting Local Devices to the RS232D Port	8-4
Connecting a Printer to the Parallel Port	8-10
Connecting Remote Devices to RS232D Port	8-14
Connecting Remote Devices to RJ-11C Jack (not available on PP1E)	8-20

Continued on next page

Overview, Continued

In this chapter
(continued)

Topic	See Page
Connecting to a Facsimile (Fax) Machine (not available on PP1E)	8-25
Output Connected Device Configuration Test	8-28

Connecting Local Devices to the RS232D Port

Introduction

A terminal, PC, or serial printer may be connected through an accessory cable to the RS232D port as a direct connection for local operation. Once connected, the device is configured for operation by selection of options from the menu.

RS232D port description

The RS232D serial port is located on the rear panel of the Power Platform and consists of a 25-pin female connector and operates as a Data Communications Equipment (DCE) port. It provides data output of 300 to 9600 baud and parity control. This port permits the PP1-8000 to communicate with a terminal, PC, or printer for up to 50 feet.

Port pinout description

The following table describes the RS-232D port pinouts.

Pin and Name	Function	Data Direction	Description of Operation
1. GND	Protective ground	Not Applicable	Shielding of cable (Drain) is tied to this pin.
2. XMT	Transmit	To PP1	Serial data output from connected device. RTS and DTR must be TRUE for data to be recognized.
3. RCV	Receive	From PP1	Serial data output to connected device. RTS and DTR must be TRUE for data to be recognized
4. RTS *	Request To Send	To PP1	Controls data flow from PP1. Must be TRUE for PP1 to transmit data.
6. DSR	Data Set Ready	From PP1	Same as RTS.
7. GND	Signal Ground	Not Applicable	Signal ground for input/output data.
11. DCD	Carrier Detect	From External Modem	Used only with external modem interface cable.
20. DTR *	Data Terminal	To PP1	Must be TRUE for PP1 to acknowledge presence of connected device. A FALSE state causes immediate disabling of the port.

*If either RTS or DTR are de-asserted for more than two seconds, the PP1 will consider the line dead and disable the port.

Continued on next page

Connecting Local Devices to the RS232D Port, Continued

Cables required The following cables are provided as optional accessories.

Type	Part Number	Description
Direct, Shielded	113376-G1	RS232 Cable, 25-pin male to 25-pin female, 10 feet. D-sub connectors.
Adapter, Shielded	113394-G1	RS232 Cable, Adapter, 25-pin male to 9-pin female, 1 foot. D-sub connectors.

See figures for the shielded cable wiring.

CAUTION This equipment has been tested and found to comply with emissions and/or immunity requirements. Shielded cables and shielded connectors must be used when connecting external devices to the main or auxiliary ports. Only certified Class A or B peripherals, applicable to the national regulations of the user, are recommended for use with this equipment. The use of non-certified peripherals is likely to result in undesired interference.

PRECAUCIÓN Este equipo ha sido probado y se ha encontrado en conformidad con los requisitos de emisiones y/o inmunidad. Deben utilizarse cables blindados y conectores blindados cuando se conecten dispositivos externos a los puertos principal o auxiliar. Con este equipo, se recomienda utilizar sólo periféricos certificados de Clase A o B, aplicables a las regulaciones nacionales del usuario. Es probable que el uso de periféricos sin certificación produzca una interferencia indeseable.

MISE EN GARDE Ce matériel a été testé et déterminé conforme aux règlements relatifs à la pollution de l'air et/ou à l'immunité. Des câbles et des connecteurs blindés doivent être utilisés lors de la connexion de dispositifs extérieurs au port principal ou aux ports auxiliaires. Seuls des périphériques homologués Classe A ou Classe B, applicables dans le cadre des règlements nationaux de l'utilisateur, sont recommandés pour être utilisés avec ce matériel. L'utilisation de périphériques non homologués produira vraisemblablement des parasites.

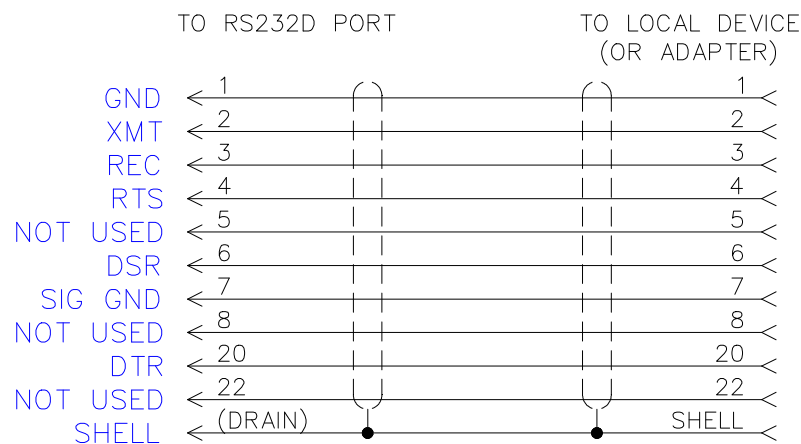
Continued on next page

Connecting Local Devices to the RS232D Port, Continued

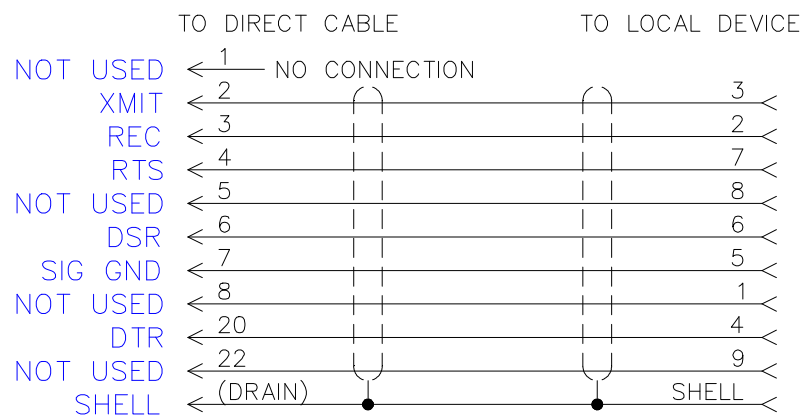
VORSICHT

Dieses Gerät wurde getestet und entspricht Emissions- bzw. Störfestigkeitsanforderungen. Bei der Verbindung externer Geräte mit den Haupt- bzw. Zusatzanschlüssen müssen abgeschirmte Kabel und Stecker verwendet werden. Für die Verwendung mit diesem Gerät werden nur genehmigte Peripheriegeräte der Klasse A oder B, die den Vorschriften im jeweiligen Land des Benutzers entsprechen, empfohlen. Die Verwendung nicht genehmigter Peripheriegeräte führt voraussichtlich zu unerwünschten Störungen.

Direct cable diagram



Adapter cable diagram

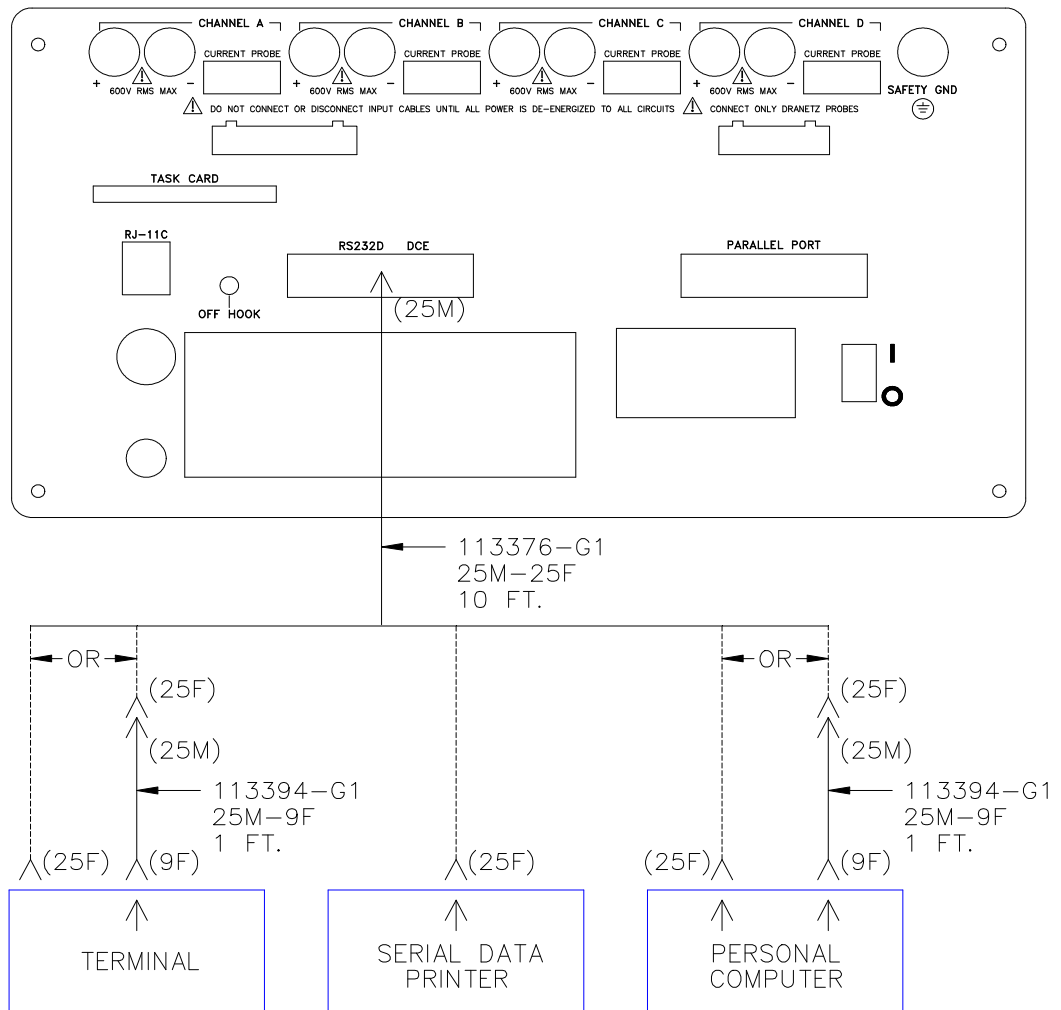


8600-42

Connecting Local Devices to the RS232D Port, Continued

Direct connections to RS232D port

The direct connections of a device connected to the RS232D port are shown below. Only one device can be connected to the RS232D port at any time using the direct connector cable, 113376-G1. Connection to a terminal or PC having a 9-pin connector port will require the use of the adapter cable, 113394-G1.



8600-2

Continued on next page

Connecting Local Devices to the RS232D Port, Continued

Displaying the screen

Follow these steps to display the RS232D Configuration screen.

Step	Action
1	Select item 4, Configuration Setup, from the Main Menu.
2	Select item 1, Inputs/Outputs from the Setup Menu.
3	Select item 3, RS232, from the Configure I/O Menu. <u>Result:</u> The following screen appears.

```

Aug-25-93                               15:29:03

          RS232D CONFIGURATION
BAUD RATE:  9600
PARITY TYPE NONE
# STOP BITS:  1
FLOW CONTROL: SOFTWARE (XON/XOFF)
DEVICE:      TERMINAL

SET  SET  FLOW  SET
BAUD PARITY CONTRL DEVICE MORE EXIT
    
```

Direct connection configuration

To configure the PP1-8000 for the operation of a Terminal, Printer, or PC directly connected to the RS232D port, perform the following steps.

Step	Action
1	Press SET DEVICE to select the device to be used: Terminal (or PC), Modem, Printer=Okidata, or Printer=Epson. <u>Note:</u> Modem cannot be used for direct connection operation.
2	Press SET BAUD until the desired baud of 300, 1200, 2400, 4800, or 9600 is displayed.

Continued on next page

Connecting Local Devices to the RS232D Port, Continued

**Direct
connection
configuration**
(continued)

Step	Action
3	Press SET PARITY and select Odd, Even, or None. <u>Note</u> : The # Stop Bits = 1 is preset and not alterable.
4	Press EXIT to activate the configuration.

**Configuration
test**

To test that the configuration and connections are correct, perform the configuration test on page 8-28.

Connecting a Printer to the Parallel Port

Introduction An Epson model FX80, parallel data printer, (or another printer that can emulate an Epson FX80) can be connected to the parallel port on the rear of the Power Platform and configured for printer operation.

Note Connection of an external printer will disable the internal thermal printer.

Cable required A Centronics parallel data cable, not supplied, consisting of a 25-pin male to 36-pin male connectors is required.

CAUTION **This equipment has been tested and found to comply with emissions and/or immunity requirements. Shielded cables and shielded connectors must be used when connecting external devices to the main or auxiliary ports. Only certified Class A or B peripherals, applicable to the national regulations of the user, are recommended for use with this equipment. The use of non-certified peripherals is likely to result in undesired interference.**

PRECAUCIÓN **Este equipo ha sido probado y se ha encontrado en conformidad con los requisitos de emisiones y/o inmunidad. Deben utilizarse cables blindados y conectores blindados cuando se conecten dispositivos externos a los puertos principal o auxiliar. Con este equipo, se recomienda utilizar sólo periféricos certificados de Clase A o B, aplicables a las regulaciones nacionales del usuario. Es probable que el uso de periféricos sin certificación produzca una interferencia indeseable.**

MISE EN GARDE **Ce matériel a été testé et déterminé conforme aux règlements relatifs à la pollution de l'air et/ou à l'immunité. Des câbles et des connecteurs blindés doivent être utilisés lors de la connexion de dispositifs extérieurs au port principal ou aux ports auxiliaires. Seuls des périphériques homologués Classe A ou Classe B, applicables dans le cadre des règlements nationaux de l'utilisateur, sont recommandés pour être utilisés avec ce matériel. L'utilisation de périphériques non homologués produira vraisemblablement des parasites.**

Continued on next page

Connecting a Printer to the Parallel Port, Continued

VORSICHT

Dieses Gerät wurde getestet und entspricht Emissions- bzw. Störfestigkeitsanforderungen. Bei der Verbindung externer Geräte mit den Haupt- bzw. Zusatzanschlüssen müssen abgeschirmte Kabel und Stecker verwendet werden. Für die Verwendung mit diesem Gerät werden nur genehmigte Peripheriegeräte der Klasse A oder B, die den Vorschriften im jeweiligen Land des Benutzers entsprechen, empfohlen. Die Verwendung nicht genehmigter Peripheriegeräte führt voraussichtlich zu unerwünschten Störungen.

Port pinout description

The following table describes the parallel port pinouts.

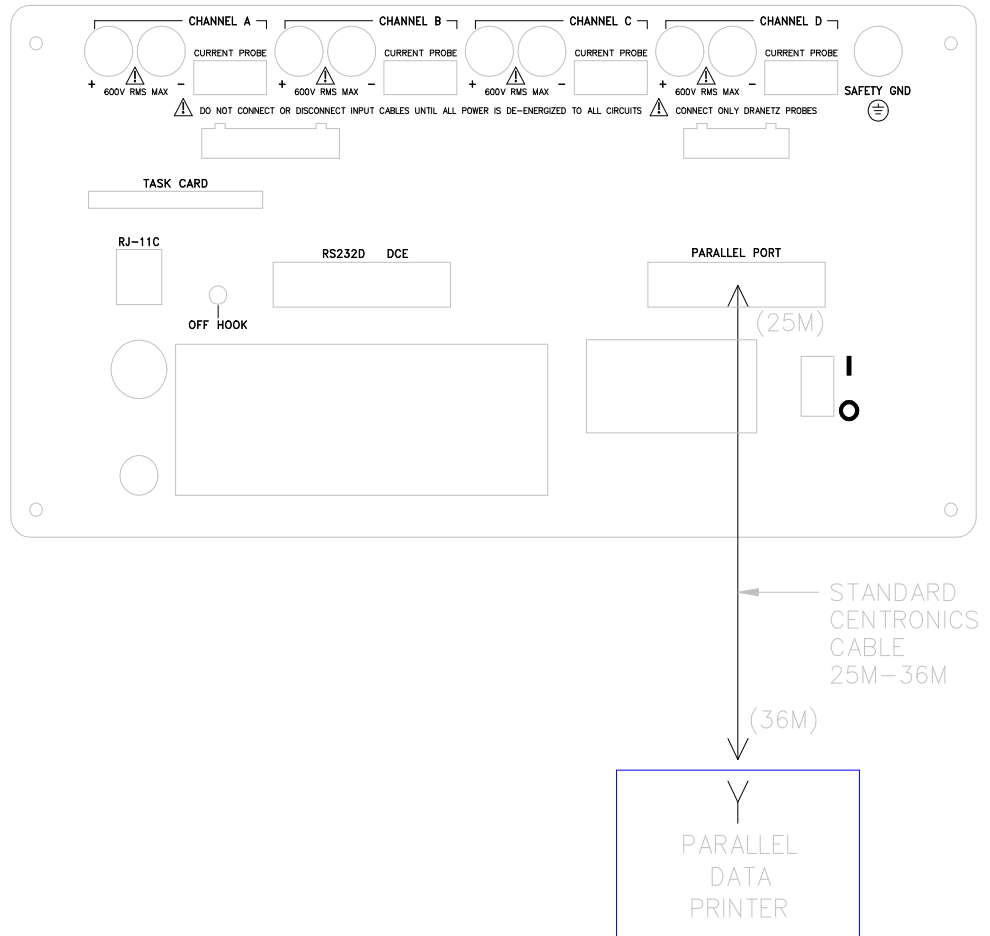
Pin and Name	Function	Data Direction	Description of Operation
1. STROBE [~]	General Purpose	Output	Transfer latched data to printer.
2 - 9. D01 -D07	Data	Output	8-bit Parallel Data.
10. ACK [~]	Acknowledge	Input	Output from printer indicating data has been accepted.
11. BUSY	Printer Busy	Input	Output from printer indicating printer not ready to accept data.
12. PE	Paper Empty	Input	Output from printer indicating out of paper. (High = no paper)
13. SLCT	Select	Input	Output from printer indicating the printer has been selected.
14. AUTOFD [~]	Autofeed	Output	To signal printer for continuous form feed. (Auto linefeed)
15. ERROR [~]	Printer Error	Input	Output from printer indicating error.
16. INIT [~]	Initialize	Output	To signal printer to initialize.
17. SLCTIN [~]	Select printer	Output	To select printer.
18 -25. GND	Ground		Chassis signal Ground

Continued on next page

Connecting a Printer to the Parallel Port, Continued

Connection diagram

The following diagram shows the connection for the Epson FX80 printer.

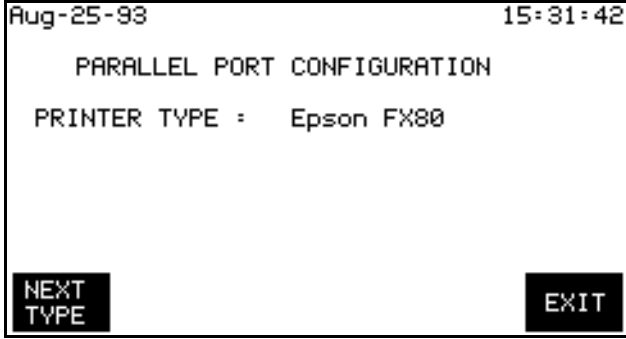


8600-29

Continued on next page

Connecting a Printer to the Parallel Port, Continued

Configure port Follow these steps to configure the parallel port.

Step	Action
1	Select item 4, Configuration Setup , from the Main Menu.
2	Select item 1, Inputs/Outputs, from the Configuration Setup Menu.
3	Select item 8, Parallel Port, from the Configure I/O Menu. The following display appears. 
4	Press NEXT TYPE to select either Off or Epson FX80.
5	Press EXIT to initiate printer operation.

Connecting Remote Devices to RS232D Port

Introduction A remote serial data terminal, PC, or printer can be connected to the RS232D port of the Power Platform by means of external modems. Only one device can be connected at any time.

Modem Hayes AT command set compatible modems are recommended.

CAUTION **This equipment has been tested and found to comply with emissions and/or immunity requirements. Shielded cables and shielded connectors must be used when connecting external devices to the main or auxiliary ports. Only certified Class A or B peripherals, applicable to the national regulations of the user, are recommended for use with this equipment. The use of non-certified peripherals is likely to result in undesired interference.**

PRECAUCIÓN **Este equipo ha sido probado y se ha encontrado en conformidad con los requisitos de emisiones y/o inmunidad. Deben utilizarse cables blindados y conectores blindados cuando se conecten dispositivos externos a los puertos principal o auxiliar. Con este equipo, se recomienda utilizar sólo periféricos certificados de Clase A o B, aplicables a las regulaciones nacionales del usuario. Es probable que el uso de periféricos sin certificación produzca una interferencia indeseable.**

MISE EN GARDE **Ce matériel a été testé et déterminé conforme aux règlements relatifs à la pollution de l'air et/ou à l'immunité. Des câbles et des connecteurs blindés doivent être utilisés lors de la connexion de dispositifs extérieurs au port principal ou aux ports auxiliaires. Seuls des périphériques homologués Classe A ou Classe B, applicables dans le cadre des règlements nationaux de l'utilisateur, sont recommandés pour être utilisés avec ce matériel. L'utilisation de périphériques non homologués produira vraisemblablement des parasites.**

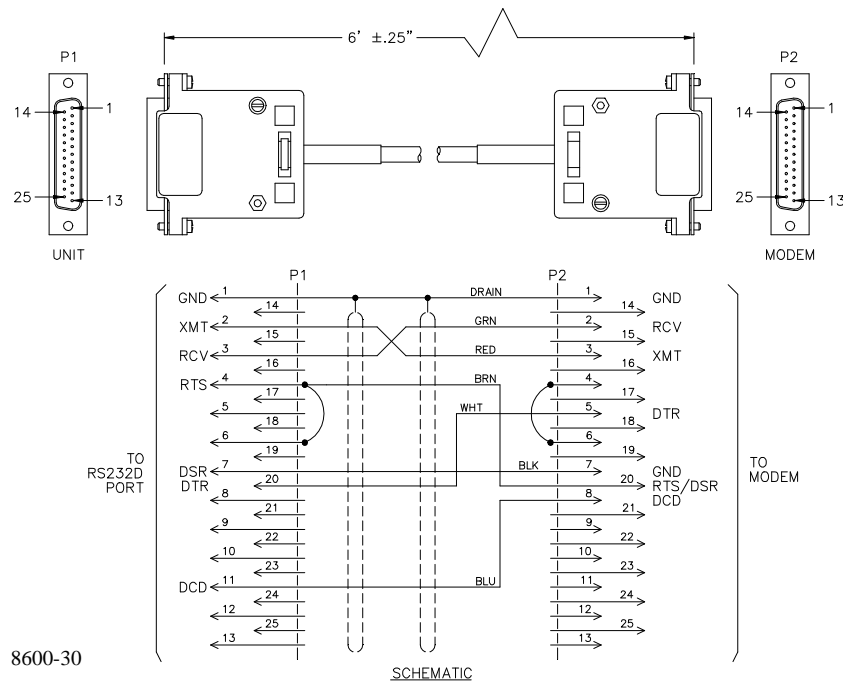
VORSICHT **Dieses Gerät wurde getestet und entspricht Emissions- bzw. Störfestigkeitsanforderungen. Bei der Verbindung externer Geräte mit den Haupt- bzw. Zusatzanschlüssen müssen abgeschirmte Kabel und Stecker verwendet werden. Für die Verwendung mit diesem Gerät werden nur genehmigte Peripheriegeräte der Klasse A oder B, die den Vorschriften im jeweiligen Land des Benutzers entsprechen, empfohlen. Die Verwendung nicht genehmigter Peripheriegeräte führt voraussichtlich zu unerwünschten Störungen.**

Connecting Remote Devices to RS232D Port, Continued

Cables required The following cables are provided as optional accessories.

Type	Part Number	Description
Direct, Shielded	113376-G1	RS232 Cable, 25-pin male to 25-pin female, 10 feet. D-sub connectors.
Adapter, Shielded	113394-G1	RS232 Cable, Adapter, 25-pin male to 9-pin female, 1 foot. D-sub connectors.
Modem, Shielded	115767-G1	RS232 Cable, External Modem Interface Cable Assembly, 6 feet. See Figure below.
Telephone	111024-G1	Four conductor, double ended, male plugs, 25 feet (Supplied with option MDM24).

Modem cable

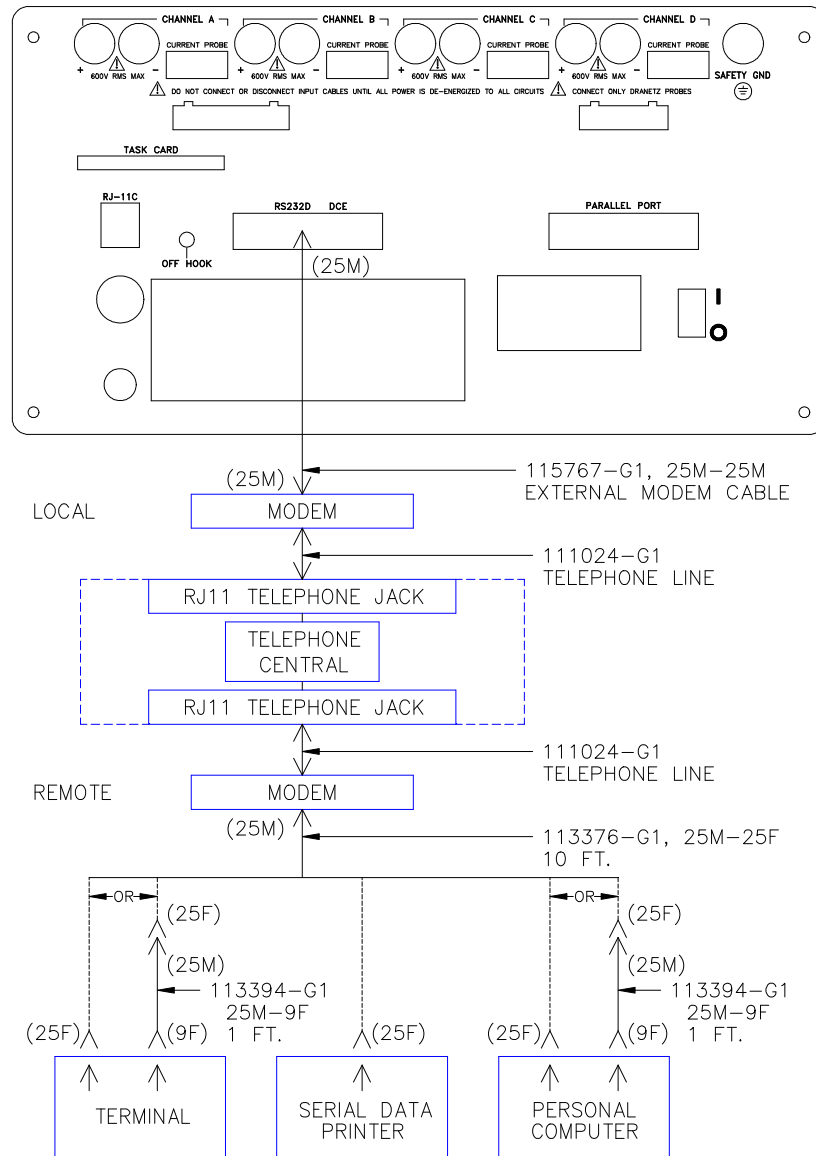


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Connecting Remote Devices to RS232D Port, Continued

Connection diagram

The following figure shows the physical connection of a remote device to the RS232D port using modems.



8600-3

Continued on next page

Connecting Remote Devices to RS232D Port, Continued

Displaying the screen

Follow these steps to display the RS232D Configuration screen.

Step	Action
1	Select item 4, Configuration Setup, from the Main Menu.
2	Select item 1, Inputs/Outputs, from the Configuration Setup Menu.
3	Select item 3, RS232, from the Configure I/O Menu. <u>Result:</u> The following screen appears: <div data-bbox="672 726 1292 1062" data-label="Image"> <pre> Dec-15-93 14:38:12 RS232D CONFIGURATION BAUD RATE: 9600 PARITY TYPE NONE # STOP BITS: 1 FLOW CONTROL: SOFTWARE (XON/XOFF) DEVICE: MODEM SET SET FLOW SET SET SET BAUD PARITY CONTRL DEVICE MORE EXIT </pre> </div>

Configuring the RS232D port for modem use

Follow these steps to configure the RS232D port for remote communication with a modem.

Step	Action
1	Press SET BAUD until the correct baud for your modem is displayed. <u>Note:</u> If using a 300 or 1200 Baud external modem, set the modem DIP switches for the following configuration: <ul style="list-style-type: none"> • DTR always ON • DCD REACT to CARRIER DETECT • ECHO MODE to OFF • VERBOSE MODE to OFF

Continued on next page

Connecting Remote Devices to RS232D Port, Continued

Configuring the RS232D port for modem use (continued)

Step	Action						
2	<p>Press SET PARITY and select odd, even, or none.</p> <p><u>Note:</u> # Stop Bits= 1 is not changeable.</p>						
3	<p>Press FLOW CONTRL for software control (XON/XOFF), hardware control (RTS/CTS), or NONE.</p> <p><u>Note:</u> Set for NONE if using a 9600 Baud modem</p>						
4	Press SET DEVICE until modem is displayed.						
5	Press MORE to display next screen.						
6	<p>Press #RINGS to set number of rings before answer.</p> <p><u>Result:</u> The menu bar will change to the following.</p> <div style="text-align: center; border: 1px solid black; padding: 5px;"> <table style="display: inline-table; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px 10px;">ENTER</td> <td style="border: 1px solid black; padding: 2px 10px;">BACK SPACE</td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; padding: 2px 10px;">EXIT</td> </tr> </table> </div>	ENTER	BACK SPACE				EXIT
ENTER	BACK SPACE				EXIT		
7	<p>Enter a number from 0 the 99.</p> <p><u>Note:</u> If 0 is entered, then the PP1-8000 will not answer.</p>						
8	<p>Press AUTO BAUD to toggle the auto baud function ON or OFF.</p> <p><u>Note:</u> When set to on, the modem will automatically adjust to the speed of the calling modem. If you are using a 300 Baud modem, set Auto Baud to OFF.</p>						
9	<p>Press ENTER HEADER to enter a header string. The alphanumeric entry screen appears to permit you to enter up to 37 command set characters. Refer to modem operating manual for command sets.</p> <p><u>Note:</u> It is not necessary to send the command ATZ or AT&F in the header string because the PP1-8000 automatically sends this command with every new configuration.</p>						
10	Press EXIT to initiate the configuration settings.						

Continued on next page

Connecting Remote Devices to RS232D Port, Continued

**Configuration
test**

To test that the device connected to the RS-232D port will respond to the configuration setup, perform the configuration test on page 8-28.

Connecting Remote Devices to RJ-11C Jack (not available on PP1E)

Introduction Remote devices can be connected to the RJ-11C jack if the internal modem option, MDM24, is purchased (not available on PP1E). This option is installed internal to the PP1-8000 and is provided with a 25 foot telephone cable. An FCC label is attached next to the RJ-11C on the rear panel to identify that the internal modem is installed.

RJ-11C jack description The RJ-11C telephone jack consists of a standard two-active-line (tip and ring) telephone cable for connection to a remote telephone jack.

Telephone active indicator The OFF HOOK indicator on the rear panel is lit yellow when the telephone line is active.

Cables required The following cables are provided as optional accessories.

Type	Part Number	Description
Direct, Shielded	113376-G1	RS232 Cable, 25-pin male to 25-pin female, 10 feet. D-sub connectors.
Adapter, Shielded	113394-G1	RS232 Cable, Adapter, 25-pin male to 9-pin female, 1 foot. D-sub connectors.
Telephone	111024-G1	Four conductor, double ended, male plugs, 25 feet (Supplied with option MDM24).

Compliance with FCC Rules and Regulations The optional internal Modem (MDM24) complies with Part 68 of the FCC rules. On the rear panel of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this. If requested, this information must be provided to the telephone company.

Notification of the Telephone Company: All direct connection to the telephone network must be made through standard plugs and jacks as described in Part 68, Subpart F of the FCC Rules. The terminal equipment (Dranetz-BMI PP1-8000 equipped with Option MDM24) cannot be used on public coin service provided by the telephone company. Connection to Party Line Service is allowable and subject to state tariffs. (Contact the state public utility commission, public service or corporation commission for information.)

Continued on next page

Connecting Remote Devices to RJ-11C Jack, Continued

Compliance with FCC rules and regulations (continued)

Before connecting the equipment to the telephone network, notify the telephone company of the line that you are using, the FCC Registration Number, the Ringer Equivalence of the Modem, and the type of Jack used for connection.

- FCC Registration Number: B46USA-65156-FA-E
- Ringer Equivalence: 0.2A
- Phone Jack (USOC): RJ-11C

Ringer equivalence number: The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive REN's on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total REN's contact the telephone company to determine the maximum REN for the calling area.

Incidence of harm: If the terminal equipment (Dranetz-BMI Power Platform equipped with option MDM24) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

Responsibilities of the telephone company: The telephone company may make changes in it's facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

In case of trouble: If trouble is experienced with this equipment (Dranetz-BMI Power Platform equipped with option MDM24), please contact Dranetz-BMI Customer Service Department, (732) 287-3680 for repair and warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you to remove the equipment from the network until the problem is resolved.

Continued on next page

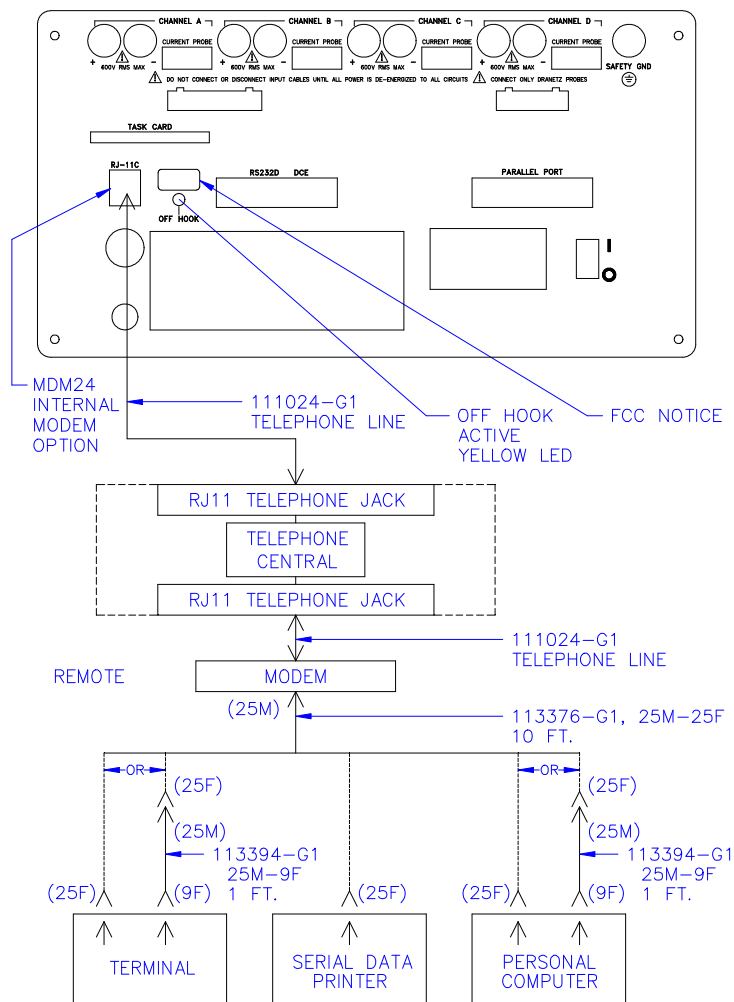
Connecting Remote Devices to RJ-11C Jack, Continued

Compliance with FCC rules and regulations
(continued)

Service: All service and repairs must be performed by Dranetz-BMI. If unauthorized modification or repair is performed, both the FCC Registration and the manufacturer's warranty in effect become null and void. If a malfunction is suspected, it is your responsibility to contact Dranetz-BMI Customer Service Department for further instructions. Telephone Number: (732) 287-3680

Connection diagram

The figure below shows the connection to external devices through the internal modem connected to the RJ-11C jack.



8600-4

Continued on next page

Connecting Remote Devices to RJ-11C Jack, Continued

Displaying the screen

Follow these steps to display the Modem/Fax Configuration screen.

Step	Action
1	Select item 4, Configuration Setup Menu, from the Main Menu.
2	Select item 1, Inputs/Outputs, from the Configuration Menu.
3	Select item 4, Modem/FAX, from the Configure I/O Menu <u>Result:</u> The following screen will appear.

```

Aug-25-93                               15:23:48
      MODEM/FAX CONFIGURATION
SET DEVICE : MODEM
BAUD RATE  : 2400
AUTO BAUD  : ON
PARITY     : NONE

SET  SET  AUTO  SET  SET  SET
DEVI BAUD BAUD PARI MORE EXIT
  
```

Configure internal modem

Follow these steps to configure the internal modem for remote communication to a printer, terminal, or PC.

Step	Action
1	Press SET DEVICE to select Modem.
2	Press SET BAUD to select the desired baud.
3	Press AUTO BAUD to select either On or Off.
4	Press SET PARITY to select Odd, Even, or None.
5	Press MORE to display next screen.
6	Press FLOW CONTRL to select None, Software (XON/XOFF), or blank.
7	Press # RINGS and enter 0 to 99 digits in highlighted area for number of rings before answer selection.
8	Press # DIAL and enter 0 to 99 digits in highlighted area for number of dial attempts to be made.

Continued on next page

Connecting Remote Devices to RJ-11C Jack, Continued

Configure internal modem, continued

Step	Action
9	Press ENTER HEADER and enter modem header string. Refer to Appendix J for the explanation of valid character sequences and their meaning of the Hayes character set commands.
10	Press MORE to display next screen.
11	Press MODEM NUMBER and enter modem phone number.

Configuration test

To test that the configuration and cable connections are correct, perform the configuration test on page 8-28.

Connecting to a Facsimile (Fax) Machine (not available on PP1E)

Introduction

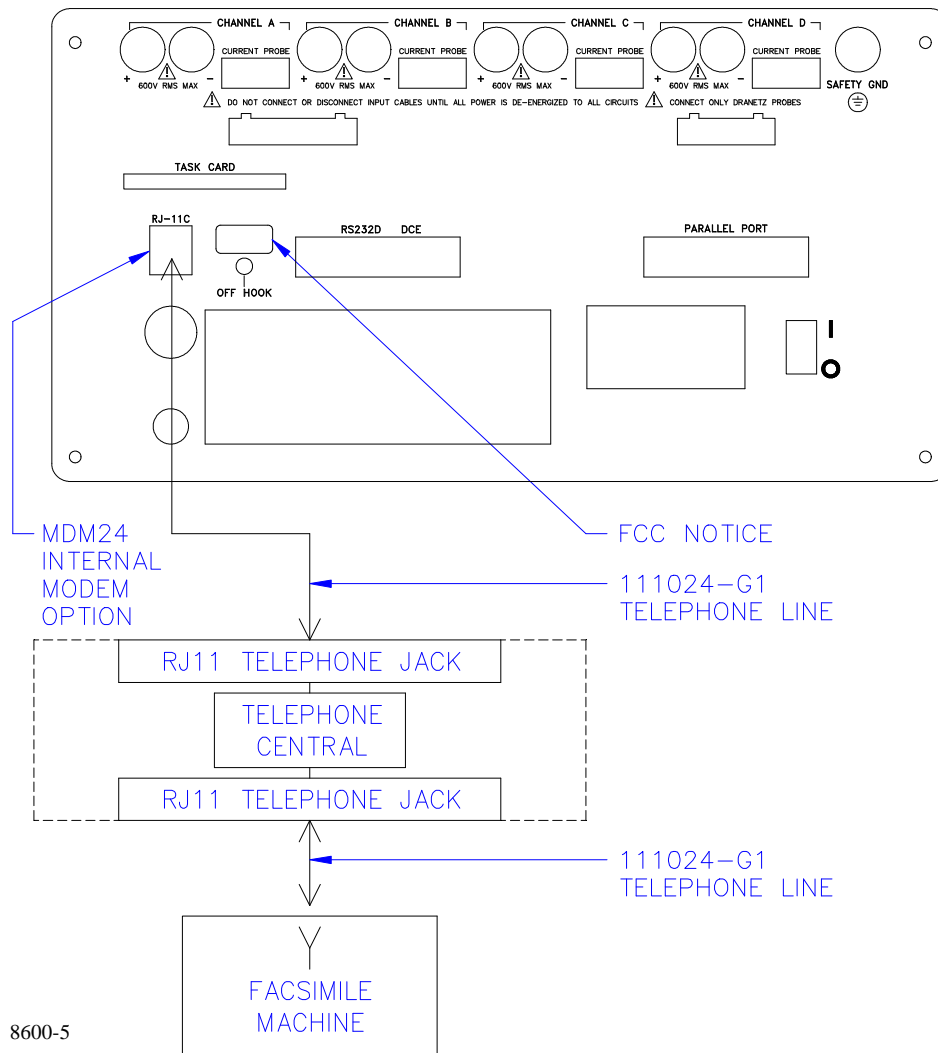
Communication with a fax machine consists of connection to the RJ-11C jack on the rear of the Power Platform and configuring the modem/fax. This feature is not available on the model PP1E.

Cable required

The only cable required for communication with a fax machine is a telephone cable. Telephone cable, part number 111024-G1, is available as an accessory.

Connection diagram

The following figure shows the connection of the fax machine to the RJ-11C jack.



Continued on next page

Connecting to a Facsimile (Fax) Machine, Continued

Displaying the screen

Follow these steps to display the Modem/Fax Configuration screen.

Step	Action
1	Select item 4, Configuration Setup, from the Main Menu.
2	Select item 1, Inputs/Outputs, from the Configuration Setup Menu.
3	Select item 4, Modem/Fax, from the Configure I/O Menu. <u>Result:</u> The following screen will appear.

```

Aug-25-93                               15:23:48
      MODEM/FAX CONFIGURATION
SET DEVICE : MODEM
BAUD RATE  : 2400
AUTO BAUD  : ON
PARITY     : NONE

SET  SET  AUTO  SET  MORE  EXIT
DEVI BAUD BAUD PARIT
  
```

Fax machine configuration

Follow these steps to configure the internal modem to communicate with a fax machine.

Step	Action
1	Press SET DEVICE and select FAX.
2	Press SET BAUD and select 300/1200/2400 rate.
3	Press AUTO BAUD and select On.
4	Press SET PARITY and select Odd/Even/None parity. <u>Note:</u> # Stop Bits= 1 is not changeable.
5	Press MORE to select next screen for more selections.
6	Press FLOW CONTRL and select None.
7	Press # RINGS and enter number of rings before answer.
8	Press # DIAL and enter number of dial attempts.

Continued on next page

Connecting to a Facsimile (Fax) Machine, Continued

Step	Action
9	Press ENTER HEADER. Default header string of ATQ0V0X4S7=60S9=10S10=5 will be displayed.
10	Press MORE to select next screen for more selections.
11	Press FAX# and enter FAX telephone number.
12	Press MODEM# and enter Modem telephone number.
13	Press EXIT.

Configuration test

To test that the configuration and cable connection is correct, refer to the configuration test on page 8-28.

Output Connected Device Configuration Test

Introduction

This test creates a simple fault and redirects the occurring fault message to the output connected device. The device may be connected directly to the RS232D, through an external modem, or internal modem. If the device is connected and configured correctly, then the error message will appear at that device.

Displaying the screen

Follow these steps to display the Error Message Output screen.

Step	Action
1	From Main Menu select item 4, Configuration Setup.
2	From this menu select 2, Analyzer Parameters.
3	From this menu select 3, Select Output Error Message. <u>Result:</u> The following screen appears. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <pre> Jun-11-91 11:05:17 ERROR MESSAGE REDIRECTION ERROR MESSAGES OUTPUT DEVICE PRINTER PAPER LOW RS232 BATTERY LOW AC POWER LOSS RELAY#1 SYNCH LOSS RS232 INPUT OVERLOAD DEVICE FAULT MISC. ERRORS SELECT ERROR SELECT RS232 SELECT MODEM SELECT RELAY1 EXIT </pre> </div>

Configuration test

Follow these steps to perform the configuration test.

Step	Action
1	Press SELECT ERROR until MISC. ERRORS is highlighted.
2	Press SELECT RS232 and/or SELECT MODEM depending on the device connected. The screen should appear as shown above.

Continued on next page

Output Connected Device Configuration Test, Continued

**Configuration
test (continued)**

Step	Action
3	Press EXIT to initialize error message procedure.
4	Set the Run/Load lever to the load position. <u>Result:</u> A Printer Head Up error message will appear at the top of the display and will be redirected to the remote device.
5	Verify that the error message is received at the local or remote connected device.

Chapter 9

Printer Operation

Overview

Introduction The Power Platform with a built-in thermal printer produces high resolution graphic or text output of 320 dots per line at one inch per second. Printing is done either automatically or manually. Automatic printing occurs for operator programmed triggering of reports or when error messages are generated. Manual printing is operator controlled with the PRINT key that is located on various screens.

In this chapter The following topics are covered in this chapter.

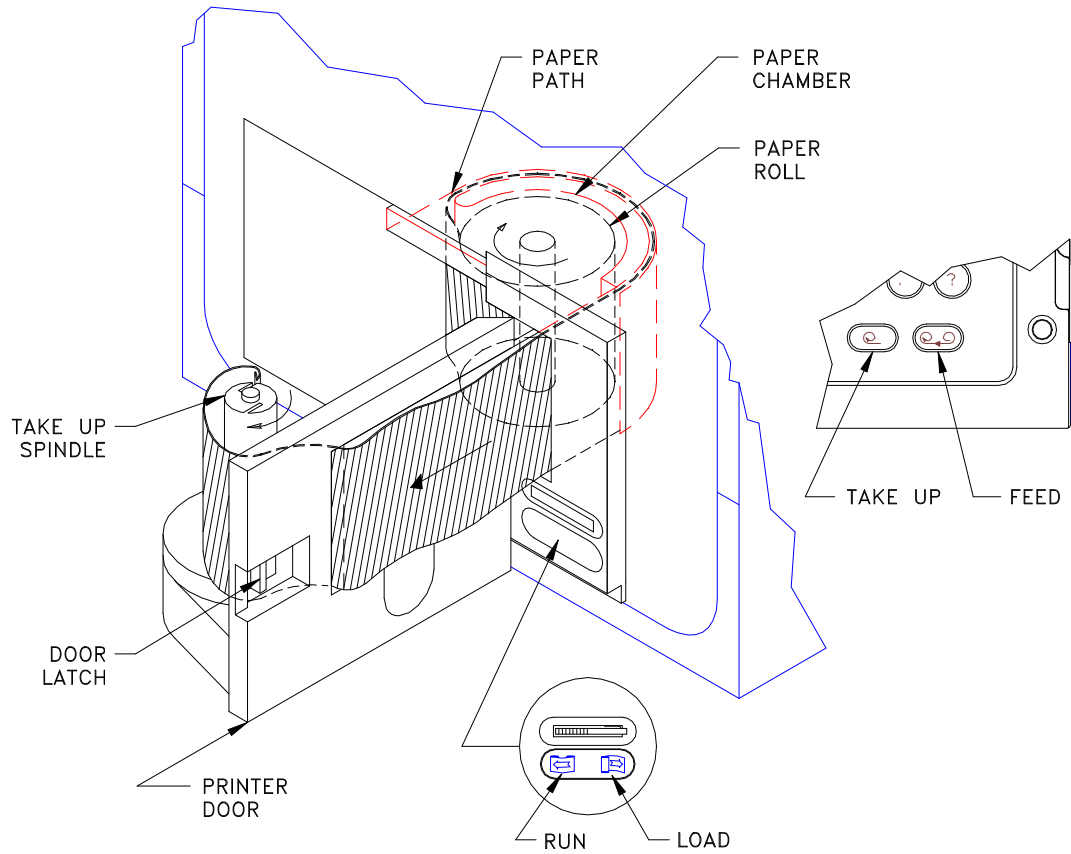
Topic	See Page
Printer Controls	9-2
Normal Operation	9-5
Paper Replacement	9-7

Printer Controls

Introduction

Printer controls are located on the front panel as well as in software. The printer assembly and its front panel controls are shown below.

Printer assembly



8000-13

Continued on next page

Printer Controls, Continued

Front panel controls

The following table provides a description of the front panel printer controls.

Part	Function
Run/Load lever	Used to raise and lower the printhead. <ul style="list-style-type: none">• In normal operation the lever is left in the RUN position.• With the lever in the LOAD position, printing is disabled and the printer paper may be removed or loaded.
Take-up button	Removes slack in the printer paper when pressed. The take-up feature stops under the following conditions: <ul style="list-style-type: none">• when there is some paper resistance, or• within ten seconds if the paper is torn or disconnected from the take-up spindle and the RUN/LOAD lever is in the RUN position.
Feed button	Advances the paper when pressed.

Continued on next page

Printer Controls, Continued

Software controls

The printer software controls are located on the Other Devices Configuration screen.

Displaying the screen: Follow these steps to display the screen.

Step	Action
1	From the Main Menu, select item 4, Configuration Setup.
2	From the Configuration Setup Menu, select item 1, INPUTS/OUTPUTS.
3	From the Configure I/O menu, select item 6, Other Devices. <u>Result:</u> The following screen will appear.

```

Jan-20-94                               13:37:35
      OTHER DEVICES CONFIGURATION
LCD BACKLIGHT AUTO-SHUTOFF: ENABLED
PRINTR ON/OFF: ON
PRINTR BATTERY OPERATION: TIME LIMIT
AUDIBLE ALARM ON/OFF: ON
LCD DISPLAY MODE: NORMAL
      (press 1 to change)
BACK  PRINTR PRINTR  ALARM  PRINT  EXIT
LIGHT ON/OFF BATTERY ON/OFF
    
```

Function keys: The following table provides a description of the printer related functions keys for the Other Devices configuration screen.

Key	Function
PRINTR ON/OFF	Turns printer on or off when pressed.
PRINTR BATTERY	Selects one of three operating modes when pressed: <ul style="list-style-type: none"> • Instant Off turns the printer off immediately after AC power loss • Time Limit turns the printer off 15 minutes after AC power loss • No Limit allows the printer to operate until the battery is completely depleted.

Note: The EXIT key must be pressed for either selection to take effect.

Normal Operation

Introduction To operate the printer normally (not running off the internal battery), the following conditions must be met:

- The printer must be turned on
- The RUN/LOAD lever must be in the RUN position.
- The printer must have paper.

Manual control of the printer from the function keys or the keypad and automatic printing of reports and error messages can now take place.

Manual printing Manual operation of the printer consists of selecting PRINT from the menu bar at the bottom of a screen (such as the Other Devices Configuration screen shown on the previous page) or pressing the correct number on the keypad for a menu screen that has a print selection.

Automatic printing Automatic printing occurs when reports or error messages are generated. Report generation is controlled by the user; error message generation is not. Reports are printed automatically when user defined trigger conditions are met. Refer to Chapter 7 for more information.

Printout storage During printing, the paper is collected on the internal take-up spindle for storage and future review. Stored printouts can be viewed by inserting a finger into the finger groove, so that it is behind the paper tape, and pulling the paper tape straight out from the printer door. When finished viewing the earlier data, press the TAKE-UP pushbutton to remove the slack. If long lengths of paper are outside the Power Platform, be sure to keep paper from being twisted when using the paper take-up feature.

Continued on next page

Normal Operation, Continued

CAUTION Never grasp the printer paper and try to pull it out from the printhead with the RUN/LOAD lever in the RUN position. Damage to the printhead will result.

PRECAUCION Nunca tire del papel de impresora desde el cabezal de impresión con la palanca RUN/LOAD en la posición RUN. Puede ocasionar daños al cabezal de impresión.

MISE EN GARDE Ne jamais tirer le papier de la tête d'impression lorsque le levier RUN/LOAD est en position RUN. La tête d'impression serait endommagée.

VORSICHT Greifen und ziehen Sie nie das Druckpapier vom Druckkopf, wenn der "RUN/LOAD"-Hebel (Laufen/Laden-Hebel) sich in der RUN-Position (Laufen) befindet. Der Druckkopf kann beschädigt werden.

Snapshot printing Snapshot (single print) printing is used in the meter mode, scope mode, harmonic analysis, etc. These individual events are manually printed and are generally collected and cataloged into notebooks, ledgers, etc. Snapshot prints are separated from the print roll by tearing at the right edge of the printer window at the end of each print cycle.

Since snapshots are printed without the take-up motor engaged, the motor will run during each print cycle (approximately five seconds).

Paper Replacement

Paper low condition

The last 40 inches of paper is marked with a red stripe on the top and bottom edges. When the printer is out of paper, or the print head is up, the PP1-8000 will buffer the printouts until it can print again or until it runs out of memory.

CAUTION

To avoid damage to the printhead when loading or removing paper, the RUN/LOAD lever must be in the LOAD position.

PRECAUCION

Para evitar daños al cabezal de impresión cuando cargue o retire papel, la palanca RUN/LOAD debe estar en la posición LOAD.

MISE EN GARDE

Pour éviter d'endommager la tête d'impression lors de la mise en place et du retrait du papier, le levier RUN/LOAD doit être en position LOAD.

VORSICHT

Um während des Ladens oder Entfernens von Papier Beschädigung am Druckkopf zu verhindern, muß der "RUN/LOAD"-Hebel sich in der "LOAD"-Position (Laden) befinden.

Removing paper roll

Follow these steps to remove paper roll.

Step	Action
1	If paper is low, but not out, press the paper FEED pushbutton until only blank paper is showing.
2	Pull the paper out for slack and tear the paper on the right edge of the printer window.
3	Set the RUN/LOAD lever to the LOAD position.
4	Press the printer door latch to the right and open the door until it locks in place.
5	Remove the paper from the take-up spindle by tightly grasping the paper on the spindle, turning it clockwise, and gently pulling the paper up and off the spindle.
6	If there is paper remaining in the paper path, gently pull this paper out of the printer mechanism.
7	Remove the empty paper spool and any remaining paper from the paper chamber.

Paper Replacement, Continued

CAUTION Using thermal paper other than that supplied by Dranetz Technologies, Inc. or its authorized representatives may damage the printhead.

PRECAUCIÓN El uso de papel térmico que no sea el suministrado por Dranetz Technologies o sus representantes autorizados puede causar daños a la impresora.

MISE EN GARDE L'utilisation d'un papier thermosensible différent de celui fourni par Dranetz Technologies ou par ses représentants autorisés peut endommager l'imprimante.

VORSICHT Nur das von Dranetz Technologies oder seinen Vertretungen gelieferte Thermopapier benutzen. Anderes Papier kann den Drucker beschädigen.

Before loading new paper roll Follow these steps before you load a new paper roll.

Step	Action
1	Remove the new paper roll from its box and remove any wrapping.
2	If the end of the paper roll is glued down, cut off and remove any glued portion.
3	Unroll approximately 12 inches of paper.
4	Verify that the RUN/LOAD lever is in the LOAD position.

Loading new paper roll Follow these steps to load a new paper roll.

Step	Action
1	Center the paper roll on the white nub on the bottom of the paper chamber with the loose end coming out clockwise from the back of the roll. See page 9-2 for paper routing.
2	Insert the end of the paper into the paper path slot to the left of the paper roll.
3	Feed the paper through the path until it comes out the front of the printer door.

Continued on next page

Paper Replacement, Continued

Loading new paper roll (continued)

Step	Action
4	Hold the paper against the spindle while rotating the bottom of the spindle at least two turns clockwise.
5	Move the end of the paper across the front of the printer door (from right to left) and guide it through the slot near the take-up spindle.

After loading new paper roll

Follow these steps after loading a new paper roll.

Step	Action
1	Set the RUN/LOAD lever to the RUN position. <u>Note:</u> Printer will not work if this lever is in the LOAD position.
2	Press the paper take-up pushbutton and note that all slack in the printer paper is removed, the paper is taut and the take up motor stops.
3	If the take up motor continues to spin, the paper is not engaged correctly. Repeat step 5 of the previous procedure.
4	Press the paper FEED pushbutton to ensure the paper advances freely across the printer door without slipping or stopping.
5	If the paper does not feed smoothly, remove the paper and repeat “Loading new paper roll” procedure on the previous page.
6	Close the printer door.

Ordering thermal paper

Contact Dranetz-BMI or your authorized Dranetz-BMI representative to order thermal paper (P/N 115323-G1) for the Power Platform thermal printer.

Chapter 10

System Test

Overview

General

System test consists of the normal operation Power Turn-on Diagnostic Test and the operator selected System Self-Test. Both tests are similar; however, the self-test is more thorough in its testing of memory. The self-test selection also provides an immediate update of the analyzer status display to quickly inform the operator of the system internal operational condition.

Power Turn-on Diagnostics

Description

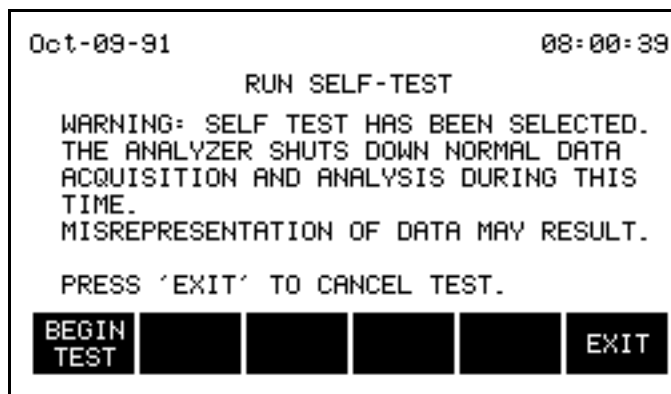
Immediately upon power turn-on, the Dranetz-BMI copyright notice is displayed and the first test routine, Program RAM, is started.

Once this first test is completed, the result (either PASSED or FAILED) is displayed. The remaining five tests are run and the results displayed. All six test routines run for approximately 10 seconds and check the Program RAM, System RAM, LCD RAM, Dual Port RAM, ACP, and I/O.

After the power turn-on diagnostics are complete, the TASKCard operating system will be loaded. If there are no errors loading the TASKCard, the scope mode is displayed and normal operation of the Power Platform-8000 is resumed.

Self-Test

Description Self-Test is operator initiated by selecting item 5, Analyzer Status, from the MAIN MENU, then item 2, Self-Test, from the Analyzer Status Menu. The following Run Self-Test Screen is displayed.



Once testing is begun, the test program cannot be stopped. Since the test program takes precedence over all operating functions, ensure that no critical parameter measurement is being performed during this time, or that no billing reports are being generated.

CAUTION **Monitoring will be turned off for the duration of the test.**

PRECAUCIÓN **El monitoreo quedará apagado mientras dure la prueba.**

MISE EN GARDE **La surveillance sera mise à l'arrêt pour toute la durée du test.**

VORSICHT **Die Überwachung ist während des Tests ausgeschaltet.**

Begin Test Press the [Begin Test] function key to begin the test procedure. This will execute the self-test program to check the functionality of the various processors. The test takes approximately 40-50 seconds to run.

Cancel Test Cancelling the test must be done before the test is begun. Press the [EXIT] function key to return to the previous menu without execution of the test. Pressing [EXIT] once testing begins has no effect.

Appendix A

Optional Accessories

In this appendix The following topics are covered in this appendix.

Topic	See Page
Optional Accessories List	A-2
Optional Accessories Descriptions	A-4

Optional Accessories List

Accessory	Part Number
Power Quality Plus, TASKCard (English)	TASK-PQPlus-E
Power Quality Plus, TASKCard (Spanish)	TASK-PQPlus-S
Power Quality Plus, TASKCard (French)	TASK-PQPlus-F
8000, TASKCard	TASK-8000
Inrush, TASKCard	TASK-Inrush
Communications and Analysis Software	PCPP1
Field Handbook for Electrical Energy Management	HB114415
Service Manual	SM-PP1
Clamp-on Current Probe, 1 to 10 A	CT-10
Clamp-on Current Probe, 15 to 150 A	CT-150
Clamp-on Current Probe, 30 to 300 A	CT-300
Clamp-on Current Probe, 100 to 1000 A	CT-1000
Clamp-on Current Probe, 300 to 3000 A	CT-3000
Isolated Current Transformer Box, 1A	ISO-1A
Isolated Current Transformer Box, 5A	ISO-5
Memory Card Reader, Serial Port	
Memory Card Reader, Serial Port, 230 V	
Memory Card Reader, Parallel Port	
Memory Card Reader, Parallel Port, 230 V	
Memory Card Reader, Data Bus Plug-in	
Memory Card, 512k	CARD-512
Memory Card, 1M	CARD-1M
Memory Card, 2M	CARD-2M
Box of Thermal Paper (16 rolls)	CTP-16
External DC Battery Filter	XBF-12
External Battery Charger	

Continued on next page

Optional Accessories List, Continued

List (continued)

Accessory	Part Number
External Modem Interface Cable	XMC-8
RS-232 Cables, 25-pin M to 25-pin F, and a 25-pin M to 9-pin F adapter cable.	RSCOM
Soft Carrying Case (with probe pallet)	SCC-8
Reusable Shipping Case	RSC-8
Battery Pack, Field Replaceable	FBP-8
Internal Modem, 2400 Baud (not available on PP1E)	MDM24
Adapter Cable, 808 Probe to PP1 (see page A-6) (not available with PP1E)	115551-G1
Adapter Cable, 658 Probe to PP1 (see page A-6)	115552-G1

Optional Accessories Descriptions

Current probes and isolation current transformers

Current Probes: There are five clamp-on current probes, models CT 10, CT150, CT300, CT1000, and CT3000 used to measure ACrms currents up to a maximum of 10A, 150A, 300A, 1000A, and 3000A, respectively.

Isolation Current Transformers: Two isolation current transformers (ISO boxes), models ISO-1A (2Arms max) and ISO-5 (10Arms max) provide low level isolation nominal currents of 1Arms and 5Arms, respectively, for connection to low current devices or for connection to current probes of other manufacturers.

Either the clamp-on current probes or the isolation transformers can be connected to any one of the four current jacks on the Power Platform rear panel. A decal sheet is provided to allow color coding of the probes and transformers that correspond to the rear panel jacks.

Internal 2400 baud modem

The MDM24 option consists of a Hayes compatible 2400 Baud modem installed on the I/O controller board and a 25 foot modular plug/cable assembly for connection to telephone lines. Normally installed at factory when unit is originally purchased.

TASKCard-8000

The 8000 TASKCard changes the Power Platform to a power quantity monitor so that it measures, records, and displays electric power parameters to help you find inefficiencies in your electric system.

RSCOM cables

The RSCOM cables consist of two RS232 cables, one 10' long, the other 1' long. The ten foot cable has a 25-pin male connector and a 25-pin female connector. The one foot adapter cable has a 25-pin female connector and a 9-pin male connector for serial data connections. The cables permit the PP1-8000 to communicate with a terminal, computer, external printer, or external modem.

Memory cards

Several types of memory cards are available, from 512 kilobytes to 2 megabytes. A memory card is read by your PC with a memory card reader, also available as an option.

Continued on next page

Optional Accessories Descriptions, Continued

Memory card readers Three types of memory card readers are available as options. Each reader provides a different means of communications with an IBM compatible computer. The three types are: RS232 port, parallel port, and data bus plug-in.

External battery charger The optional external battery charger provides an alternate means for charging the FBP-8 battery pack or additional battery packs.

PCPP1 This is a Windows based program that is used to access and retrieve data from single or multiple remote Dranetz-BMI Power Platforms. Other features include totalization of demand and energy data from multiple units, manipulation of time plot data, and the ability to read data from a memory card if your PC is equipped with a memory card reader.

Handbook for Energy Management This optional reference handbook provides a comprehensive guide for information related to conducting a thorough energy audit, power distribution analysis, and methods of remedying inefficiencies of energy management.

Adapter cables Two types of adapter cables are available to permit connecting current probes of Dranetz-BMI models 808 and 658 to the PP1 current input jacks. These adapter cables are shown on the following page. Supplied with these cables is an information sheet (P/N 899009) that describes the cables and the scale factors of the respective current probes used with the cables.

Ordering information To order accessories, contact Dranetz-BMI Customer Service.

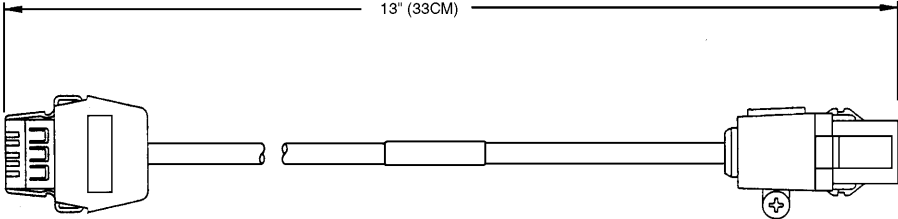
Telephone: 1-800-372-6832 or 732-287-3680

Fax: 732-248-1834

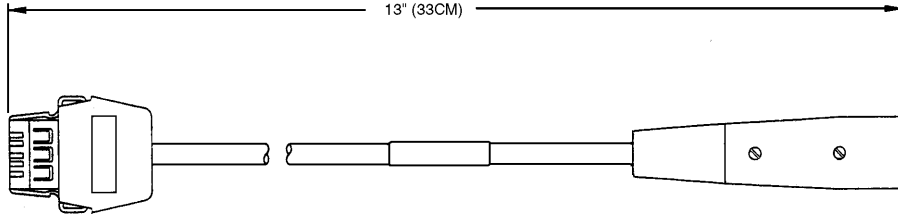
Web site: www.dranetz-bmi.com

Optional Accessories Descriptions, Continued

**Adapter cable,
808 to PP1,
P/N 115551-G1
(not available
on PP1E)**



**Adapter cable,
658 to PP1,
P/N 115552-G1**



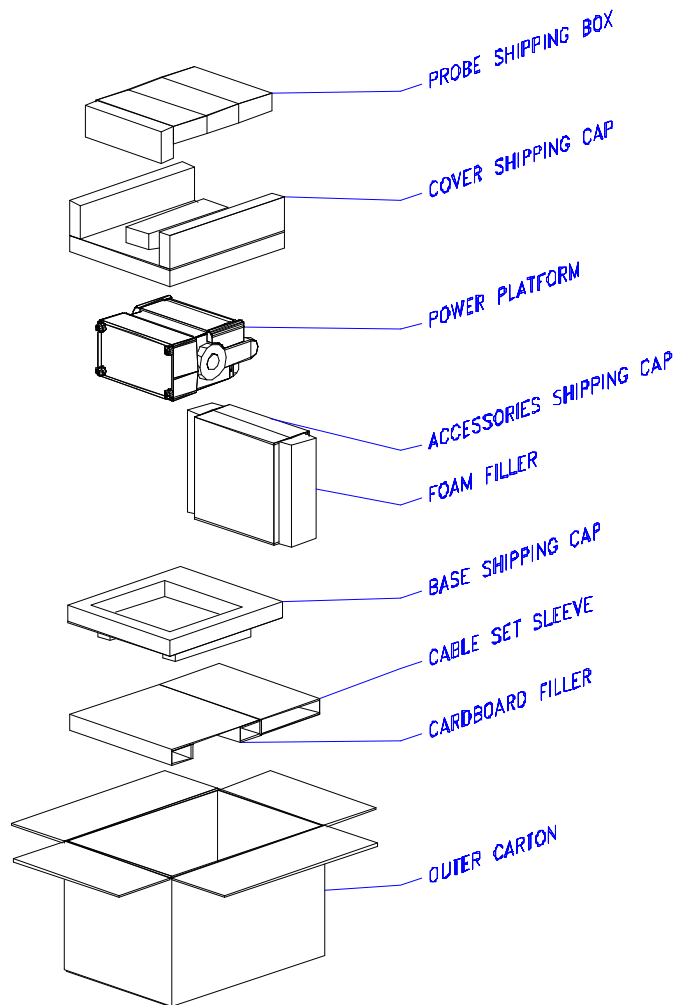
Appendix B

Repacking for Return Shipment

Introduction If the unit must be returned to Dranetz-BMI for service or repair, repack the unit in its original shipping carton as shown below. Do not return the Power Platform in an unpacked box. Dranetz-BMI will not be responsible for damage incurred during transit due to inadequate packing on your part.

Return notice Notify Dranetz-BMI Customer Service of your intention to return the unit. Do not return the unit without prior instructions from Dranetz-BMI Customer Service Department, telephone 732-287-3680 or 1-800-372-6832.

Original shipping carton



8600-31

Appendix C

Battery Specifications and Replacement Procedure

Overview

Introduction The internal battery pack used in the Power Platform functions as the uninterruptible power supply (UPS) in the event of AC power loss. It can also function as the primary power source when no AC power source is available.

The Power Platform also contains a lithium battery for memory backup.

In this appendix The following topics are covered in this appendix.

Topic	See Page
Battery Specifications	C-2
Battery Pack Safety Precautions	C-3
Battery Pack Replacement	C-5
Memory Card Battery Replacement	C-6

Battery Specifications

Battery Pack

Location: battery compartment on the top front of the unit

Number of cells: 10

Type: sealed, rechargeable NiCad cells

Voltage: 12 V DC

Capacity: 2.5 Ah

Length of operation: One hour of monitoring only operation when fully charged, or up to 15 minutes of continuous printer operation.

Suggested replacement interval: two years.

Note

The length of time that the Power Platform can operate on the battery pack degrades over the life of the batteries and the number of charge/discharge cycles.

Lithium Battery Power Module

A Lithium Battery Power Module is mounted on the CPU board and is used for memory backup of the PP1-8000 configurations and setups.

3 V, 1000 mAh Lithium battery for data retention with an estimated life of 2 years (operational), 1 1/2 years (storage). Replacement recommended during each Dranetz-BMI calibration procedure.

The Lithium battery is not operator replaceable. Refer to the Power Platform service manual, SM-PP1, for replacement procedures by qualified service personnel.

Battery Pack Safety Precautions

WARNING **DO NOT intentionally short circuit the battery pack. The batteries are capable of producing hazardous output currents if short circuited. The Power Platform is equipped with an internal battery charger circuit. Do not attempt to charge the batteries with an external charger other than the Dranetz-BMI battery charger, since improper charging could cause battery explosion.**

ADVERTENCIA **NO ponga intencionalmente la batería en cortocircuito. Las baterías son capaces de proporcionar corrientes de salida peligrosas si están en cortocircuito. La Power Platform está equipada con un circuito interno cargador de baterías. No intente cargar las baterías con un cargador externo que no sea el cargador de baterías Dranetz-BMI, puesto que la carga indebida podría hacer que explote la batería.**

AVERTISSEMENT **NE PAS court-circuiter délibérément le bloc-batterie. Lors d'un court-circuit, les batteries risquent d'émettre des courants effectifs dangereux. "Power Platform" possède un circuit de chargeur de batterie intégré. Ne pas tenter de charger les batteries au moyen d'un chargeur externe autre que le chargeur de batterie Dranetz-BMI, car un rechargement fautif pourrait entraîner l'explosion de la batterie.**

WARNUNG **Die Batterien dürfen NICHT kurzgeschlossen werden. Im Falle eines Kurzschlusses können die Batterien lebensgefährliche Ausgangsströme leiten. Power Platform ist mit einem internen Batterieladegerät ausgestattet. Die Batterien sollten nur mit dem Ladegerät von Dranetz-BMI geladen werden. Die Verwendung eines externen Ladegeräts kann zu einer Explosion der Batterien führen.**

Battery Safety Precautions The following safety precautions must be adhered to.

- Keep batteries away from children. Never permit a child to play with a battery as an ornament or toy.
- Do not disassemble battery or battery pack.
- Do not dispose of battery in fire.
- Dispose of a used battery promptly in accordance with local Environmental Protection Agency (EPA) regulations.

Continued on next page

Battery Pack Safety Precautions, Continued

Battery Safety Precautions (continued)

- Visually inspect the battery pack for corrosion.
-

Medidas de seguridad de la batería

Deberán observarse las medidas de seguridad siguientes:

- No deberá mantenerse las baterías al alcance de los niños. No deberá permitirse que un niño juegue con una batería.
 - No deberá desensamblarse ninguna batería ni el compartimiento de la misma.
 - No deberá prenderse fuego a una batería.
 - Toda batería agotada deberá desecharse de manera rápida según las normas locales de la Agencia de protección del medio ambiente (EPA).
 - Deberá verificarse que el compartimiento de las baterías no esté corroído.
-

Mesures de sécurité relatives aux batteries

Il est très important de suivre les mesures de sécurité suivantes.

- Ne pas laisser les batteries à la portée des enfants. Ne jamais laisser un enfant jouer avec une batterie.
 - Ne pas démonter de batterie ou de bloc-batterie.
 - Ne pas jeter de batterie dans le feu.
 - Se débarrasser rapidement des batteries usagées en se conformant aux règlements de l'EPA (Agence américaine pour la protection de l'environnement).
 - Inspecter le bloc-batterie à l'oeil nu pour rechercher les signes de corrosion.
-

Batterie-Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen müssen beachtet werden.

- Halten Sie Batterien von Kindern fern. Erlauben Sie einem Kind unter keinen Umständen, eine Batterie als Verzierung oder Spielzeug zu benutzen.
 - Nehmen Sie Batterien oder Batteriepackungen nicht auseinander.
 - Entsorgen Sie Batterien nicht durch Verbrennen.
 - Entsorgen Sie verbrauchte Batterien umgehend nach den gesetzlichen Umweltschutzbestimmungen.
 - Prüfen Sie die Batteriepackung optisch auf Korrosion.
-

Note

The batteries have a safety pressure vent to prevent excessive gas build-up and corrosion indicates that venting has occurred. Possible causes of venting are: a defective charger, excessive temperature, excessive discharge rate, or a defective cell.

If corrosion is excessive, the battery pack may require replacement (contact Dranetz-BMI Customer Service Department).

Battery Pack Replacement

Introduction The Power Platform contains an easily replaceable internal battery pack. Replacement is recommended when the battery pack can no longer maintain a charge. Depleted battery packs may be charged outside the PP1 by using the optional battery charger. See Appendix A for battery pack ordering information.

Note During normal operation, the battery pack will be slightly warm to the touch.

Procedure Follow these steps to replace the battery pack.

Step	Action
1	Set the Power Platform's power switch to OFF.
2	On the top front section of the Power Platform, release the two slide fasteners holding the cover in place by pressing them inward.
3	Remove the cover.
4	Gently lift the battery pack from the battery compartment and disconnect the battery pack connector from the unit's mating connector.
5	Remove battery pack.
6	Connect the replacement battery pack connector to the unit's mating connector and place the new pack into the compartment.
7	Replace the cover and press down until it latches closed.
8	Discard the old battery pack in accordance with Environmental Protection Agency (EPA) regulations.
9	Set the Power Platform's power switch to ON.
10	Allow 8 hours to ensure a full charge. The Power Platform can be operated normally, using AC power, during this time.

Memory Card Battery Replacement

Introduction Replacement of the 3-volt lithium battery in the memory card is performed when the battery message in the Memory Card Function screen states the battery is depleted. Replacement is simple and requires no special tools. Two physically different types of batteries are used due to different manufacturers of the memory card. The correct replacement type must be used.

WARNING The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, or dispose of in fire. Replace battery with Panasonic BR2325 or CR2025 only. Use of another type battery may present a risk of fire or explosion.

ADVERTENCIA La batería empleada en este dispositivo puede presentar un peligro de incendio o quemadura química si se manipula indebidamente. No recargue, desarme ni deseche en el fuego. Cambie la batería por una Panasonic BR2325 o CR2025 solamente. El uso de cualquier otro tipo de batería puede presentar un peligro de incendio o explosión.

AVERTISSEMENT La batterie utilisée dans cette unité peut présenter des risques d'incendie ou de brûlures chimiques par suite d'une utilisation abusive. Ne pas recharger, démonter, ni jeter au feu. Remplacer uniquement la batterie par une batterie Panasonic BR2325 ou CR2025. L'utilisation d'un tout autre modèle de batterie peut entraîner des risques d'incendie ou d'explosion.

WARNUNG Die in diesem Gerät verwendete Batterie kann im Falle einer unsachgemäßen Behandlung zu Bränden oder chemischen Verätzungen führen. Sie sollte nicht wiederaufgeladen, auseinandergenommen oder verbrannt werden. Ersetzen Sie die Batterie nur mit Batterien vom Typ Panasonic BR2325 oder CR2025. Die Verwendung eines anderen Batterietyps kann Brände oder Explosionen hervorrufen.

Continued on next page

Memory Card Battery Replacement, Continued

Battery check To check the condition of the memory card battery, perform the following steps.

Step	Action
1	Insert questionable memory card in memory card slot on Power Platform and press card in firmly.
2	From Main Menu select 5, Analyzer Status.
3	From Analyzer Status Menu select 5, Memory Card Functions.
4	Read “Memory Card Battery =”. If OK, do not replace the battery. If not OK, proceed to replacement procedure.
5	If message says OK, but the memory card is faulty, try a different memory card for operation. If the replacement memory card operates OK, the original memory card is faulty and should be replaced.

Battery types There are two types of physically different memory card batteries. Both batteries are 3-Volt, lithium, wafer type.

Part Number	Diameter	Thickness
Panasonic CR2025	0.79” (20mm)	0.1” (2.5mm)
Panasonic BR2325	0.9” (23mm)	0.1” (2.5mm)

Battery Safety Precautions The following safety precautions must be adhered to.

- Keep batteries away from children. Never permit a child to play with a battery as an ornament or toy.
- Do not disassemble battery or battery pack.
- Do not dispose of battery in fire.
- Dispose of a used battery promptly in accordance with local Environmental Protection Agency (EPA) regulations.

Continued on next page

Memory Card Battery Replacement, Continued

Medidas de seguridad de la batería

Deberán observarse las medidas de seguridad siguientes:

- No deberá mantenerse las baterías al alcance de los niños. No deberá permitirse que un niño juegue con una batería.
 - No deberá desensamblarse ninguna batería ni el compartimiento de la misma.
 - No deberá prenderse fuego a una batería.
 - Toda batería agotada deberá desecharse de manera rápida según las normas locales de la Agencia de protección del medio ambiente (EPA).
-

Mesures de sécurité relatives aux batteries

Il est très important de suivre les mesures de sécurité suivantes.

- Ne pas laisser les batteries à la portée des enfants. Ne jamais laisser un enfant jouer avec une batterie.
 - Ne pas démonter de batterie ou de bloc-batterie.
 - Ne pas jeter de batterie dans le feu.
 - Se débarrasser rapidement des batteries usagées en se conformant aux règlements de l'EPA (Agence américaine pour la protection de l'environnement).
-

Batterie-Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen müssen beachtet werden.

- Halten Sie Batterien von Kindern fern. Erlauben Sie einem Kind unter keinen Umständen, eine Batterie als Verzierung oder Spielzeug zu benutzen.
 - Nehmen Sie Batterien oder Batteriepackungen nicht auseinander.
 - Entsorgen Sie Batterien nicht durch Verbrennen.
 - Entsorgen Sie verbrauchte Batterien umgehend nach den gesetzlichen Umweltschutzbestimmungen.
-

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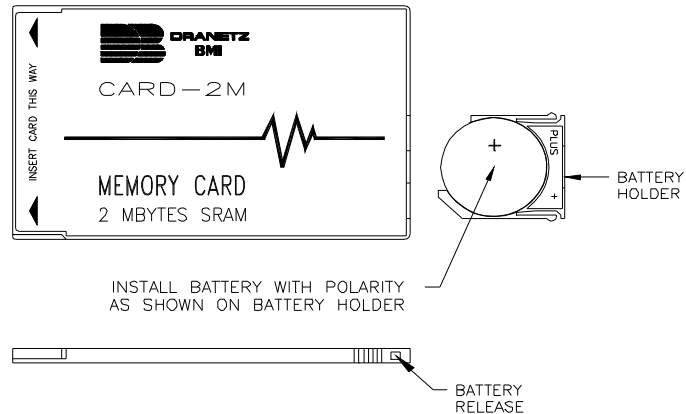
Memory Card Battery Replacement, Continued

Replacement procedure

To remove and replace a memory card battery, proceed with the following steps.

Step	Action
1	Remove memory card from Power Platform.
2	Refer to figure below. Gently press in battery release with pencil point and remove battery holder
3	Remove battery from holder and identify the type battery used. If type is not identified on body of battery refer to preceding page for battery dimensions.
4	Insert the exact type replacement battery in holder with plus (+) terminal facing up.
5	Insert battery holder into memory card and press in until locked in position.
6	Dispose of battery promptly. See safety precautions above.

Battery replacement diagram (typical)



Appendix D

Fuse Replacement

Overview

Introduction Operator replaceable fuses consist of the main power fuses and the battery fuse. One of each type replacement fuse is located in the battery compartment and all fuses are accessible from the rear panel. Both types of replacement are covered in this appendix.

WARNING For continued protection against risk of fire or shock replace only with the same type and rating of fuse.

ADVERTENCIA Para la protección continua contra el peligro de incendio o descarga, cambie sólo por fusibles del mismo tipo y capacidad nominal.

AVERTISSEMENT Pour assurer une protection continue contre les risques d'incendie ou de choc, ne remplacez que par un fusible du même type et de la même valeur nominale.

WARNUNG Zum anhaltenden Schutz gegen Brand oder einen elektrischen Schlag nur gegen eine Sicherung desselben Typs und mit demselben Nennwert austauschen.

In this appendix The following topics are covered in this appendix.

Topic	See Page
Main Power Fuses	D-2
Battery Fuse	D-5

Main Power Fuses

Main Power Fuses

Follow these steps to remove and replace the two main power fuses. Refer to the diagram on the following page.

Step	Action
1	Set the Power Platform's power switch to OFF.
2	Turn off all power to monitoring circuits. Disconnect all Power Platform monitoring cables from power sources.
3	Disconnect the power cord plug from its wall or power receptacle, then remove the power cord from the AC power input module on the rear panel.
4	Place a small screwdriver blade into the notch next to the release arm of the fuse drawer.
5	Push the release to the right and pivot the screwdriver to the left to release the fuse drawer.
6	Remove the fuse drawer by pulling it straight out of the housing.
7	Replace blown fuse(s) with the exact replacement of slow-blow (time-delayed) fuse(s). See Main Power Fuse table.
8	Insert fuse drawer and press in until it snaps into position.
9	Reconnect power cord to the AC power input module, then reconnect power cord plug to its wall or power receptacle.
10	Before powering the unit on, refer to Chapter 4, Section A for operating precautions.
11	Set the Power Platform's power switch to ON.
12	Verify that the unit is operational.

WARNING

Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.

ADVERTENCIA

No reemplace el fusible nuevamente si se repite la falla. La repetición de las fallas indica una condición defectuosa que no se subsanará con el cambio del fusible. Acuda a un técnico calificado para evaluar la condición.

Continued on next page

Main Power Fuses, Continued

**AVERTISSE-
MENT**

Ne remplacez pas le fusible une nouvelle fois si la défaillance se répète. Une défaillance répétée indique une condition défectueuse qui ne disparaîtra pas avec le remplacement du fusible. Consultez un technicien qualifié.

WARNUNG

Die Sicherung nicht erneut austauschen, wenn der Fehler noch einmal auftritt. Ein wiederholtes Auftreten des Fehlers weist auf einen Defekt hin, der sich nicht durch Austauschen der Sicherung beheben läßt. Den Defekt einem qualifizierten Techniker mitteilen.

**Main Power
Fuse table**

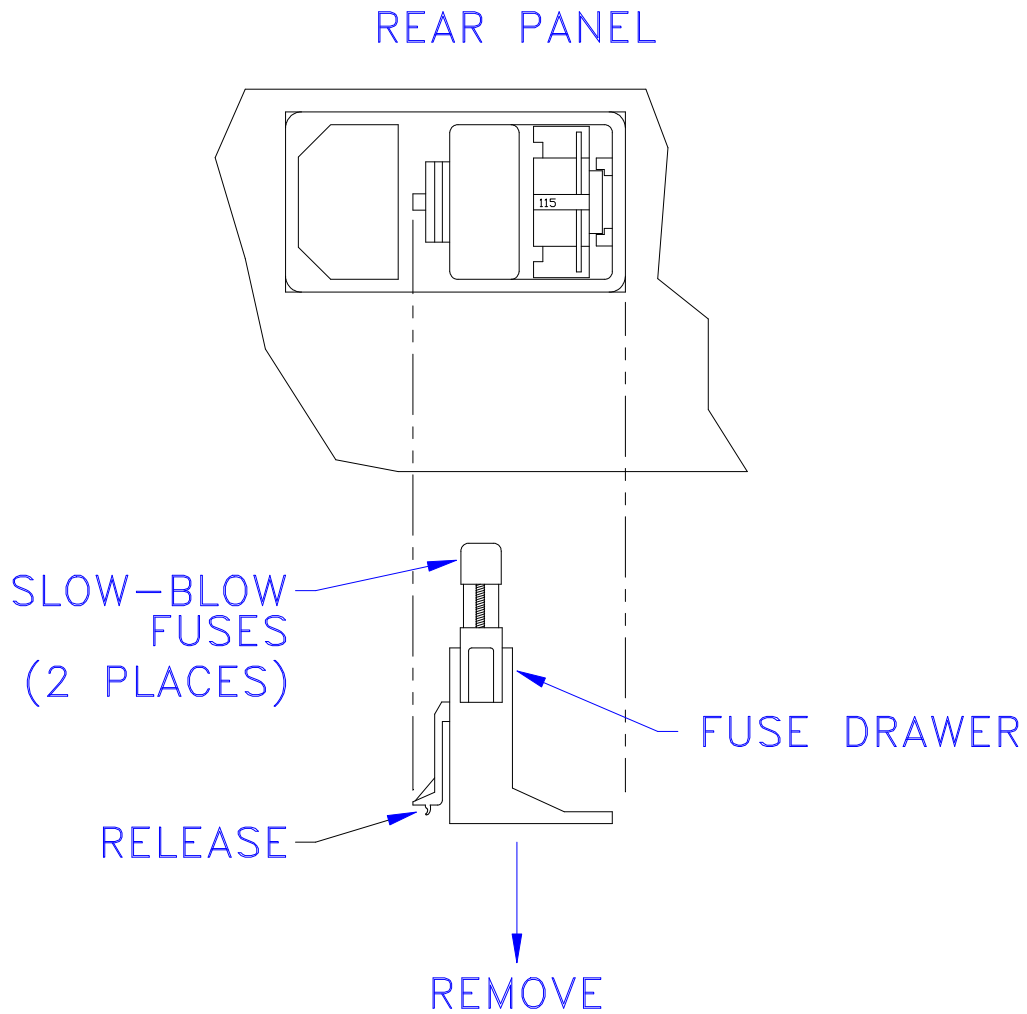
Use this table to determine the type of fuse required.

	Main Power Fuse	Dranetz-BMI P/N
Model PP1	Slow blow, 250V, T2A, 3AG, glass tube 1/4 x 1 1/4	113204-G2
Model PP1E	Slow blow, 250V, T1.25A glass tube 5 x 20 mm (standard IEC127, type T, sheet III)	900387

Continued on next page

Main Power Fuses, Continued

Diagram



Battery Fuse

Introduction

The battery fuse is used for fusing the internal battery pack, as well as an external DC source that is connected to the DC power source jack on the rear of the unit.

Procedure

Follow these steps to replace the battery fuse.

Step	Action
1	Set the Power Platform's power switch to OFF.
2	Turn off all power to monitoring circuits. Disconnect all Power Platform monitoring cables from power sources.
3	If external DC source is being used, disconnect it or turn it off. If using an external DC battery, disconnect the negative terminal and then the positive terminal.
4	Disconnect external DC power source plug from external DC power source input jack on the rear panel of the Power Platform.
5	Insert the blade of a small screwdriver into the slot on the fuse cap and rotate a quarter turn counter clockwise.
6	Test fuse for continuity with an ohmmeter and replace fuse if blown. Replace blown fuse with the exact replacement of slow-blow (time delayed) fuse. See Battery Fuse table.
7	Reinsert the fuse cap and tighten securely.
8	Reconnect external DC source (if external DC source is being used).
9	Before powering the unit on, refer to Chapter 4, Section A for correct operating precautions.
10	Set the Power Platform's power switch to ON.

WARNING

Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.

ADVERTENCIA

No reemplace el fusible nuevamente si se repite la falla. La repetición de las fallas indica una condición defectuosa que no se subsanará con el cambio del fusible. Acuda a un técnico calificado para evaluar la condición.

Continued on next page

Battery Fuse, Continued

**AVERTISSE-
MENT**

Ne remplacez pas le fusible une nouvelle fois si la défaillance se répète. Une défaillance répétée indique une condition défectueuse qui ne disparaîtra pas avec le remplacement du fusible. Consultez un technicien qualifié.

WARNUNG

Die Sicherung nicht erneut austauschen, wenn der Fehler noch einmal auftritt. Ein wiederholtes Auftreten des Fehlers weist auf einen Defekt hin, der sich nicht durch Austauschen der Sicherung beheben läßt. Den Defekt einem qualifizierten Techniker mitteilen.

**Battery Fuse
table**

Use this table to determine the type of fuse required.

	Main Power Fuse	Dranetz-BMI P/N
Model PP1	Slow blow, 250V, T10A, 3AB, ceramic tube 1/4 x 1 1/4	113204-G3
Model PP1E	Slow blow, 250V, T6.3A glass tube 5 x 20 mm. (standard IEC127, type T, sheet III)	900396

Appendix E

Operator Replaceable Parts List

Introduction The following parts are listed for those items readily replaceable by the operator and not requiring special tools or access to the interior of the unit.

To order parts Call Dranetz-BMI Customer Service to order any of the following parts, telephone 1-800-372-6832 or 732-287-3680.

Parts List

Part Description	Part Number
Rubber Foot (Rear Panel)	115284-G1
Screw for above, 6-32 x 5/8" Long	113200-G15
Keylock keys (2)	115282-G1
Label, RUN/LOAD	115117-G1
Fuse, Slow blow, 250V, T2A, 3AG, glass tube 1/4 x 1 1/4 (AC power input) for PP1	113204-G2
Fuse, Slow blow, 250V, T1.25A glass tube 5 x 20 mm (standard IEC127, type T, sheet III) (AC power input) for PP1E	900387
Fuse, Slow blow, 250V, T10A, 3AB, ceramic tube 1/4 x 1 1/4 (Internal/External Battery) for PP1	113204-G3
Fuse, Slow blow, 250V, T6.3A glass tube 5 x 20 mm (standard IEC127, type T, sheet III) (Internal/External Battery) for PP1E	900396
Battery Pack	FBP-8
Battery Cover, without latches	115110-G1
Latch for Battery Cover (2 req'd)	115341-G1
Rubber Foot (Display Assembly)	113304-G1
Measurement Cable Set, complete (See next page for separate parts.)	115815-G1

Continued on next page

Parts List, Continued

Measurement Cable Set, Parts List

Part Description	Part Number		
	Domestic	Euro	UK
Measurement Cable Set	115815-G1	115815-G2	115815-G3
Cable Pallet	115816-G1	115816-G1	115816-G1
Interconnecting Cable Assy, Blue, 12 in. (30.5 cm)	114013-G1	114013-G1	114013-G1
Interconnecting Cable Assy, Red, 96 in. (243.8 cm)	114013-G2	114013-G2	114013-G2
Interconnecting Cable Assy, Black, 96 in. (243.8 cm)	114013-G3	114013-G3	114013-G3
Interconnecting Cable Assy, Blue, 96 in. (243.8 cm)	114013-G4	114013-G4	114013-G4
Interconnecting Cable Assy, Yellow, 96 in. (243.8 cm)	114013-G5	114013-G5	114013-G5
Safety Ground Cable Assy	114014-G5	114014-G5	114014-G5
Safety Clip Set Assy (Consists of 1 red and 1 black safety clip with attached caution label)	114890-G1	114890-G1	114890-G1
Power Cord, shielded, 115 VAC (Domestic)	110893-G1		
Power Cord, Shielded, 230 VAC (Euro)		115369-G1	
Power Cord, Shielded, 230 VAC (UK)			115368-G2

Appendix F

Error Messages

General

Error messages are automatically generated to inform you of problems that have occurred in the Power Platform-8000 that will interfere with normal operation. These problems can range from simple faults that require operator attention - but not that serious to cause operation of the Power Platform-8000 to cease - to catastrophic failure requiring repair to the unit beyond the operator's capability to correct.

Error Message Types

Error messages can occur at anytime; in normal operation or during testing. When an error message is displayed it is automatically saved to event memory for recall at a later time. Error messages are grouped into two categories: Normal error Annunciator and EM-1 (Error Message Type 1), with the first being of least importance.

In general, a more important message will take precedence over a less important one, with the exception of interactive screens which must wait for you to complete an operation.

Annunciator Error Messages

All annunciator error messages are displayed on the screen on the top line, between the time and date, and are a maximum of 21 characters long. Important error messages are displayed in reverse video to distinguish them from the normal type of error messages.

When more than one annunciator message is active, a priority cycling of two-second displays is used. The priority cycling is as follows:

1. All new annunciator messages are displayed immediately, accompanied by a short beep, then normal message cycling is resumed.
 2. When there are important annunciator messages, only these will be cycled until they are cleared.
 3. When there is only one important annunciator message displayed, no normal annunciator messages will cycle until the displayed message is cleared.
 4. There are no annunciator updates during HELP screens, but the EM-1 error message will operate normally.
 5. EM-1 messages will always take precedence over any type of annunciator display.
-

Continued on next page

Error Messages, Continued

Annunciator Error Messages (continued)

Annunciator error messages will remain on the screen for as long as the error exists. Message cycling of annunciator error messages only will occur if more than one of this type is to be displayed. Only EM-1 messages, or a message being displayed for the first time, will interrupt this display.

Annunciator normal error messages may be set or cleared in a variety of ways depending on the specific message.

EM-1 Error Message

The EM-1 error message is informative, and is mostly used to warn of user mistakes or to inform you of potential system problems. It is displayed full screen.

Error Message Listings

Each of the error message types; normal error annunciator and EM-1 error messages are listed in respective tables below.

Annunciator Normal Error Messages

Error Message

PRINTER HEAD OVERHEAT

PRINTER HEAD UP

PRINTER PAPER OUT

INTERNAL BAT GOOD

INTERNAL BAT CHARGE

INTERNAL BAT LOW

INTERNAL BAT BAD

EXTERNAL BAT GOOD

EXTERNAL BAT BAD

SYNC LOST CH A

SYNC LOST CH B

SYNC LOST CH C

SYNC LOST CH D

SYNC AQUIRED-CH A

SYNC AQUIRED-CH B

SYNC AQUIRED-CH C

SYNC AQUIRED-CH D

PROBE CH A-CONNECT

PROBE CH B-CONNECT

PROBE CH C-CONNECT

PROBE CH D-CONNECT

PROBE CH A-DISCONNECT

PROBE CH B-DISCONNECT

PROBE CH C-DISCONNECT

PROBE CH D-DISCONNECT

Continued on next page

Error Message Listings, Continued

Annunciator Normal Error Messages (continued)

Error Message

VOLTS OVERLOAD CH-A
 VOLTS OVERLOAD CH-B
 VOLTS OVERLOAD CH-C
 VOLTS OVERLOAD CH-D

AMPS OVERLOAD CH-A
 AMPS OVERLOAD CH-B
 AMPS OVERLOAD CH-C
 AMPS OVERLOAD CH-D

VOLTS OVERRANGE CH A
 VOLTS OVERRANGE CH B
 VOLTS OVERRANGE CH C
 VOLTS OVERRANGE CH D

AMPS OVERRANGE CH A
 AMPS OVERRANGE CH B
 AMPS OVERRANGE CH C
 AMPS OVERRANGE CH D

ACP SELF RESET (Reverse Video)
 AC POWER RESTORED (Reverse Video)

EM-1 Error Messages

Error Message	
PRINTER POWER FAILURE	"All print operations are currently suspended, please call Dranetz-BMI for service."
AC POWER LOST	"The unit has now switched to battery operation."
ACP SELF RESET	"The ACP processor has reset. If this occurs regularly, please call Dranetz-BMI for service."

Appendix G

Default Settings

General

When the Power Platform-8000 is shipped from Dranetz-BMI, the programmable configurations are set to certain default values. These values are displayed in Tables E-1 through E-4. At the time of shipment, there are no active monitoring setups (the status of each of the pre-defined monitoring setups is set to "INACTIVE").

The configuration settings (with the exception of time and date) can be returned to their default state at any time by selecting the [RESET CONFIG] option from the *Clear Memory Screen* (QAC 5,3).

The Quick Access Code (QAC) indicates the keys that have to be selected to reach the screen where that function is programmed from the MAIN MENU.

NOTE

The [RESET CONFIG] option does not change the status of any of the monitoring setups.

I/O Configuration Default Settings

QAC	Screen	Configuration	Setting
4,1,1	Analog Inputs	Present Configuration	THREE PHASE, FOUR WIRE
		Voltage Scale Factor (All Channels)	1.0
		Current Scale Factor (All Channels)	1.0
		Channel D	LOW Range
4,1,1	Analog Inputs	Voltage Value (All Channels)	XX.X (User Selectable)
	NO VOLTAGE Mode	Current Scale Factor (All Channels)	1.0
		Power Factor	1.0
		Frequency	60.0
		Channel D	LOW Range
4,1,2	Digital Inputs	All Channels	NOT USED
4,1,3	RS232 Port	Baud	9600
		Parity	EVEN

**I/O
Configuration
Default Settings
(Continued)**

QAC	Screen	Configuration	Setting
4,1,4	Internal Modem	Baud	AUTO
		Phone Number	17322873194
		Fax Number	17322879410
		# Dial Attempts	4
		# Rings Before Answer	2
		Header String	ATQ0V0X4Y0S0=2S7=60S9=10S10=5
4,1,5	Relays	All Channels	OPEN
4,1,6	Other Devices	LCD Backlight Auto-Shutoff	ENABLED
		Printer	ON
		Printer Battery Operation	INSTANT OFF
		Audible Alarm	ON

**Analyzer
Parameter
Default Settings**

QAC	Screen/Configuration	Setting
4,2,1	Time and Date	Current Time And Date (EST)
4,2,2	Language Selection	ENGLISH
4,2,3	Error Message Redirection	No Devices Active
4,2,4	Memory Type	OVERWRITE

**Site Parameters
Default Settings**

QAC	Screen	Configuration	Setting
4,2,1	Site ID		POWER PLATFORM
4,3,2	Billing Dates		First of Each Month
4,3,3	Time of Use		Cleared
4,3,4	Demand Criteria	Interval Type Interval Duration Interval Synch Demand Parameter	FIXED 15 Minutes START NOW WATTS

**Time Plot
Default Settings**

QAC	Screen	Configuration	Parameter
3,5 F1	Time Plot	CHAN A	HZ
		CHAN A	DPF
		CHAN B	DPF
		CHAN C	DPF
		CHAN D	DPF
		CHAN A	Vthd
		CHAN A	Ithd

Appendix H

Technical Specifications

Overview

In this appendix The following specifications are covered in this appendix.

Topic	See Page
General	H-2
Interfaces	H-3
Measured Parameters	H-5
Computed Parameters	H-7
Harmonics	H-10
Current Probes	H-11
Isolated Current Transformer Boxes	H-12

General

Dimensions Size: 7” Height x 13” Width x 10” Depth (17.8 x 33 x 25.4 cm)
Weight: 20.8 pounds (9.4 kg)

Environmental Operating: 5 to 45° Celsius (41 to 113° F)
Storage: -20 to 55° Celsius (-4 to 131° F).
Humidity: 10% to 90% non-condensing.

System Time Clock Crystal controlled. 1 second resolution.
Event time clock displays to 10msec resolution
time displayed in 24 hour format HH:MM:SS.
Accurate to 60 seconds per month.

Memory 750 kbytes of standard non-volatile data RAM (event storage).
256 kbytes of standard volatile data RAM (system memory).
768 kbytes of program RAM. (system memory)
256 kbytes of program EPROM. (system memory)

Memory Card 512Kbytes to 2Mbytes depending on the optional card memory capacity.

Note A 15 minute warm up period is required to ensure that all performance specifications are met.

Power Requirements Voltage: Switch selectable 90-130 or 180-250 V RMS.
Frequency: 47-450 Hz.
Consumption: 100 watts max.
Unit will also operate using a 12 Vdc, 10 A external battery with filtering.

Installation Categories Mains supply: Installation Category II, Pollution Degree 2
Measurement inputs: Installation Category III, Pollution Degree 2

Interfaces

Display

Type: Negative Transmissive Liquid Crystal Display (LCD) with Electroluminescent (EL) backlighting.

Resolution: 240 x 128 dot matrix.

Size: 4.25 x 2.27 inches.

Printer

Type: High resolution thermal graphics printer.

Resolution: 320 dots per line.

Speed: 1 inch per second.

Paper: 2.36 inches by 98 feet thermal paper.

Report size: Approximately 4 inches wide.

Serial Port

One RS232D female 25-pin D-type connector.

Configuration: DCE

Data rate: 300 to 9600 baud

Stop bits: 1

Parity: Odd, even, or none

Internal Modem/Fax:

Compatible with: Bell 103, Bell 212A, V.22, V.22 bis Responds to "AT" command set, FAX is group III compatible.

Modem data rate: 300, 1200, 2400 baud (automatic)

Fax data rate: 9600

Phone jack (USOC): RJ-11C

Continued on next page

Interfaces, Continued

**Internal
Modem/Fax:**
(continued)

FCC registration: B46USA-65156-FA-E

Ringer equivalence: 0.2 A

Relay outputs

One relay for external access rated 120 V AC or 30 V DC at 1 amp max. Rated as pilot relay.

Alarm

Audible alarm of short duration (approximately 0.1 second) indicates an error condition. Audible alarm of long duration (approximately 1 second) indicates an event trigger.

Measured Parameters

Voltage

Four fully differential voltage channels.

Channels A,B,C range: 10-600 Vrms max

Channel D low range: 1-60 Vrms max

Channel D high range: 10-600 Vrms max

Crest factor: Maximum of 2 at full scale

Accuracy: $\pm 0.5\%$ of reading $\pm 0.05\%$ full scale

Voltage transients

Channels A,B,C range: 50-6000 Vpk

Channel D low range: 5-600 Vpk

Channel D high range: 50-6000 Vpk

Frequency response: Typically -4dB at 1 μ s for half sine wave pulse

Accuracy: $\pm 10\%$ of reading $\pm 1\%$ full scale for half sine wave pulses $\geq 10\mu$ s

Transient duration: 1 μ sec minimum

Current

Four independent current input channels.

Channels A,B, C range: 10%-200% of full scale CT rating

Channel D range: 2%-100% of full scale CT rating

Channels A,B,C crest factor: Maximum of 3 at full scale

Channel D crest factor: Maximum of 2 at full scale

Accuracy: $\pm 0.5\%$ of reading $\pm 0.05\%$ of full scale, at 400 Hz, using Dranetz-BMI CT-10, CT-150, CT-300, CT-1000, and CT-3000 probes only.

Continued on next page

Measured Parameters, Continued

Current transients

Channels A,B,C range: 10%-300% CT full scale

Channel D range: 2%-200% CT full scale

Frequency Response: Typically -4dB at 1 μ s for half sine wave pulses plus probe.

Accuracy: $\pm 10\%$ of reading $\pm 1\%$ FS for half sine wave pulses $\geq 10\mu$ s plus probe.

Transient Duration: 1 μ sec minimum

Phase

Each voltage/current pair (i.e. Channel A voltage, Channel A current) are sampled simultaneously to preserve phase relationship.

Input resistance

Voltage input: 8 Mohms

Current input: 200 kohms

Frequency

Fundamental range: 30Hz - 450Hz

Accuracy: $\pm 0.2\%$ of reading

Environmental

All specifications are met at 25 degrees Celsius (77° F)

Temperature coefficient for measured parameters is approximately 200 ppm of full scale per degree Celsius.

Computed Parameters

Update rate All parameters (except harmonic) are updated once per second. Harmonic based parameters are updated every 5 seconds.

ABC volts Calculated as the geometric mean of the three phases. See note.

$$V_{ABC} = \sqrt{(V_A^2 + V_B^2 + V_C^2)/3}$$

ABC amps Calculated as the sum of the three phases. See note.

$$I_{ABC} = I_A + I_B + I_C$$

Real power Single Phase: Average of instantaneous power samples taken as the product of voltage and current samples. Includes sign to indicate direction of power flow: + from source to load, - from load to source.

$$W = (1/N) \sum_{n=1}^N V_n I_n$$

Three Phase: Calculated as the sum of the three phases. Includes sign to indicate direction of power flow: + from source to load, - from load to source. See note.

$$W_{ABC} = W_A + W_B + W_C$$

Accuracy: $\pm 2\%$ of reading $\pm 0.2\%$ of full scale at fundamental frequency.

Note All totals (ABC) numbers are not 3 phase. They are based on the wiring configuration, which can have single phase, split phase, wye or delta phase. Totals are based on N phases for calculations.

Continued on next page

Computed Parameters, Continued

Apparent power Single Phase: Calculated as volts RMS times amps RMS.

$$VA = V_{rms} \cdot I_{rms}$$

Three Phase: Calculated as vector sum of VAR_{ABC} and W_{ABC} . Includes sign to indicate direction of power flow: + from source to load, - from load to source.

$$VA_{ABC} = \sqrt{VAR_{ABC}^2 + W_{ABC}^2}$$

Accuracy: $\pm 2\%$ of reading $\pm 0.2\%$ of full scale at fundamental frequency.

Power factor Calculated as real power divided by apparent power. Includes sign to indicate leading or lagging load current.

$$PF = W/VA$$

Accuracy: ± 0.05 typical

Reactive power Single Phase: Calculated as vector difference between VA and W. Includes sign to indicate direction of power flow: + from source to load, - from load to source.

$$VAR = \sqrt{(VA)^2 - W^2}$$

Three Phase: Calculated as the sum of the three phases. Includes sign to indicate direction.

$$VAR_{ABC} = VAR_A + VAR_B + VAR_C$$

Accuracy: $\pm 2\%$ of reading, $\pm 0.2\%$ of full scale at power factor = 1.

Demand Average power during a demand interval in W, VA, or VAR

$$Dm = \frac{1}{N} \sum_{n=1}^N W_n$$

Accuracy: $\pm 0.2\%$ of reading $\pm 0.02\%$ of full scale at fundamental frequency

Continued on next page

Computed Parameters, Continued

Energy

Summation of Watt-Hours for accumulated energy use

$$E = \sum_{n=1}^N W \times (Time)$$

Accuracy: $\pm 0.2\%$ of reading $\pm 0.02\%$ of full scale at fundamental frequency

Updating

Computed parameters are updated once per second

Environmental

All specifications are met at 25 degrees Celsius.

Temperature coefficient for computed parameters is approximately 400 ppm of full scale per degree Celsius.

Harmonics

Introduction The Power Platform-8000 performs a harmonic analysis using a Fast Fourier Transform (FFT) algorithm. The accuracy of any given reading is dependent on several factors including amplitude of the input signal, the distortion level, and the distribution of the individual harmonic components.

Updating All harmonic related parameters are updated once every five seconds.

Total Harmonic Distortion (THD) Calculated using the individual harmonic components that result from the FFT.

$$THD = \sqrt{\sum_{n=2}^N \frac{(hn_{rms})^2}{(fund_{rms})^2}}$$

Displacement Power Factor (DPF) A direct result of the FFT that indicates the phase relationship of voltage to current at the fundamental frequency of a given channel. This value will agree with the (true) power factor only when the signals are pure sine waves.

Telephone Influence Factor (TIF) Calculated as per the ANSI/IEEE Standard 519-1981: "IEEE Guide for Harmonic Control and Reactive Compensation of Static Power Converters."

Transformer Derating Factor (TDF) Calculated as per the ANSI/IEEE Standard CS57.110-1986: "Recommended Practice for Establishing Transformer Capability when Supplying Non-Sinusoidal Line Currents."

Current Probes

-
- Guidelines** To achieve the rated accuracies, follow these guidelines:
- The conductor must be at a right angle to the probe
 - The conductor must be centered in the probe core
 - The jaw contact surfaces must be clean and properly aligned.
-

Specifications The following table lists the operating specifications for all optional Dranetz-BMI current probes.

	CT10	CT150	CT300	CT1000	CT3000
Current Range for Amplitude Accuracy (Arms) of 0.5%	1 to 10	3 to 125	10 to 300	50 to 1000	200 to 3000
Current Range for Phase Accuracy of 0.2° (Arms) at Calibration Point ()	2 to 10 (5)	5 to 125 (30)	15 to 300 (200)	100 to 1000 (200)	300 to 3000 (300)
Frequency Range (Hz)	45 to 10,000	45 to 10,000	15 to 10,000	30 to 50,000	30 to 5000
Impulse Width	Typically -3dB at 1 µsec at one-half sine wave.				
Output Signal of 3 Vrms at	10 Arms	150 Arms	300 Arms	1000 Arms	3000 Arms
Maximum Conductor Size	0.47" (12mm)	0.47" (12mm)	2.13" (54mm)	2.17" (55mm)	2.56" (65mm) or 1.97" x 5.3" (50 x 135 mm) or 2.56" x 3.94" (65 x 100 mm)

Environmental Operation: 5 to 45 degrees Celsius (41 to 113° F)

Storage: -20 to 55 degrees Celsius (-4 to 131° F)

Isolated Current Transformer Boxes

Specifications The following tables list the operating specifications for Dranetz-BMI isolated current transformers.

	ISO-1	ISO-1A	ISO-5
Current Range (Arms)	0.02 to 1.0 2.0 Arms max	0.02 to 1.0 2.0 Arms max	0.10 to 5.0 10.0 Arms max
Frequency Response (Hz)	50 to 3000	50 to 3000	50 to 3000
Output signal	3 Vrms @ 1 Arms	2 Vrms @ 1 Arms	3 Vrms @ 5 Arms
Accuracy	±1% 0.2 to 1 Arms	±1% 0.2 to 1 Arms	±1% 0.5 to 5 Arms
Scale Factor	0.333	0.500	1.666

Environmental Operation: 5 to 45 degrees Celsius (41 to 113° F)

Storage: -20 to 55 degrees Celsius (-4 to 131° F)

Appendix I

Pre-Defined Monitoring Setups

General

Reports for the following eight pre-defined monitoring setups (except for harmonic graphics) are always routed to the internal or external connected printer.

If your PP1 does not have an internal printer and is not connected to an external printer, the reports for this selected setup will not be recorded anywhere. For this condition, the setup must be copied to a blank setup and another device must be selected for each report. See Section 7, Programming Monitoring Setups, for details of this procedure.

Pre-Defined Monitoring Setups

Setup	Report	Device	Chan.	Parameter	Trigger Condition
1 Complete Demand/Energy					
1	All Chan. & Param.	Printer	ALL	ALL	End of Demand Interval
2	Demand	Printer	ABC	Demand	4 times a day (00:00, 6:00, 12:00, 18:00)
3	Energy	Printer	ABC	Energy	4 times a day (00:00, 6:00, 12:00, 18:00)
4	Daily Time Plot	Printer	ABC	Demand	4 times a day (all set to 00:00)
5	Daily Time Plot	Printer	ABC	Energy	4 times a day (all set to 00:00)
6	Monthly Time Plot	Printer	ABC	Demand	End of Billing Month
7	Monthly Time Plot	Printer	ABC	Energy	End of Billing Month
2 Daily Demand/Energy					
1	Demand	Printer	ABC	Demand	4 times a day (00:00, 6:00, 12:00, 18:00)
2	Energy	Printer	ABC	Energy	4 times a day (00:00, 6:00, 12:00, 18:00)
3	Daily Time Plot	Printer	ABC	Demand	4 times a day (all set to 00:00)
4	Daily Time Plot	Printer	ABC	Energy	4 times a day (all set to 00:00)
3 All Parameter/Interval; Midnight Summary					
1	All Chan. & Param.	Printer	ALL	ALL	End of Demand Interval
2	Demand	Printer	ABC	Demand	4 times a day (all set to 00:00)
3	Daily Time Plot	Printer	ABC	Demand	4 times a day (all set to 00:00)
4	Energy	Printer	ABC	Energy	4 times a day (all set to 00:00)
5	Daily Time Plot	Printer	ABC	Energy	4 times a day (all set to 00:00)

**Pre-Defined
Monitoring Setups (Continued)**

Setup	Report	Device	Chan.	Parameter	Trigger Condition
4 V & I Hi/Lo Limit					
1	Event	Printer	A	Volts	Hi/Lo Limits (Chan A Volts: Hi = 127, Lo = 108)
2	Min/Max	Printer	A	Volts	Hi/Lo Limits (Chan A Volts: Hi = 127, Lo = 108)
3	Event	Printer	B	Volts	Hi/Lo Limits (Chan B Volts: Hi = 127, Lo = 108)
4	Min/Max	Printer	B	Volts	Hi/Lo Limits (Chan B Volts: Hi = 127, Lo = 108)
5	Event	Printer	C	Volts	Hi/Lo Limits (Chan C Volts: Hi = 127, Lo = 108)
6	Min/Max	Printer	C	Volts	Hi/Lo Limits (Chan C Volts: Hi = 127, Lo = 108)
7	Event	Printer	D	Volts	Hi/Lo Limits (Chan D Volts: Hi = 5, Lo = 0)
8	Min/Max	Printer	D	Volts	Hi/Lo Limits (Chan D Volts: Hi = 5, Lo = 0)
5 Time-of-Use					
1	Time-of-Use	Printer	ABC	Demand	4 times a day (all set to 00:00)
2	Time-of-Use	Printer	ABC	Demand	End of Billing Month
6 Min/Max					
1	Min/Max	Printer	ABC	Watts	4 times a day (00:00, 6:00, 12:00, 18:00)
2	Min/Max	Printer	A	Volts	4 times a day (00:00, 6:00, 12:00, 18:00)
3	Min/Max	Printer	B	Volts	4 times a day (00:00, 6:00, 12:00, 18:00)
4	Min/Max	Printer	C	Volts	4 times a day (00:00, 6:00, 12:00, 18:00)
5	Min/Max	Printer	A	Amps	4 times a day (00:00, 6:00, 12:00, 18:00)
6	Min/Max	Printer	B	Amps	4 times a day (00:00, 6:00, 12:00, 18:00)
7	Min/Max	Printer	C	Amps	4 times a day (00:00, 6:00, 12:00, 18:00)
8	Min/Max	Printer	ABC	Va	4 times a day (00:00, 6:00, 12:00, 18:00)
9	Min/Max	Printer	ABC	Var	4 times a day (00:00, 6:00, 12:00, 18:00)
10	Min/Max	Printer	A	PF	4 times a day (00:00, 6:00, 12:00, 18:00)
11	Min/Max	Printer	B	PF	4 times a day (00:00, 6:00, 12:00, 18:00)
12	Min/Max	Printer	C	PF	4 times a day (00:00, 6:00, 12:00, 18:00)
13	Demand	Printer	ABC	Demand	4 times a day (00:00, 6:00, 12:00, 18:00)
14	Energy	Printer	ABC	Energy	4 times a day (00:00, 6:00, 12:00, 18:00)
15	Daily Time Plot	Printer	ABC	Demand	4 times a day (all set to 00:00)
16	Daily Time Plot	Printer	ABC	Energy	4 times a day (all set to 00:00)

**Pre-Defined
Monitoring Setups (Continued)**

Setup	Report	Device	Chan.	Parameter	Trigger Condition
7 Harmonics (need Task Card-8000)					
1	Harmonic Text	Printer	A	Volts	Time Interval (1 hour intervals, starting at 9:00)
2	Harmonic Text	Printer	B	Volts	Time Interval (1 hour intervals, starting at 9:00)
3	Harmonic Text	Printer	C	Volts	Time Interval (1 hour intervals, starting at 9:00)
4	Harmonic Text	Printer	D	Volts	Time Interval (1 hour intervals, starting at 9:00)
5	Harmonic Text	Printer	A	Amps	Time Interval (1 hour intervals, starting at 9:00)
6	Harmonic Text	Printer	B	Amps	Time Interval (1 hour intervals, starting at 9:00)
7	Harmonic Text	Printer	C	Amps	Time Interval (1 hour intervals, starting at 9:00)
8	Harmonic Text	Printer	D	Amps	Time Interval (1 hour intervals, starting at 9:00)
9	Harmonic Text	Printer	A	Watts	Time Interval (1 hour intervals, starting at 9:00)
10	Harmonic Text	Printer	B	Watts	Time Interval (1 hour intervals, starting at 9:00)
11	Harmonic Text	Printer	C	Watts	Time Interval (1 hour intervals, starting at 9:00)
12	Harmonic Text	Printer	D	Watts	Time Interval (1 hour intervals, starting at 9:00)
13	Harmonic Graph	Memory	A	Volts	4 times a day (all set to 00:00)
14	Harmonic Graph	Memory	B	Volts	4 times a day (all set to 00:00)
15	Harmonic Graph	Memory	C	Volts	4 times a day (all set to 00:00)
16	Harmonic Graph	Memory	D	Volts	4 times a day (all set to 00:00)
17	Harmonic Graph	Memory	A	Amps	4 times a day (all set to 00:00)
18	Harmonic Graph	Memory	B	Amps	4 times a day (all set to 00:00)
19	Harmonic Graph	Memory	C	Amps	4 times a day (all set to 00:00)
20	Harmonic Graph	Memory	D	Amps	4 times a day (all set to 00:00)
21	Harmonic Graph	Memory	A	Watts	4 times a day (all set to 00:00)
22	Harmonic Graph	Memory	B	Watts	4 times a day (all set to 00:00)
23	Harmonic Graph	Memory	C	Watts	4 times a day (all set to 00:00)
24	Harmonic Graph	Memory	D	Watts	4 times a day (all set to 00:00)

**Pre-Defined
Monitoring Setups (Continued)**

Setup	Report	Device	Chan.	Parameter	Trigger Condition
8 Harmonics/Time Plot (need Task Card-8000)					
1	Min/Max Time Plot	Printer	ABC	Vthd	4 times a day (all set to 00:00)
2	Harmonic Text	Printer	A	Volts	Vthd: Hi = 15%; Lo = 0
3	Harmonic Text	Printer	B	Volts	Vthd: Hi = 15%; Lo = 0
4	Harmonic Text	Printer	C	Volts	Vthd: Hi = 15%; Lo = 0
5	Harmonic Text	Printer	D	Volts	Vthd: Hi = 15%; Lo = 0
6	Min/Max Time Plot	Printer	ABC	Ithd	4 times a day (all set to 00:00)
7	Harmonic Text	Printer	A	Amps	Ithd: Hi = 15%; Lo = 0
8	Harmonic Text	Printer	B	Amps	Ithd: Hi = 15%; Lo = 0
9	Harmonic Text	Printer	C	Amps	Ithd: Hi = 15%; Lo = 0
10	Harmonic Text	Printer	D	Amps	Ithd: Hi = 15%; Lo = 0
11	Harmonic Text	Printer	A	Watts	Ithd: Hi = 15%; Lo = 0
12	Harmonic Text	Printer	B	Watts	Ithd: Hi = 15%; Lo = 0
13	Harmonic Text	Printer	C	Watts	Ithd: Hi = 15%; Lo = 0
14	Harmonic Text	Printer	D	Watts	Ithd: Hi = 15%; Lo = 0
15	Harmonic Graph	Memory	A	Volts	Ithd: Hi = 15%; Lo = 0
16	Harmonic Graph	Memory	B	Volts	Vthd: Hi = 15%; Lo = 0
17	Harmonic Graph	Memory	C	Volts	Vthd: Hi = 15%; Lo = 0
18	Harmonic Graph	Memory	D	Volts	Vthd: Hi = 15%; Lo = 0
19	Harmonic Graph	Memory	A	Amps	Ithd: Hi = 15%; Lo = 0
20	Harmonic Graph	Memory	B	Amps	Ithd: Hi = 15%; Lo = 0
21	Harmonic Graph	Memory	C	Amps	Ithd: Hi = 15%; Lo = 0
22	Harmonic Graph	Memory	D	Amps	Ithd: Hi = 15%; Lo = 0
23	Harmonic Graph	Memory	A	Watts	Ithd: Hi = 15%; Lo = 0
24	Harmonic Graph	Memory	B	Watts	Ithd: Hi = 15%; Lo = 0
25	Harmonic Graph	Memory	C	Watts	Ithd: Hi = 15%; Lo = 0
26	Harmonic Graph	Memory	D	Watts	Ithd: Hi = 15%; Lo = 0

Appendix J

Internal Modem Commands

General The internal modem of the Power Platform is a Hayes compatible modem used in Bell 212A or CCITT V.22 operation. The internal modem is controlled by operator selected serial command sequences entered as the Modem Header String during display of the Modem/Fax Configuration screen 4,1,4. The command line may be as long as 40 characters excluding command AT. Table G-1 lists the command codes with their descriptions. Table G-2 lists the registers accessed by the modem to execute a variety of operations. The function of each register is explained in the table. The value of each register must be 0-255.

NOTE It is not necessary to send the Command ATZ or AT&F because the Power Platform automatically sends this command with every configuration.

Command Summary

Command Summary

Command	Description
AT	: Command line prefix (Attention code); precedes command line except ++++ (escape and A/ (repeat) commands
ATZ	: Loads the modem active configuration area with the stored configuration profile in nonvolatile memory
AT&F	: Loads the modem active configuration area with the factory profile contained in ROM
A	: Go off-hook in answer mode
A/	: Re-execute last command line; (A/ is not followed by a carriage return)
B	: Selects CCITT V.22 operation when communicating at 1200 bps
B1	: Selects Bell 212A operation when communicating at 1200 bps
D	: Dial number which follows D in the command line (See Dial Descriptors at end of table)
E	: Modem does not "echo" commands back to terminal
E1	: Modem "echoes" commands back to terminal
H	: On Hook (Hang up)
H1	: Off Hook
I	: Request product identification Code
I1	: Performs checksum on firmware ROM; returns checksum
I2	: Performs checksum on firmware ROM; returns OK or ERROR
L, L1	: Low speaker volume
L2	: Medium speaker volume
L3	: High speaker volume
M	: Speaker off
M1	: Speaker on until carrier detected
M2	: Speaker always on
M3	: Speaker on until carrier detected except during dialing
O	: Return to on-line state
O1	: Return to on-line state and initiate equalizer retrain
Q	: Modem returns result codes
Q1	: Modem does not return result codes

Command Summary (Continued)

Command	Description
Sr=n	: Set register r to value n
Sr?	: Request contents of register r
V	: Short form numeric result codes
V1	: Full word result codes
X	: CONNECT result code enabled
X1	: Modem blind dials; all CONNECT XXXX result codes enabled; busy signal not detected
X2	: Modem waits for dial tone before dialing; all CONNECT XXXX result codes enabled; busy signal not detected
X3	: Modem blind dials; all CONNECT XXXX result codes enabled; modem sends BUSY result code if busy signal detected
X4	: Modem waits for dial tone before dialing; all CONNECT XXXX result codes enabled; modem sends BUSY result code if busy signal detected
Y	: Long space disconnect disabled
Y1	: Long space disconnect enabled
+++	: The default escape code
&C	: DCD always ON
&C1	: DEC ON indicates presence of data carrier
&D	: Modem ignores DTR
&D1	: Modem assumes command state when ON-to-OFF transition detected on DTR
&D2	: Modem hangs up, assumes command state and disables auto answer upon detected in ON-to-OFF transition on DTR
&D3	: Modem assumes initialization state upon detecting an ON-to-OFF transition on DTR
&G	: No guard tone
&G1	: 550 Hz guard tone
&G2	: 1800 Hz guard tone
&L	: Selects dialup (switched) line
&L1	: Selects leased line
&M	: Asynchronous mode
&M1	: Synchronous mode 1 (Sync/Async mode)

Command Summary (Continued)

Command	Description
&M2	: Synchronous mode 2 (Dial Stored Number mode)
&M3	: Synchronous mode 3 (DTR control of Data/Talk)
&P	: Pulse dial make/break ratio = 39/61 (USA)
&P1	: Pulse dial make/break ratio = 33/67 (UK/HK)
&R	: CTS follows RTS
&R1	: Modem ignores RTS; CTS always ON
&T	: Terminate test in progress
&T1	: Initiate Local Analog Loopback test
&T3	: Initiate digital loopback
&T4	: Modem grants request from remote modem for RDL
&T5	: Modem denies request from remote modem for RDL
&T6	: Initiate Remote Digital Loopback test
&T7	: Initiate Remote Digital Loopback with self test
&T8	: Initiate Local Analog Loopback with self test

Register Access

Register Access

Register	Description
S0	: Number of rings before auto-answering a call. If set to 0, the modem will not auto-answer.
S1	: Counts incoming rings. If no ring occurs for 8 seconds, the counter is cleared to 0. The register only counts when the modem is set to auto-answer (S0 greater than 0).
S2	: Escape code character. Can be ASCII 0-127. Default is +. If S2 is greater than 127 then the escape code is completely disabled and only a call disconnection will return the modem to the command mode.
S3	: End-of-line character. This character is used to both terminate commands and to terminate status messages. Defaults to carriage return. (ASCII 13)
S4	: Line feed character. This character is output following the end-of-line after English status messages. Defaults to line feed (ASCII 10).
S5	: Backspace character. This character is typed to erase one command character and move the cursor back one space on the host screen. To erase a character, the modem first outputs a backspace, then it outputs a space and then another backspace to move over the blank. Default is backspace (ASCII 8).
S6	: Dial tone wait. Defines the pause after going off-hook (in seconds). Can't be less than 2 due to FCC regulations. Default is 2.
S7	: Time in seconds, to wait for carrier before aborting a connection attempt. Default is 30 seconds.
S8	: Length of pause, in seconds, produced by the comma command. Default is 2 seconds.
S9	: Time, in 1/10 seconds, that carrier must be present to be detected. Default is 600 milliseconds.
S10	: Time, in 1/10 seconds, between loss of carrier and disconnect. Default is 700 milliseconds. If S10 is set to 255, then the modem acts as if a carrier is always present.
S12	: Time Delay, in 1/50 seconds, required before and after an escape code. The time between the characters of the escape code must be less than the value of S12. If S12 is 0, then timing is not a factor in recognizing the escape code. Default is 1 second.

Register Access (Continued)

Register	Description
S16	: Test mode. S16, BIT 0: Local Analog Loop - 0-Disable, 1-Enable S16, BIT 1: Not Used S16, BIT 2: Local Digital Loopback - 0-Disable, 1-Enable S16, BIT 3: Remote Digital Loopback initiated by remote modem - 0-Loopback off, 1-Loopback in progress S16, BIT 4: Remote Digital Loopback - 0-Disabled, 1-Initiate Enabled S16, BIT 5: Remote Delay Loopback with test message and error count - 0-Disable, 1-Enable S16, BIT 6: Local Analog Loopback - 0-Disable, 1-Enable S16, BIT 7: Not Used
S25	: Delay to DTR. Transitions on DTR that occur for less time specified by this register are ignored. DTR will only be examined after S25 has timed out.
S26	: RTS to CTS Delay Interval used in synchronous operation. Upon detection of a transition and RTS the CH1780 will wait the duration specified by this register before returning a CTS.

NOTE

All other Registers not indicated are not used.

Dial Descriptors

Dial Descriptors In addition to specifying a number to dial, the following descriptors can be used with the D Command.

0-9 # * A B C D	Digits and characters for dialing
@	Wait for quiet answer (no dial tone transmitted)
!	Hookflash
;	Return to command state after dialing
,	Delay processing of next character
P	Pulse dial
R	Reverse mode (for calling an originate-only modem)
S=n	Dial number stored in location "n" (0-7)
T	Tone dial
W	Wait for dial tone

Appendix K

Identifying Your Power Circuit Type

General

When undertaking power system analysis, it is common to not know exactly what type of circuit you have. In a typical junction box you may see three, four, or five conductors without any kind of conductor identification.

Tables K-1 and K-2, together with some simple tests, were created to help you out with this circuit identification problem. For seven different three-wire systems and four different four-wire systems, these tables give line-to-ground voltages, line-to-line voltages, relative current levels in the different conductors, a simple circuit diagram, and instructions on how to connect the Power Platform. Voltage values are given for the common voltage levels at which the particular circuits are used, and the tables also include voltage and current vector diagrams for the various circuits.

The first step is to check for conductors at or near ground potential, using the Power Platform as a voltmeter. In many modern systems an additional equipment ground conductor is installed with the electric load circuit conductors. An example is the bare, or green insulated conductor used in many wiring installations. The conductor does not carry load current in a healthy circuit, but is connected to ground at the source and to all metal enclosures of the power conductors for safety purposes.

The problem here is that there will probably also be a neutral return conductor for line-to-neutral loads which is also at or near ground potential. An example is the single-phase, three-wire and ground circuit of Table K-1, where both Wires 3 and 4 are at or near ground potential. Separate voltage to ground and current measurements on Wires 3 and 4 will identify Wire 4 as the equipment ground since normally it should carry no current. Once identified, and while equipment ground is not necessary for Power Platform measurements, (note Wire 4 is not used in the Power Platform connection instructions for this circuit), it is a good place to ground the Power Platform voltage cable green safety ground lead.

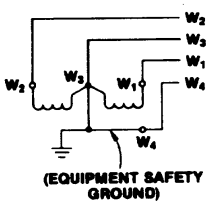
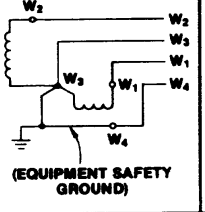
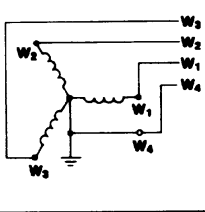
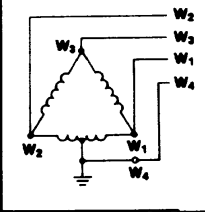
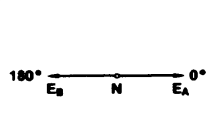
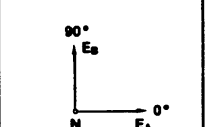
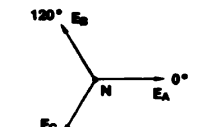
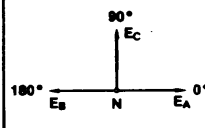
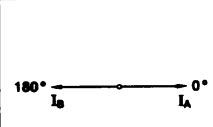
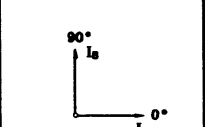
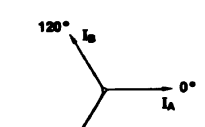
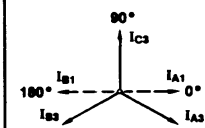
Once the current-carrying conductors have been identified, then usually line-to-ground and line-to-line voltage measurements using the Power Platform will permit identifying the specific circuit type.

Note from Table K-2 that it is impossible to differentiate between a three-phase, three wire floating delta and a three-phase, three-wire wye without neutral by making voltage and current measurements on the conductors. But it doesn't matter since the Power Platform is hooked up exactly the same in either case.

Table K-1 Three Wire Systems

Type of System	Single-phase two-wire and ground	Single-phase three-wire	Two-phase three-wire	Three-phase delta one leg grounded	Three-phase delta, floating (near ground)	Three-phase wye without neutral	Three-phase open delta
Voltage	Line-to-ground	120	120	240	240	240	240
	Line-to-ground	240	240	480	480	480	240
	Line-to-line	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0
Current	I_1	120	170	≈ 240	240	240	I_1
	I_2	≈ 0	120	240	240	240	$I_2 \approx I_1$
	I_3	0	120	240	240	240	$I_3 \approx I_1$
System Diagrams							
	$I_1 = I_2$	$I_3 \approx I_1 - I_2$	$I_2 \approx I_1$ $I_3 = 1.4 \times I_1$	I_1 $I_2 \approx I_1$ $I_3 \approx I_1$	I_1 $I_2 \approx I_1$ $I_3 \approx I_1$	I_1 $I_2 \approx I_1$ $I_3 \approx I_1$	I_1 $I_2 \approx I_1$ $I_3 \approx I_1$
	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0	≈ 0
Measurements to determine system type							
W_1 to ground	120	240	120	240	≈ 138	≈ 138	240
W_2 to ground	≈ 0	240	240	480	≈ 277	≈ 277	240
W_3 to ground	0	≈ 0	≈ 0	≈ 0	≈ 138	≈ 138	≈ 0
W_1 to W_2	120	480	340	≈ 480	240	480	≈ 240
W_1 to W_3	120	240	240	240	240	480	240
W_2 to W_3	≈ 0	240	240	240	240	480	240
(HIGH RESISTANCE TO GROUND)							
(CAPACITANCE TO GROUND)							

How to connect the 808						
808 measurement type	One-channel	Two-channel	Two-channel	Two-channel	Two-channel	Two-channel
Voltage lead connections	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground
CT or current probe connections (arrow or X ₂ towards load)	A on W ₁ B not used C not used	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C not used
Voltage vector representation						
Current vector representation (with resistive loads)						

Type of System		Single-phase, three-wire, and ground	Two-phase, three-wire, and ground	Three-phase, four-wire wye	Three-phase delta with center tap (red-legged)	
Measurements to determine system type						
Voltage	Line-to-gnd	W ₁ to gnd 120 W ₂ to gnd 120 W ₃ to gnd ≈ 0 W ₄ to gnd 0	240 240 ≈ 0 0	120 240 ≈ 0 0	240 240 ≈ 0 0	120 240 277 277 208 416 ≈ 0 ≈ 0
	Line-to-line	W ₁ to W ₂ 120 W ₁ to W ₃ 120 W ₁ to W ₄ 120 W ₂ to W ₃ 120 W ₂ to W ₄ 120 W ₃ to W ₄ ≈ 0	480 240 240 240 240 240 ≈ 0	170 340 120 240 120 240 ≈ 0	340 240 240 240 240 240 ≈ 0	208 416 480 480 480 480 277
Current	I ₁ I ₂ I ₃ I ₄	I ₁ I ₂ I ₃ = I ₁ - I ₂ 0	I ₁ I ₂ ≈ I ₁ I ₃ ≈ 1.4 × I ₁ 0	I ₁ I ₂ ≈ I ₁ I ₃ ≈ I ₁ 0	Load dependent	
System configurations						
How to connect the 808						
808 Measurement Type	Two-channel	Two-channel	Three-channel	Three-channel		
Voltage lead connections	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₃ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₄ G to ground	A to W ₁ B to W ₂ C to W ₃ N to W ₄ G to ground		
CT or current probe connections (arrow or X ₂ towards load)	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C not used	A on W ₁ B on W ₂ C on W ₃	A on W ₁ B on W ₂ C on W ₃		
Voltage vector representation						
Current vector representation (with resistive loads)				 [Depends on combination of three-phase (subscript 3) and single-phase (subscript 1) loads]		

Appendix L

Connecting an External DC Power Supply

Overview

Introduction An external DC source of power can be connected to the Power Platform for normal operation without having to rely on local AC power. An external stand-alone automotive battery (installed in or out of the vehicle) or a regulated DC power supply of at least 10 amps capacity may be used. Connection is made to the DC external source jack in the lower left corner of the rear panel.

WARNING **Physical injury or damage to the instrument could result from incorrect connections. Always observe correct polarity. Make connections to the PP1 first and then make connections to the external DC power source.**

ADVERTENCIA **Podrían producirse lesiones físicas o daños al instrumento debido a conexiones incorrectas. Siempre observe la polaridad correcta. Efectúe primero las conexiones al PP1 y luego haga las conexiones a la fuente de energía de corriente continua externa.**

AVERTISSEMENT **Des connexions incorrectes risquent de causer des blessures aux personnes ou l'endommagement du matériel. Observez toujours la polarité correcte. Faites les connexions au PP1 en premier, puis branchez sur la source d'alimentation c.c. externe.**

WARNUNG **Falsche Verbindungen können zu Verletzungen oder Schäden am Gerät führen. Immer auf richtige Polarität achten. Zuerst Anschlüsse mit dem PP1 und dann Anschlüsse mit der externen Gleichspannungsquelle vornehmen.**

CAUTION **The internal battery of the Power Platform must be installed and charged before connecting an external power source to prevent possible damage to the Power Platform and/or the external power source.**

Continued on next page

Overview, Continued

PRECAUTION Debe estar instalada y cargada la batería interna del PP1 antes de conectar a una fuente de energía externa, a fin de prevenir posibles daños al PP1 y a la fuente de energía externa. Si se desconoce la condición cargada de la batería interna, cargue la batería por lo menos durante 16 horas.

MISE EN GARDE La batterie interne du PP1 doit être installée et chargée avant toute connexion à une source d'alimentation externe afin d'éviter tout risque d'endommagement du PP1 et de la source d'alimentation externe. Si l'état de charge de la batterie interne n'est pas connu, chargez la batterie pendant un minimum de 16 heures.

VORSICHT Zur Vermeidung möglicher Schäden am PP1 und der externen Spannungsquelle muß die interne Batterie des PP1 vor dem Anschluß an eine externe Spannungsquelle installiert und aufgeladen werden. Ist der Ladezustand der internen Batterie nicht bekannt, die Batterie mindestens 16 Stunden lang aufladen.

Standard Accessory A DC connector, part number 107506, is supplied with the Power Platform to permit you to make your own external power connecting cable.

Optional Accessories Optional connecting cables and a DC filter are available as accessories to connect external DC sources.

In this appendix The following topics are covered in this appendix.

Topic	See Page
Making and Connecting the DC Input Cable	L-3
External Battery Filter	L-6
Extension Cables	L-7
Installing the Battery Filter	L-8

Making and Connecting the DC Input Cable

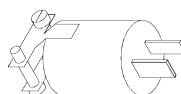
Description A connector plug is supplied with the Power Platform for making a cable for connection to a stand alone battery or DC supply.

Connection to Power Platform: External DC power source jack (10-16V) on the rear panel

Maximum cable length: 6 feet

Minimum wire size: 16 AWG

Connector plug Below is the diagram of the connector plug (P/N 107506) supplied as a standard accessory of the Power Platform.



8000-15

Restrictions If the cable will be longer than 6 feet, or if the internal battery is to be connected to any other device (including a charging system), use the optional battery filter (Option XBF-12) and recommended optional cables. See page C-3.

Making the DC cable Follow these guidelines when making the DC cable.

- Connect a 16 AWG black colored wire (6 feet max) to pin 1 (wide prong) of connector plug. This is the negative (-) terminal.
- Connect a 16 AWG red colored wire (6 feet max) to pin 2 of the connector plug. This is the positive (+) terminal.

WARNING **Physical injury, or equipment damage could result if the cable is wired incorrectly. Verify all connections are correct before proceeding.**

ADVERTENCIA **Podrían producirse lesiones físicas o daños al equipo si se conecta incorrectamente el cable. Compruebe que todas las conexiones estén correctas antes de proceder.**

Continued on next page

Making and Connecting the DC Input Cable, Continued

**AVERTISSE-
MENT**

Une connexion incorrecte du câble risque de causer des blessures aux personnes ou l'endommagement du matériel. Vérifiez que toutes les connexions sont correctes avant de poursuivre.

WARNUNG

Bei einem falschen Anschluß des Kabels kann es zu Verletzungen oder Schäden am Gerät kommen. Vor dem Fortfahren überprüfen, ob alle Anschlüsse ordnungsgemäß vorgenommen wurden.

**Internal battery
check**

Follow these steps to check the status of the internal battery before connecting an external DC source.

Step	Action
1	From the Main Menu, select item 5, View Status
2	Press ANALYZR STATUS. <u>Result:</u> A screen similar to the following will appear. <div data-bbox="672 995 1295 1331" data-label="Code-Block"><pre>Jan-20-94 13:24:29 ANALYZER STATUS DISPLAY PRINTER: ON CONFIG: V1.0 RS232: OFF BATTERY: GOOD MODEM: OFF INPUT: GOOD MEMORY: 1024k ON HOST CPU: V2.0 GOOD I/O CPU: V1.0 GOOD ACP CPU: V1.0 GOOD DATABASE: V2.0 PRINT EXIT</pre></div>
3	Verify that the Battery=Good statement is displayed.

CAUTION

Do not connect an external DC source if the battery statement is other than GOOD. Determine cause of battery fault before continuing.

PRECAUCION

No conecte una fuente de CC externa si el estado de la batería no es GOOD (BUENO). Determine la causa de la falla de la batería antes de continuar.

Continued on next page

Making and Connecting the DC Input Cable, Continued

MISE EN GARDE

Ne pas connecter une source d'alimentation c.c. si l'état affiché de la batterie n'est pas **GOOD (BON)**. Il est important de déterminer pourquoi la batterie est faible avant de continuer.

VORSICHT

Schließen Sie keine externe DC-Stromversorgungsquelle an, wenn der Zustand der Batterie anders als "GOOD" (Gut) ist. Bestimmen Sie die Ursache des Batteriefehlers, bevor Sie fortfahren.

Connecting the cable

Follow these steps when connecting the DC cable to the Power Platform.

Step	Action
1	Turn off power to Power Platform.
2	Turn off power to the external power source.
3	Disconnect cable wires from battery terminals, if connected.
4	Connect plug of DC cable to Power Platform 10-16V external power input jack on rear panel.
5	Connect DC cable wires to external power source (battery or power supply).
6	Turn on external power supply, if connected.
7	Turn on power to the Power Platform.

External Battery Filter

Introduction

Battery Filter, Model XBF-12, hereinafter referred to as the filter, provides external DC filtering for an external power source connected to the Power Platform. The filter provides a filtered DC input to the external power input jack on the Power Platform. The filter suppresses automotive ignition noise and discriminates against voltage transients greater than 18 VDC peak.

External power source

The external power source can consist of a 12V stand-alone battery or charging circuit of 12-16 VDC. If an automotive battery is used, it is recommended that the automotive engine be operating so that the battery is charging during usage.

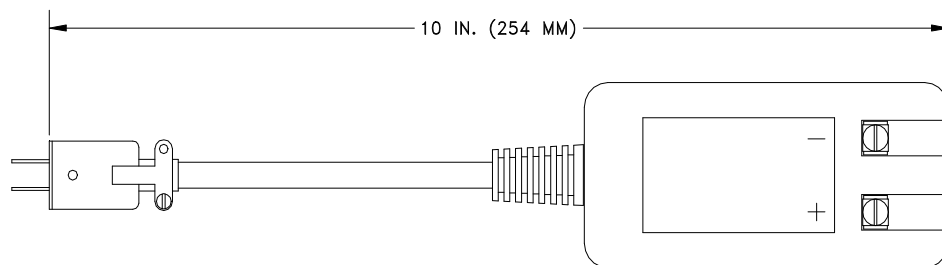
If using own cable

If using the battery filter with your own cable, maximum cable length cannot exceed 25 feet. The minimum wire size to use is 16 AWG. Use black colored wire to connect to the negative terminal on the battery filter. Use red colored wire to connect to the positive terminal.

Filter description

The filter, Model XBF-12, shown below, consists of a two-terminal enclosure connected to an eight inch cable assembly, which is terminated by a two-pin plug. The two-pin polarized plug is connected to the rear panel connector jack, labeled 10-16VDC, on the Power Platform. Polarity indicators are provided on the cover for the terminal connections.

Filter diagram



8600-32

Extension Cables

Introduction

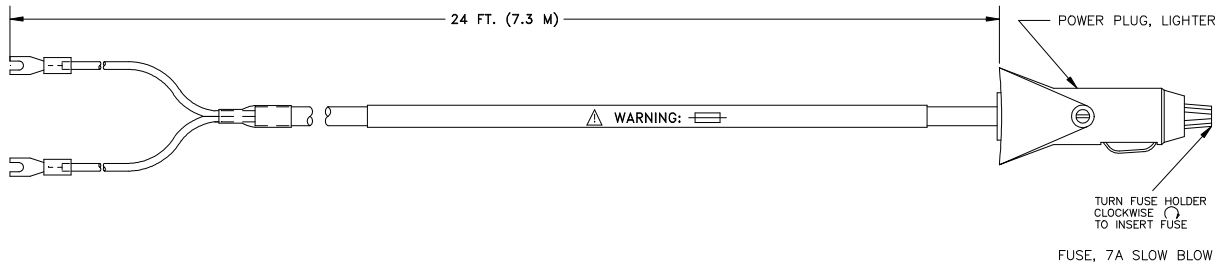
Two types of accessory extension cables, shown below, permit connection of the filter to either an automotive cigarette lighter jack (also referred to as an accessory outlet) or to the terminal posts of a stand-alone battery. Both cables are 24 feet (7.3M) long and have spade lugs for connection of the two wires to the filter assembly terminals (+ Red, - Black).

Lighter cable description

The lighter cable assembly plug contains an internal 7 amperes slow blow fuse to protect the automotive circuitry.

Lighter cable diagram

The battery extension lighter cable assembly, P/N 115586-G1, is shown below.



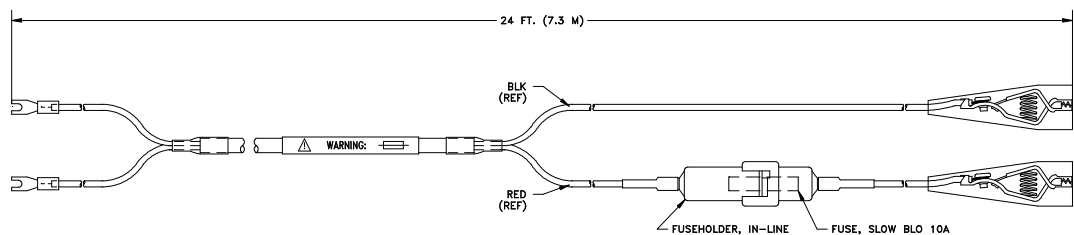
8600-33

Clip cable description

The clip cable assembly provides direct connection to the battery with crocodile clips and contains a 10 amp slow blow fuse in an in-line fuse holder of the red lead.

Clip cable diagram

The battery extension clip cable assembly, P/N 115587-G1, is shown below.



8600-34

Installing the Battery Filter

Before you begin Before you install the filter, perform the internal battery check that is detailed on page L-4.

Connect cable assembly to filter Follow these steps to connect either cable assembly to the filter.

Step	Action
1	Turn off the Power Platform and disconnect the AC input power plug from the rear panel input connector.
2	Select the type of extension cable to use depending on the voltage source. <u>Note:</u> Do not connect extension cable to source at this time.
3	Connect the extension cable spade lugs to the Filter assembly terminal connections. Red wire lug to plus (+) terminal and Black wire lug to negative (-) terminal.

CAUTION **Damage to the Power Platform and/or the external power source may occur if the lugs are reversed. Verify the proper color wires are connected to the correct polarity terminals; red wire to positive (+), black wire to negative (-).**

PRECAUCION **Pueden ocurrir daños a la Plataforma de energía y/o a la fuente de energía externa si se invierten las patas. Verifique si están conectados los alambres de color correcto a los terminales de la polaridad correcta; alambre rojo a positivo (+), alambre negro a negativo (-).**

MISE EN GARDE **L'inversion des languettes peut endommager la plate-forme d'alimentation et/ou la source d'alimentation externe. Assurez-vous que les fils de couleur sont connectés aux bornes appropriées ; le fil rouge sur le positif (+) et le fil noir sur le négatif (-).**

VORSICHT **Beschädigung an der "Power Platform" und/oder der externen Stromversorgungsquelle kann auftreten, wenn die Drähte vertauscht werden. Prüfen Sie die Farben der Drähte und ob diese an den richtigen Polaritäts-Terminals angeschlossen sind; roter Draht an Positiv (+), schwarzer Draht an Negativ (-).**

Continued on next page

Installing the Battery Filter, Continued

Connecting filter to Power Platform

Connect polarized plug of the filter assembly into Power Platform rear panel jack (10-16 VDC).

CAUTION

Before connecting or disconnecting directly to a stand-alone battery, place a damp cloth over the battery cell vent holes.

PRECAUCION

Antes de conectar o desconectar directamente a una batería autónoma, coloque un paño húmedo sobre el agujero de ventilación de la célula de la batería.

MISE EN GARDE

Avant la connexion ou la déconnexion directe d'une batterie autonome, placez un linge humide sur les orifices de ventilation de l'élément de batterie.

VORSICHT

Legen Sie vor dem Anschluß oder Abklemmen direkt an eine "Stand-Alone"-Batterie einen feuchten Lappen über die Batteriezellen-Ventilationslöcher.

Connecting cable to external DC power source

Step	Action
1	If vehicle mounted battery is being used, turn off vehicle ignition.
2	If clip cable is used, go to step 3. If cigarette lighter plug cable is used, go to step 5.
3	Connect the positive (+) red clip to the positive (+) battery terminal.
4	Connect the negative (-) black clip to a negative common connection other than directly to the battery terminal.
5	Connect the cigarette lighter plug to vehicle lighter jack. The external source can be in its normal charging operation after connection (for instance; the automotive engine may be running).
6	(Optional) Replace ac power plug to Power Platform power input jack if ac power is available.
7	Turn on vehicle ignition and start engine, if vehicle battery is being used.

Continued on next page

Installing the Battery Filter, Continued

Disconnecting cables

Follow these steps when disconnecting an external DC power source.

Step	Action
1	Shut off power to Power Platform.
2	Turn off ignition at vehicle or disconnect power source connectors at power source.
3	Disconnect plug from DC input on Power Platform.
4	Return to normal Power Platform operation.

Appendix M

Menu Structure

Overview

The figure on the following page shows the menu structure of TASKCard-8000. The Quick Access Code is shown above each screen. Each screen has a row of six boxes on the bottom of it, which represent the six function keys on the front panel. If a function key only changes the menu bar of a screen, a line is drawn from that key to another row of six boxes. If a function key changes the entire screen, a line is drawn from that key to the new screen. If a function key cycles through several options, the options are shown in a list under that key.

The heavy horizontal lines represent the level you will return to when you press the [EXIT] key.

Glossary

Accumulated energy	Total energy consumed since beginning of billing month.
Ampere	A unit of electrical current or rate of flow of electrons. One volt across one ohm of resistance causes a current flow of one ampere. A flow of one coulomb per second equals one ampere.
Apparent power	The product of voltage and current in a circuit in which the two reach their peaks at different times, or, in other words, there is a phase angle between voltage and current. Units are VA or some multiple thereof.
Balanced load	An alternating current power system consisting of more than two current-carrying conductors in which these current-carrying conductors all carry the same current.
Billing date	The first date in the billing monthly.
Billing demand	The demand level which a utility uses to calculate the demand charges on the current month's bill. If the rate schedule includes a ratchet clause or minimum demand charge, billing demand may or may not be the actual peak average demand for the current month.
Capacitor	A device consisting essentially of two conducting surfaces separated by an insulating material or dielectric such as air, paper, mica, plastic film, or oil. A capacitor stores electrical energy, blocks the flow of direct current, and permits the flow of alternating current to a degree dependent upon the capacitance and frequency.
Connected load	The total load which a customer can impose on the electrical system if everything was connected at one time. Connected load can be measured in horse-power, watts, or volt-amperes. Some rate schedules establish a minimum demand charge by imposing a fee per unit of connected load.
Clamp-on CT	A current transformer which clamps around a current-carrying conductor so that the conductor does not have to be opened for insertion of the transformer primary. Particularly suited for making energy surveys where current must be sensed at many points for relatively short periods.
Current transformer (CT)	An instrument transformer, intended for measuring or control purposes, designed to have its primary winding connected in series with a conductor carrying the current to be measured or controlled. Also see clamp-on CT, where the conductor itself acts as the primary. CT's step down high currents to lower values which can be used by measuring instruments. They must be used with caution.

Current transformer ratio	The ratio of primary amperes divided by secondary amperes.
Day (Daily)	Begins at 00:00:00 and ends at 23:59:59.
Demand	A measure of the customer load connected to the electrical power system at any given time. Units are usually watts, volt-amperes, or volt-ampere-reactive.
Demand charge	The charge which utilities apply to the billing demand for the current month. Units are usually dollars per kilowatt or dollars per volt or kilo-volt-ampere.
Demand-hours	The equivalent number of hours in a month during which the peak average demand is fully utilized. In other words, if energy consumption for the current month is X KWH and the peak average demand is Y kw, then the demand hours is equal to X/Y hours. The higher the number of demand hours the better the demand leveling situation and the more efficiently demand is being used. Many rate schedules have demand-hour-based energy breaks with the higher the demand-hour figure the lower the energy consumption rate in dollars per KWH.
Demand interval	Demand charges are based on peak average demand over a utility-specified time interval, not on the instantaneous demand (or connected load) at any given moment. Typical demand intervals are 15, 20, and 30 minutes, although under certain circumstances they can drop to as low as 5 minutes.
Demand-utilization efficiency	Related to demand-hours and really a measure of how successful demand leveling procedures have been. Calculated by dividing demand hours by 720, the number of hours in a 30-day billing period. Although demand-utilization efficiency depends heavily on the type of facility, in general an efficiency of 50 percent is considered average, 40 percent and lower poor, and 60 percent and higher good.
Discretionary loads	Loads which exhibit a “flywheel” effect so that removing them from the line for short periods of time does not affect business or plant operation or personal comfort. Typical are HVAC systems, hot water heaters, and snow-melt systems. These types of load provide the shed/restore capability required in power demand controller systems.
Efficiency	In general, the ratio of output power to input power expressed as a percentage. For electromechanical equipment such as motors it is very difficult to determine true efficiency under plant-floor conditions. Electric input power can be easily measured, but accurately determining mechanical output power is difficult.
Energy consumption charges	The charges a utility imposes for the consumption of real power in watts. Units are usually dollars per kilowatt-hour.

Event	A type of report that is stored in memory when either a Hi/Lo Limits trigger or an external trigger generates a report. Events can be viewed through the VIEW REPORTS option from the MAIN MENU, or they can be sent to one of the other output devices (printer or communication ports) when a certain trigger condition is met.
Event memory	Stores events (which are created when an Hi/Lo Limits trigger or external trigger generate a report).
Fuel-adjustment charges	The charges a utility imposes for changes in the cost of the fuel they use and other utility-cost factors. Frequently these charges are based on complex formulas which include many variables related to the cost of delivering electrical energy. Units are usually dollars per KWH.
Frequency	The number of recurrences of a periodic phenomenon in a unit of time. In electrical terms, frequency is specified as so many Hertz (Hz) where one Hz equals one cycle per second.
Historical memory	Stores data that is automatically saved at the end of each demand interval.
Impedance	The total opposition (i.e., resistance and reactance) a circuit offers to the flow of alternating current at a given frequency. It is measured in ohms.
Induction motor	An alternating current motor in which the primary winding (usually the stator) is connected to the power source and induces a current into a polyphase secondary (usually the rotor). Induction motors are the principal source of poor power factor problems.
Inductor	Also called an inductance or retardation coil. A conductor, wound into a spiral or coil to increase its inductive intensity, is used for introducing inductance into a circuit. An inductor retards the change of current flow through it.
Initiator pulses	Electrical impulses generated by pulse-initiator mechanisms installed in utility revenue meters. Each pulse indicates the consumption of a specific number of watts. These pulses can be used to measure energy consumption and demand.
Installed load	Equivalent to connected load.
Kilowatt-hour (KWH)	A unit of electrical measurement indicating the expenditure of 1,000 watts for one hour. Higher quantities are expressed in megawatt-hours, or the expenditure of one-million watts for one hour.
Lagging current	The current flowing in a circuit which is mostly inductive. If a circuit contains only inductance the current lags the applied voltage by 90°. Lagging current means lagging power factor of less than unity.

Leading current	The current flowing in a circuit which is mostly capacitive. If a circuit contains only capacitance the current leads the applied voltage by 90°. Leading current means leading power factor of less than unity.
Load	Any device or circuit which consumes power in an electrical system.
Load factor	A quantity related to connected load, installed load, and contracted load capacity. Utilities use load factor to establish a minimum billing demand.
Load restoring	The energization of loads that were previously removed from the line to limit load and control demand level.
Load shedding	The removal of loads from the line to limit load and control demand level.
Month (Monthly), (Billing Month or Cycle)	If Billing Dates are programmed: Begins at 00:00:00 of first date in billing month ends at 23:59:59 of last date in billing month. If Billing Dates are NOT programmed: Begins at 00:00:00 of date memory is cleared. Subsequent billing months begin on the same date every calendar month.
Neutral	The conductor used as the return path for the current from the load to the source in power measurement procedures. The neutral is frequently, but not necessarily, grounded.
Ohm	The unit of electrical resistance. One ohm is the value of resistance through which a potential difference of one volt will maintain a current flow of one ampere.
Ohm's Law	The voltage across an element of direct current circuit is equal to the current in amperes through the element multiplied by the resistance of the element in ohms.
Overflow	Type of memory that stops collecting data once the memory is full. Must be cleared to begin data collection again.
Parameter	Refers to different types of characteristic elements. In general, parameter is used to refer to the various units or value types that can be measured by the Power Platform (such as Volts, Amps, frequency, etc.). The term parameter is also used to refer to the different programmable characteristics of the unit (such as time and date, site I.D., billing dates, etc.)
Peak average demand	The highest average load over a utility specified time interval during a billing period. If there is no ratchet clause in the rate schedule then the peak average demand is also the billing demand.
Polyphase	Having or utilizing several phases. A polyphase alternating current power circuit has several phases of alternating current with a fixed phase angle between phases.

Potential transformer (PT)	An instrument transformer, the primary winding of which is connected in parallel with the circuit whose voltage is to be measured or controlled. PT's are normally used to step down high voltage potentials to lower levels acceptable to measuring instruments.
Potential transformer ratio	The ratio of primary voltage divided by secondary voltage.
Power factor	The ratio of real power in watts of an alternating current circuit to the apparent power in volt-amperes. Also the cosine of the phase angle between the voltage applied to a load and the current passing through it.
Power factor correction	Steps taken to raise the power factor by bringing the current more nearly in phase with the applied voltage. Most frequently this consists of adding capacitance to increase the lagging power factor of inductive circuits.
Power factor penalty	The charge utilities impose for operating at power factors below some rate-schedule-specified level. This level ranges from a lagging power factor of 0.80 to unity. There are innumerable different ways by which utilities calculate power factor penalties.
Present demand	Instantaneous demand updated every second.
Projected demand	Average demand for the elapsed time of the demand interval.
Pulse initiator	A device added to a revenue meter which generates pulses proportional to meter disk rotation. Each pulse represents a discrete quantity of energy consumed. Frequently the pulses are generated photoelectrically and output through mercury-wetted relays.
Q	A phantom quantity used by power companies to calculate volt-ampere-reactive (var) when there are both leading and lagging power factors. A Q-hour meter will determine varhr's when the power factors vary from 30° leading to 90° lagging. A Q-hour meter is similar to a watt-hour meter except that the voltage applied to each potential coil lags by 60° the voltage supplied to the respective watt-hour meter potential coil. This can generally be accomplished by cross-phasing, thus eliminating the need for a phase-shifting transformer. The varhr information can be calculated as follows: $\text{varhr} = (2Q \text{ hr -w hr}) / (3^{1/2})$

Ratchet clause	A rate schedule clause which states that billing demand may be based on current month peak average demand or on historical peak average demand, depending on relative magnitude. Usually the historical period is the past eleven months although it can be for the life of the contract. Billing demand is either the current month peak average demand or some percentage (75 percent is typical) of the highest historical peak average demand, depending on which is largest.
Reactance	The opposition to the flow of alternating current. Capacitive reactance is the opposition offered by capacitors and inductive reactance is the opposition offered by an inductive load. Both reactances are measured in ohms.
Reactive power	Also called wattless power and measured in volt-ampere-reactive. Reactive power increases with decreasing power factor and is the component of apparent power which does no real work in a system.
Real Power	The component of apparent power that represents true work in an alternating current circuit. It is expressed in watts and is equal to the apparent power times the power factor.
Report	A unit of information pertaining to one or more channels and parameters. Through the monitoring setups, a report can be programmed to be sent to the memory card, printer, to one of the communication ports, or to the report memory, when a certain trigger condition is met. Present values for all available report types, and any reports stored in memory, can be viewed through MAIN MENU option 2, VIEW REPORTS.
Report Memory	Stores reports that have been programmed in the monitoring setup to be saved in memory.
Resistance	The property of a substance which impedes current flow and results in the dissipation of power in the form of heat. The unit of resistance is the ohm. One ohm is the resistance through which a difference of potential of one volt will produce a current of one ampere.
Revenue meter	A meter used by a utility to generate billing information. Many types of meters fall in this category depending on the rate structure.
Root mean square (RMS)	The effective value of alternating current or voltage. The RMS values of voltage and current can be used for the accurate computation of power in watts. The RMS value is the same value as if continuous direct current were applied to a pure resistance.
Setup	Consists of a number, title, and up to 32 reports. The types of reports programmed, and the conditions that must exist for the report to be generated, are all contained in a setup. A total of 32 setups can be programmed, although only one setup can be active at a given time.

Single-phase	An alternating current circuit in which only one phase of current is available in a two-conductor or three-conductor system where the load lines are 0° or 180° out of phase.
Sliding demand interval	A method of calculating average demand by averaging the average demand over several overlapping intervals. The intervals begin a short time span (step) apart, usually about five minutes. Updating average demand at short time intervals gives the utility a much better measure of true demand and makes it difficult for the customer to obscure high short-term loads.
Time-dependent clauses	Rate schedule provisions which vary rates depending on the time of day or time of year when energy is consumed. Frequently these clauses cover both demand and energy charges. There is money to be saved by operating high loads and consuming high amounts of energy during off-peak periods when rates are lower.
Telephone Influence Factor	Telephone Influence Factor (TIF) is a dimensionless quantity which describes the potential for interference by a power circuit on a communications circuit. TIF weighting factors take into account the relative interfering effects of various frequencies in the voice band. Weighting factors are calculated under the assumption that coupling between the power and communications circuits is directly proportional to the frequency. There is no accounting for the physical orientation of the two systems.
Time-of-use period	Utility company charge rates at different times and/or dates. For example, they may charge lower rates on weekends or holidays. On weekdays, they might charge one rate between 8 am and 5 pm, another rate between 5 pm and 10 pm, and still another rate between 10 pm and 8 am.
Transformer Derating Factor (TDF)	Excessive harmonics can cause premature failure of distribution transformers. This results from high winding “hot spot” temperatures caused by power dissipation due to the presence of harmonic currents in the windings. To maintain operation of a transformer in the presence of harmonic content, a derating factor should be used. TDF is the suggested value to be used.
Trigger	A condition that causes a report to be generated. For example, reports can be programmed to be generated at certain times of the day, when a measured parameter exceeds a certain limit, or when an external impulse is received at the digital inputs.
True power	Same as real power.
Unbalanced loads	A situation existing in an alternating current system using more than two current-carrying conductors where the current is not equal in the current-carrying conductors due to uneven loading of the phases.
Volt-ampere (VA)	The unit of apparent power. It equals volts times amperes regardless of power factor.

Volt-ampere demand	Where peak average demand is measured in volt-amperes rather than watts. In this case the customer is automatically penalized for operating at any power factor less than unity.
Volt-ampere-reactive (var)	The unit of reactive power, as opposed to real power in watts. One var is equal to one reactive volt-ampere.
Volt-ampere-reactive demand	Measuring var demand is a method of penalizing for poor power factor. Multiplying total peak average var demand by some rate (dollars per var) penalizes for operating at any power factor less than unity. Frequently there is a quantity of “free” var which is determined as some percentage of the peak average watt demand. All excess var over this quantity is then billed at this dollars per var rate. Effectively this penalizes for operating below some specified power factor less than unity.
Volt-ampere-reactive-hour	The measure of the number of var's used in one hour. Var-hr and w-hr are frequently used to calculate average power factor during a billing period.
Voltage (v)	The force which causes current to flow through a conductor. One volt equals the force required to produce a current flow of one ampere through a resistance of one ohm.
Watt (w)	A measure of real power. The unit of electric power required to do work at the rate of one joule per second. It is the power expended when one ampere of direct current flows through a resistance of one ohm.
Watt demand	The usual demand billing factor where peak average demand is measured in watts or real power.
Watt-hour (wh)	A unit of electrical work indicating the expenditure of one watt of electrical power for one hour.
Wattmeter	An instrument of measuring the real power in an electric circuit. Its scale is usually graduated in watts, kilowatts, or megawatts.
Week (Weekly)	Begins at 00:00:00 on Sunday, ends at 23:59:59 on Saturday.
Wrap	Type of memory that continues to collect data when full by writing over the earlier (oldest) data it has collected. This process continues with data constantly writing over older data.

Index

A

- AC Power Source 4-5
- All Channels, All Parameters 7-7
- All Channels, One Parameter Screen 4-63
- Analog device 5-5
- Apparent Power
 - formula H-8
- Assumed Values 5-9
- Audible Alarm 5-17
- Automatic Reports
 - definition 1-8

B

- Battery Pack
 - replacement C-5
 - replacing fuse D-5
 - safety precautions C-3
 - specifications C-2
 - status of L-4
- Battery, Lithium C-2
- Billing Date 6-12
- Billing Dates 5-26

C

- Calibration 1-9
- Channel D 5-8
- Channel Selection Screen 4-60
- Clear Memory 5-39, 5-40
- Communication 1-9
 - configuring local RS232 devices 8-8
 - configuring remote RS232 devices 8-17
 - device test 8-28
 - internal modem/fax 8-20
 - local RS232 8-4
 - parallel printer 8-10
 - remote RS232 8-14
 - types of 8-1
 - types of devices 8-1
- Configuration Setup Menu 5-1

- Configuration Setups 5-1
- Configure I/O Menu 5-3
- Configure Relays 5-14, 5-15
- Current
 - ABC totals formula H-7
- Current Channels
 - specifications H-5
- Current Connections
 - current probe 4-22
 - current probe example 4-25
 - current transformer (CT) 4-26, 4-27
 - guidelines 4-25
 - isolated current transformers 4-28, 4-29
 - safety precautions 4-12, 4-22
 - verifying 4-34

- Current Phasors
 - viewing 4-64

- Current Probes
 - connecting 4-22
 - connection example 4-25
 - description A-4
 - specifications H-11
 - types of 4-23

- Current Transformers
 - connecting 4-26, 4-27
 - safety precautions 4-26
 - types of 4-27

D

- DC Connector Plug
 - description L-3
- DC Power Source, External
 - making cable for L-3
- Delta
 - floating, connection diagram 4-43
 - floating, phasor diagram 4-52
 - high-leg, connection diagram 4-47
 - high-leg, phasor diagram 4-52
 - one leg grounded, connection diagram 4-44
 - one leg grounded, phasor diagram 4-51
 - open leg, connection diagram 4-46
 - open leg, phasor diagram 4-52
 - red-legged, connection diagram 4-47
- Demand Cost Report 7-15

Demand Interval Criteria 5-34
Demand Report 7-9
Digital Input Channels 5-11
Digital Input Setting 5-10
Digital Inputs
 description 1-10

E

Easy Start 2-1
Edit Time Plot 6-20
End of Demand Interval 6-11
Energy Cost Report 7-14
Energy Report 7-11
Error Message Output Screen 8-28
Error Messages
 TASKCard 4-8, 4-9
Events 7-21
 description 1-8
External Battery Charger A-5
External Battery Filter
 description L-6
 extension cables L-7
 installation L-8
External Disk Drives A-5
External Trigger 6-12

F

Fax
 configuration 8-26
 connection 8-25
 specifications H-3, H-4
Fill and Stop 5-22
Formatting a Memory Card 5-43
Fuses
 replacing battery D-5
 replacing main power D-2
 types of D-1

H

Handbook for Energy Management A-5
Harmonics

 viewing in meter mode 4-65
Harmonics Reports 7-24
Hi/Lo Limits 6-9

I

Internal Modem
 description A-4
Internal sync frequency 5-8
ISO Boxes, see isolated current transformers
Isolated Current Transformers
 applications 4-29
 connecting 4-28, 4-29
 connecting to non-Dranetz-BMI current
 probe 4-32
 connecting to permanently installed CT 4-
 30
 description A-4
 in-line connection 4-31
 safety precautions 4-28
 specifications H-12

K

KYZ Pulse 5-9

L

LCD Backlight Auto-shutoff 5-16

M

Measurement Cable Set 4-15
Memory Card
 description A-4
 formatting 5-43
 reading setups from 4-57
 writing to 5-44
Memory Card Function Screen 4-57, 5-43, 5-
 44
Memory Card Readers A-5
Memory Storage Type 5-22
Meter Mode

- available parameters 4-61
- description 1-7
- viewing 4-61
- viewing harmonics 4-65
- Meter Mode Menu Screen 4-62
- Min/Max Report 7-12
- Modem
 - configuring internal 8-23
 - connecting external 8-14
 - FCC Rules and Regulations 8-20
 - internal 8-20
 - internal, specifications H-3, H-4
 - test 8-28
- Modem/Fax Configuration Screen 8-23, 8-26
- Monitoring Setups
 - description 1-8
 - printing 6-13
 - programming 6-1
 - reading from memory card 4-57
 - selecting and activating 4-55

N

- No Voltage Configuration 5-8

O

- One Channel, All Parameters Screen 4-62
- Optional Accessories
 - current probes A-4
 - extension cables for external battery filter L-7
 - external battery charger A-5
 - external battery filter L-6
 - external disk drives A-5
 - Handbook for Energy Management A-5
 - internal modem A-4
 - isolated current transformers A-4
 - list A-2
 - memory card A-4
 - memory card readers A-5
 - RS232 cables 8-5, A-4
 - TASKCard 8000 A-4
- Other Devices Configuration Screen 9-4
- Overwrite 5-22

P

- Parallel Port Configuration Screen 8-13
- Parallel Printer
 - configuring 8-13
 - connection 8-10
- Phasor Diagrams
 - for standard power connections 4-51
 - viewing 4-64
- Phasor Screen 4-34
- Potential Transformers
 - connecting 4-20
 - definition 4-20
 - scale factor 4-21
- Power Factor
 - formula H-8
- Power Measurements
 - delta, one leg grounded 4-44
 - floating delta 4-43
 - four wire wye 4-41
 - high-leg delta 4-47
 - open leg delta 4-46
 - phasor diagrams 4-51
 - single phase 4-39
 - split phase 4-40
- Power Platform
 - connecting to an AC power source 4-5
 - front panel 3-2
 - installing TASKCard 4-6
 - operating on internal battery 4-5
 - operational description 1-6, 1-7
 - positioning 3-8
 - rear panel 3-4
 - setting the voltage selector 4-3, 4-4
 - standard accessories 1-4
 - turning on 4-7
- Printer
 - configuring external 8-13
 - external, parallel 8-10
 - external, serial 8-4
 - internal, assembly 9-2
 - internal, controls 9-3
 - internal, normal operation 9-5
 - internal, paper replacement 9-7
 - internal, turning on and off 9-4
 - specifications H-3

Programming Reports 6-6

R

Rate Schedule 5-28

Rate Schedule Report 7-13

Reactive Power

 formula H-8

Redirect Error Messages 5-21

Relay Reports 7-4

Relays

 specifications H-4

Repacking for Return Shipment B-1

Replaceable Parts List F1

Report Types 7-2

Reports

 programming 6-6

 types 6-6

Reports, see automatic reports

Reset Configuration 5-41

RS232

 configuring local devices 8-8

 configuring remote devices 8-17

 direct connection diagram 8-7

 local communication 8-4

 optional cables 8-5, A-4

 port description 8-4

 port specifications H-3

 remote communication 8-14

 test 8-28

RS232D Configuration Screen 8-8, 8-17

S

Scale Factors 5-6

Scope Mode

 description 1-8, 4-59

 selecting channels for display 4-60

 viewing 4-59

Scope Mode Screen 4-8, 4-10, 4-59

Select Language 5-20

Set Scales Screen 4-66

Single Phase

 connection diagram 4-39

 phasor diagram 4-51

Site Identifier 5-25

Spare Parts F1

Specifications

 computed parameters H-7

 current probes H-11

 general H-2

 interfaces H-3

 isolated current transformers H-12

 measured parameters H-5

Split Phase

 connection diagram 4-40

 phasor diagram 4-51

Standard Accessories 1-4

 DC connector plug L-3

 measurement cable set 4-15

Status Menu 5-38

Storage Time 7-6

T

TASKCard

 8000 A-4

 error messages 4-8, 4-9

 installation 4-6

Time and Date 5-19

Time Interval 6-10

Time of Use Periods 5-30

Time Plot Reports 7-17

Time-of-Use Report 7-16

Trigger Screens 6-9

Turn On Procedure 4-7

U

User Format Reports 7-23

User Reports

 copy 6-17

 creating 6-15

 delete 6-18

 printing 6-19

V

View Digital Input Status 5-42

- View Reports 7-5
- Voltage
 - ABC totals formula H-7
- Voltage & Current Phasors Screen 4-64
- Voltage and Current Harmonics Text Screen 4-67
- Voltage Channels
 - specifications H-5
- Voltage Connections
 - neutral to ground example 4-19
 - potential transformers 4-20
 - safety precautions 4-12
 - single phase example 4-18
 - verifying 4-34
 - voltage probe 4-18
- Voltage Phasors
 - viewing 4-64
- Volt-Amps
 - formula H-8
- Volt-Amps Reactive
 - formula H-8

W

- Watts
 - formula H-7
- Write Data to Memory Card Screen 5-44
- Wye
 - four wire, connection diagram 4-41

