1A PROTECTIVE RELAYING TERMINAL FACILITIES SERVING POWER INDUSTRY EQUIPMENT DESIGN REQUIREMENTS PRIVATE SERVICE SYSTEMS

1. GENERAL

SCOPE

1.01 This specification, together with the supplementary information listed herein, provides a brief system description and summarizes the equipment design requirements to be used in the manufacture and installation of the 1A protective relaying terminal.

DESCRIPTION

1.02 The 1A protective relaying terminal is an audio-tone communications system designed to protect power company high-voltage transmission lines and equipment during the onset of a fault condition. Its primary function entails high-speed signaling over leased 4-wire private lines between power substations to activate power company circuit breakers, thereby isolating the fault and preventing its propagation through the power network.

1.03 The prime concern of any relaying system is the ***reliability*** with which it performs, ie, the ability to cause a circuit breaker to trip when an authentic trip signal is initiated by a fault detector, and alternatively, to prevent false trips from activating the breaker. Inability to perform properly would result in serious damage to equipment resulting in power failures in the first case, and power outages in the latter.

1.04 The 1A protective relaying (P/R) terminal employs three audio frequencies for signaling. In the normal (idle) condition, the system transmits a continuous guard tone (2430 Hz). Receipt of a trip signal over the keyer leads causes two high-level, short-duration tones (2130 and 2730 Hz) to be transmitted with the simultaneous removal of the guard tone. The receiver logic requires both the absence of the guard signal and the reception of the two trip signals to initiate a trip to the power breaker.

1.05 ***Monitoring*** of the system's status is provided by means of the supervisory circuits and associated alarms which are integral to the terminal's operation. Moreover, the condition of the receiving station(s) can be monitored automatically at the transmit station on a continuous basis. In addition, maintenance personnel can readily perform routine checks for testing system integrity and performance of all distant terminals. Separate audio frequencies (1445, 1520, and 1595 Hz) have been assigned for the supervisory functions which permit uninterrupted supervision without impairment of the main communications link.

1.06 ***Power*** is obtained from 48- or 125-volt power station battery to ensure a dependable source. Fused output potentials of +15 and −15 volts are derived from a dc-to-dc converter. A converter input circuit is used as a surge suppression buffer between the dc converter and station battery.

1.07 The basic protective relaying system arrangements are:

(a) Unidirectional 2-point.

(b) Unidirectional multipoint.

(c) Bidirectional 2-point.

(d) Bidirectional multipoint.

1.08 All of the above systems may be configured in a dual-channel arrangement, ie, two redundant terminals in parallel using the same or diverse communication facilities to provide a still higher degree of reliability. The trip signals from each channel can be combined optionally on an AND or an OR basis, depending on whether enhanced security against false trips or dependability

of valid trip reception is the objective. In the single-channel multipoint version, a maximum of four receivers (five points) can be accommodated.

1.09 A modular ***physical design*** is employed to provide system versatility. Two mountings, the transceiver and interface units finished in blue-gray vinyl, house the terminal equipment. These units measure 7 inches high by 19 inches wide and are arranged to mount on a standard 19-inch rack. The logic circuits use high-threshold dual-in line packages (DIPs) and are mounted on circuit pack assemblies; these nest on nylon sliders which are part of the J1G030B transceiver unit (Fig. 1 and 2). Associated with the circuit packs are detachable control panel and backplane assemblies, ***two*** of which (transmitter and/or receiver) can be mounted on the transceiver unit providing controls, backplane connectors, and wiring for the circuit packs. The control panels, featuring a brushed anodized aluminum surface, mount on the horizontally hinged door of the transceiver unit by means of four nuts. A flat connector cable from the corresponding backplane plugs into the connector provided on the control panel, establishing electrical continuity. The detachable control panels and backplanes can be readily replaced in the field, permitting rapid maintenance, and eliminating lengthy troubleshooting at the site.

1.10 Where an odd number of terminals are required for a system, the vacant position can be covered by a dummy control panel to retain the aesthetics. The hinged door assembly is secured by means of three floating magnetic catches on the mounting unit. A mechanical stop is provided for the door when in the opened position.

1.11 All of the ***circuit packs*** (with the exception of the J1G030EA multipoint combiner) feature a double board hinged "sandwich" construction with an interconnected mother and daughter board (Fig. 3). Only the mother board contains a plug end with finger terminals for plugging into its associated backplane connector. The boards are arranged with the components facing each other for maximum mechanical protection, at the same time facilitating assembly and repair when opened flat on a workbench. Functional units such as the main transmitter, supervisory transmitter, supervisory receiver, and multipoint combiner are partitioned into single circuit packages. The main receiver is comprised of three circuit pack sandwiches. These employ active filters using DIP integrated circuit packages.

1.12 Field adjustments are facilitated by means of screw switches or potentiometers, without any need for disassembly of circuit packs. It is recommended that power be turned off (fuse removed

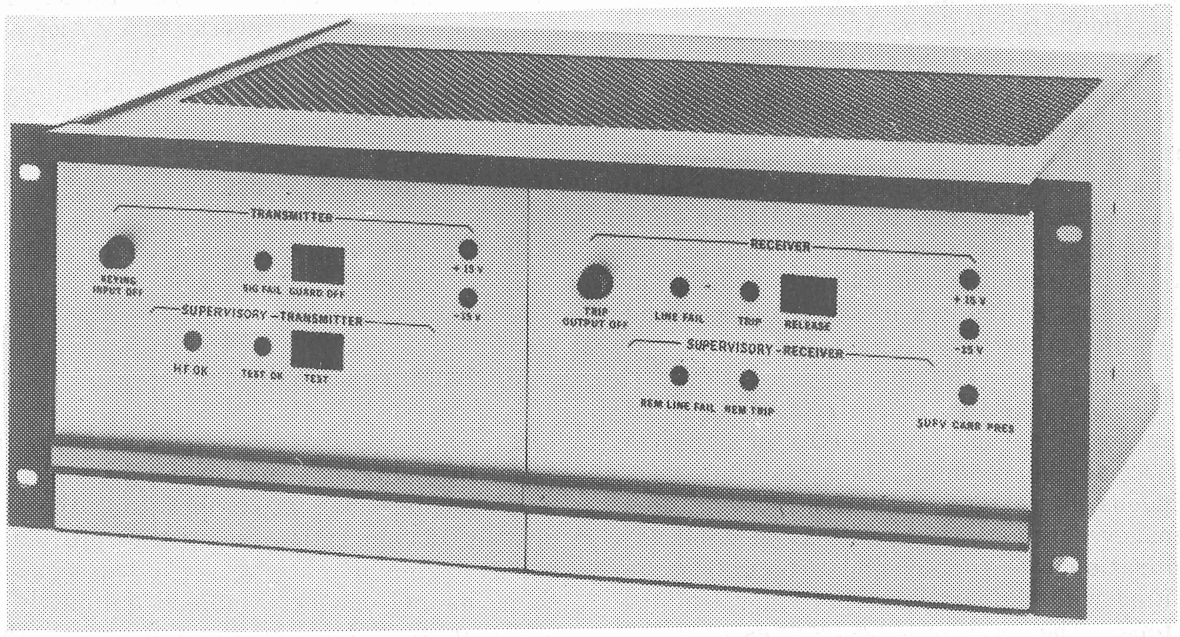

Fig. 1—Transceiver Unit

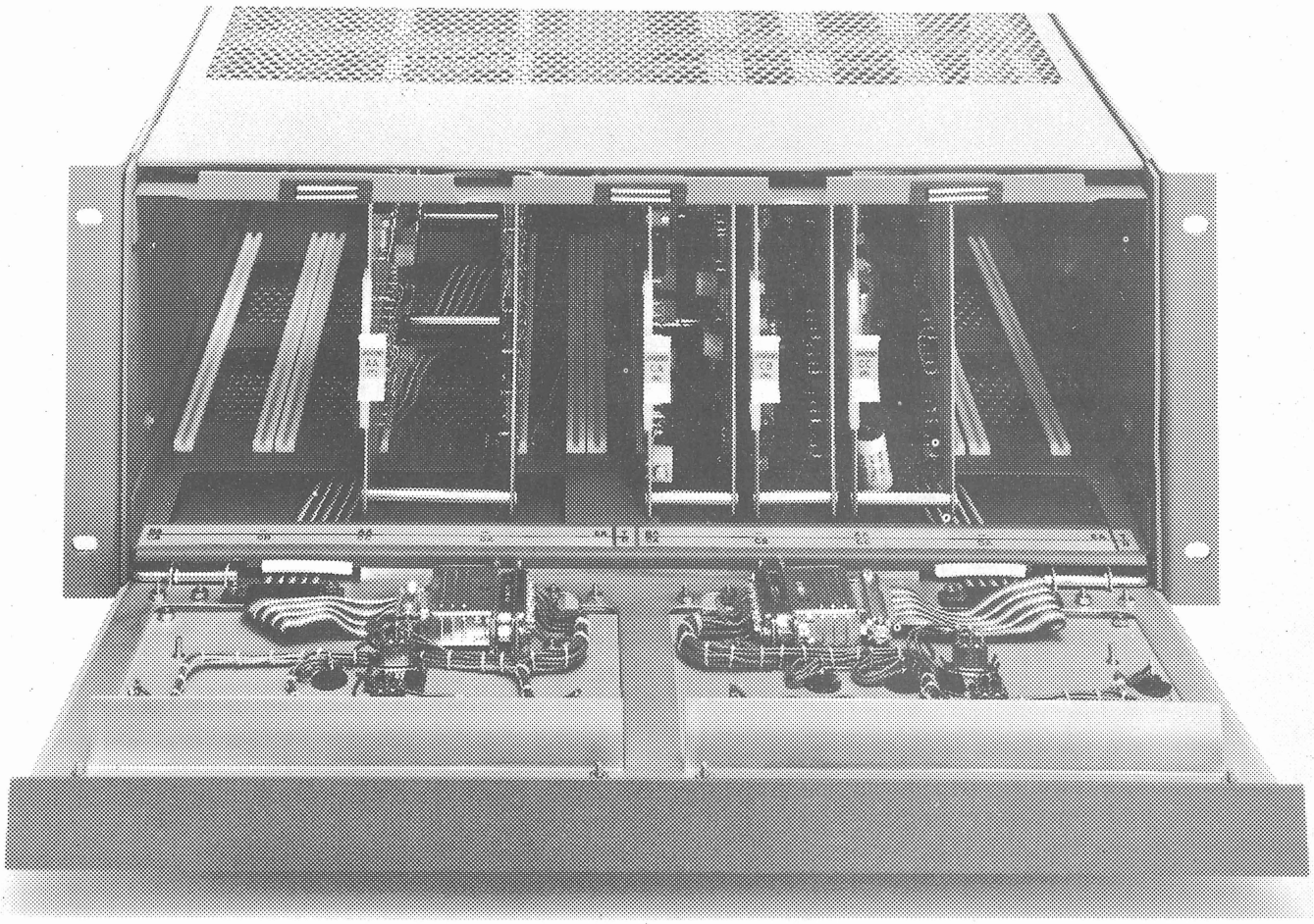

Fig. 2—Transceiver Unit—Internal View (Equipped With Main Transmitter and Main Receiver Circuit Packs)

on converter module) before insertion or extraction of unit circuit packs to prevent damage to the contacts. The transceiver unit features an integral flanged bar on the door assembly to ensure proper engagement of the circuit packs in their connectors before the door can be fully closed.

1.13 Partitioned into the J1G030G interface unit are the interface modules which include bulky and high-dissipation components for interfacing with the electric utility's fault detection equipment and circuit breakers. The interface unit is very similar physically to the transceiver except for a permanent brushed anodized aluminum panel on the hinged door (Fig. 4). The formed steel mounting permits mounting up to five interface modules (Fig. 5 and 6). This is accomplished by sliding the module into its position, engaging the slots on the lower surface, and fastening the top of the module by means of two screws. The J1G030GE fuse and converter module furnishes two sets of +15 and −15 volt (L&R) potentials for the left and right positions of the transceiver unit, as well as the alarm module. Normally a single terminal (transmitter or receiver) is powered off each set of fused ±15 volt outputs; however, it is permissible to multiple two transmitter terminals off a single set when necessary. The combinations of terminals that can be powered from a single fuse and converter module are given in Table B, Note 5. For maximum reliability, separate converters are utilized for each leg of a dual-channel system. In a 3-point bidirectional dual-channel arrangement, two fuse and converter modules are normally required for each channel; however, it is permissible to use three converters for the entire system by sharing the odd converter between the receivers of separate channels. It is important, in such a case, that the ±15 volt power

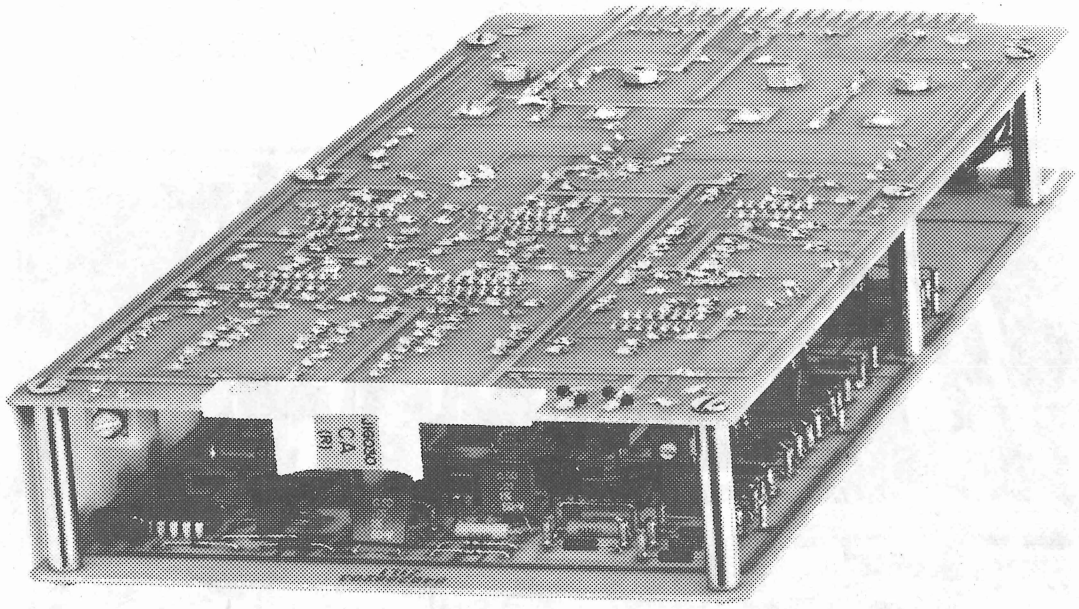

Fig. 3—Typical Circuit Pack

supplied to each receiver trip output be from the same fuse and converter module powering its associated receiver.

1.14 The ***alarm module*** (one per system) provides a means for multipling alarm leads at one point and furnishing a contact closure to the customer, as well as an audible alarm. In dual-channel applications, separate alarm modules are used with the internal alarm leads appropriately segregated. Visual indicators are provided on the face of the interface unit to denote alarm and disabled alarm conditions.

1.15 Special consideration should be given to ***system grounding.*** Separate frame and signal ground networks are to be maintained throughout. These grounds are tied together at only one point (designated station ground) independent of the number of terminals or systems by means of a Kulka 600 RJS jumper furnished with each system. The frame ground network is established by connecting the frame ground of each mounting in series with those of the mountings above and below. The signal ground from each transceiver unit, however, is connected directly to the transceiver's corresponding interface unit (converter input module). All of the signal ground terminals (converter input modules) are then tied together in series. No. 16 AWG stranded copper wire double-ended in spade terminals shall be used for all ground feeder connections; these are furnished with each converter input module.

1.16 All internal wiring connections are soldered. External connections, on the transceiver as well as the interface modules, utilize screw-type terminals rated to withstand high-voltage transients as well as providing a high-reliability connection. The terminal strips will accommodate wire sizes No. 22 to No. 16 AWG. The standard recommended interconnection uses KS-19165, L1, solid No. 20 AWG wire with the bare end wrapped around the screw terminal. Terminating two wires requires twisting the bare portions together before placing around the screw. To reduce wire buildup on any terminal, an adjacent spare terminal may be activated by means of a Kulka 600 RJS jumper (or equivalent). External wiring runs are routed on both sides of the mountings through the openings provided. Use of a commercially available plastic harness wrap for bundling wires can lend an orderly appearance to the wiring field. Upon completing a field installation, the rear covers of the mountings should be fastened to their mountings.

1.17 The 1A protective relaying terminal has been designed to operate in a thermal environment

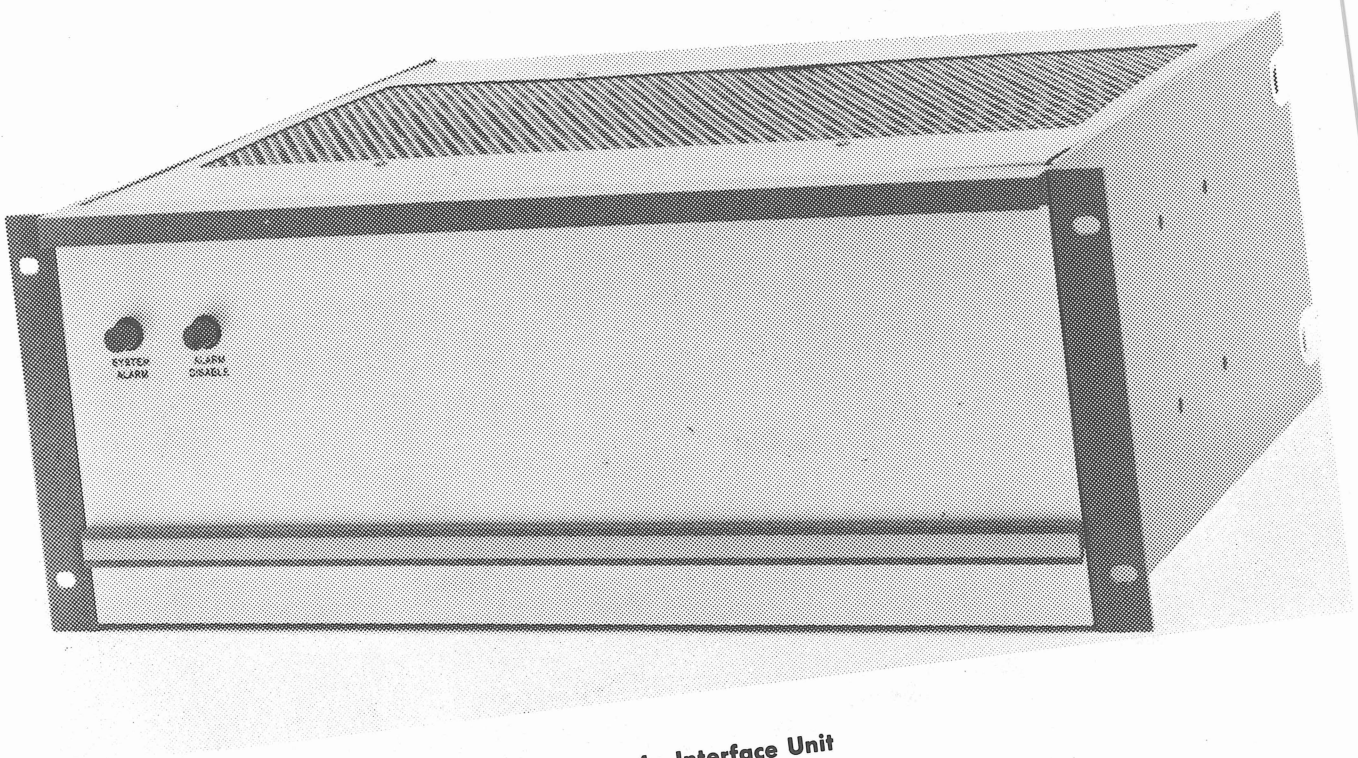

Fig. 4—Interface Unit

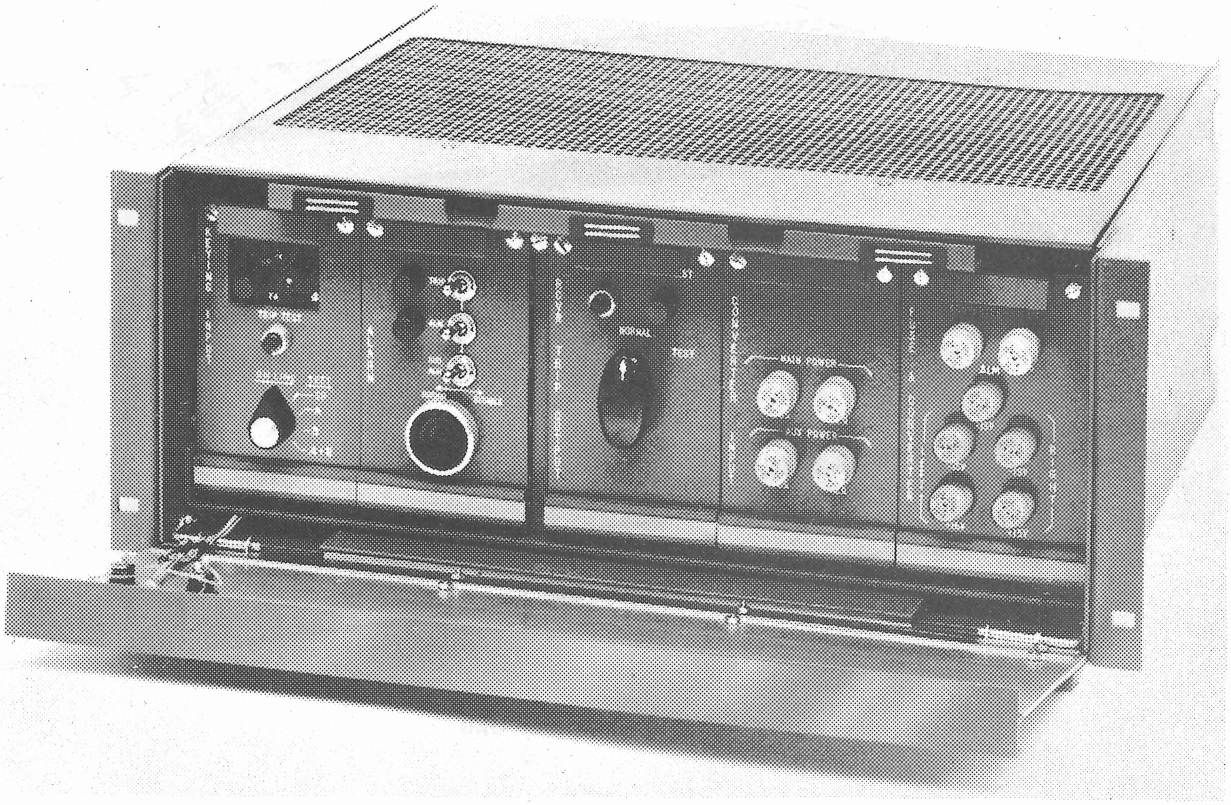

Fig. 5—Interface Unit—Internal View

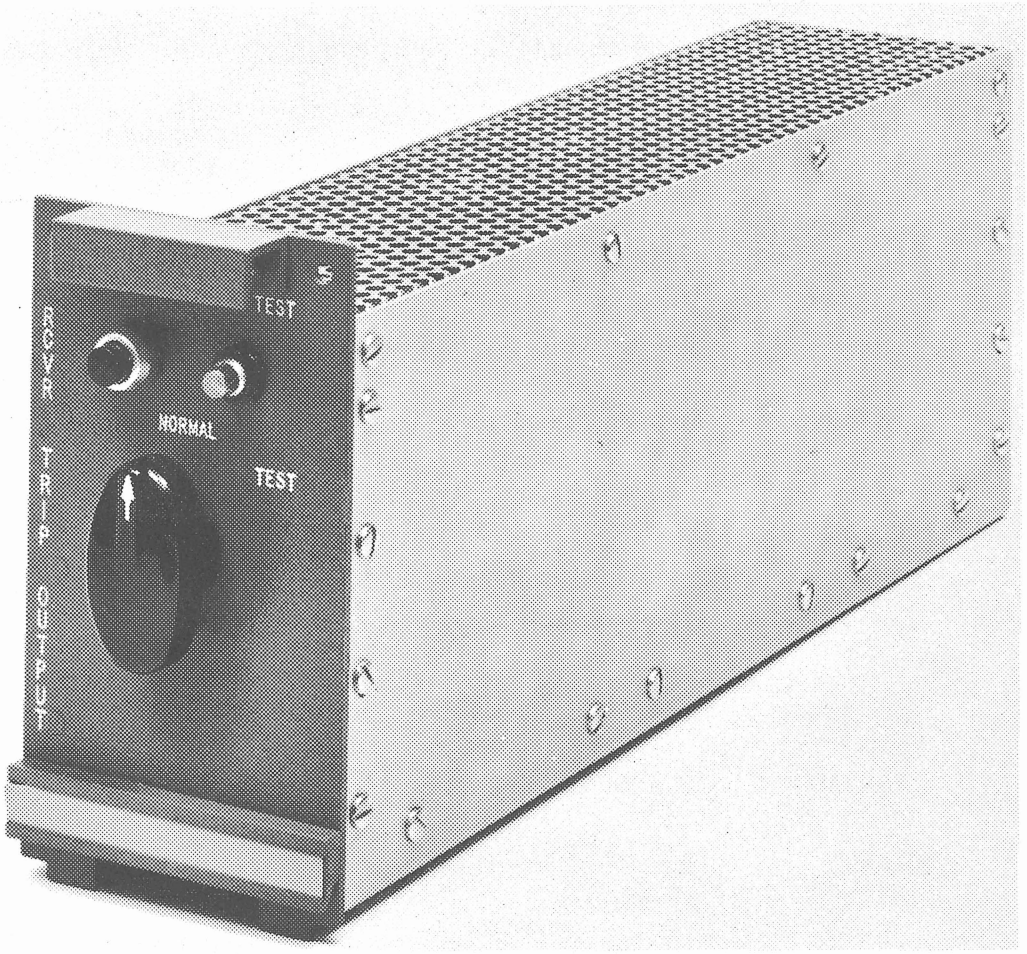

Fig. 6—Typical Interface Module (Receiver Trip Output)

of −30 to +60°C (−22 to +140°F). Since high-temperature ambients, in general, tend to have deleterious effects on component life expectancy, certain practices should be observed. Intermediate perforated covers on adjoining units may be removed prior to installation on the rack. Interface modules should be mounted in their interface mounting starting at the left so that any unused spaces are in the center, to yield a more uniform heat flux and more effective cooling. An open unobstructed rack is preferred, although installation in a well-ventilated cabinet with several inches of clearance between equipment and cabinet walls (front and rear) is acceptable. In larger systems utilizing several P/R mountings where stacking is necessary, it is recommended that three standard panel widths (5-1/4 inches) be allowed between units to reduce thermal loading, where possible.

SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX

WE J drawings should be ordered by referring to the prefix and base number and requesting the current dash (—) number.

EQUIPMENT CODE	RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING
		Mountings		
J1G030A	AT&TCo Std	Transceiver Control Panel	J1G030A-( )	SD-1G267-01
J1G030B	AT&TCo Std	Transceiver Mounting Unit	J1G030B-( )	SD-1G267-01
J1G030C	AT&TCo Std	Transceiver Backplane	J1G030C-( )	SD-1G267-01
J1G030G	AT&TCo Std	Interface Mounting Unit	J1G030G-( )	SD-1G267-01
		Circuit Packs		
J1G030AA	AT&TCo Std	Main Transmitter	J1G030AA-( )	SD-1G267-01
J1G030BA	AT&TCo Std	Supervisory Transmitter	J1G030BA-( )	SD-1G267-01
J1G030CA	AT&TCo Std	Main Receiver — Input	J1G030CA-( )	SD-1G267-01
J1G030CB	AT&TCo Std	Main Receiver — High Trip Detection	J1G030CB-( )	SD-1G267-01
J1G030CC	AT&TCo Std	Main Receiver — Logic	J1G030CC-( )	SD-1G267-01
J1G030DA	AT&TCo Std	Supervisory Receiver	J1G030DA-( )	SD-1G267-01
J1G030EA	AT&TCo Std	Multipoint Combiner	J1G030EA-( )	SD-1G267-01
		Interface Modules		
J1G030GA	AT&TCo Std	Keying Input Module	J1G030GA-( )	SD-1G267-01
J1G030GB	AT&TCo Std	Alarm Module	J1G030GB-( )	SD-1G267-01
J1G030GC	AT&TCo Std	Converter Input Module	J1G030GC-( )	SD-1G267-01
J1G030GD	AT&TCo Std	Receiver Trip Output Module	J1G030GD-( )	SD-1G267-01
J1G030GE	AT&TCo Std	Fuse and Converter Module	J1G030GE-( )	SD-1G267-01
J1G030D	Reserved			
J1G030E	Reserved			
J1G030F	Reserved			

Circuit Schematic Index

CIRCUIT DRAWING	J1G030 EQPT CODE
SD-1G267-01	A, B, C, G, AA, BA CA, CB, CC, DA EA, GA, GB, GC, GD, GE

2. SUPPLEMENTARY INFORMATION

811-000-000—Numerical Index—Private Service Systems
800-020-001—Checking List—General Equipment Requirements—Divisions 800 to 839
800-600-000—Checking List—General Equipment Requirements
800-612-154—Connecting and Soldering Individual Conductors
024-195-100—Description and Operation—1A Protective Relaying Terminal
024-195-200—Installation—1A Protective Relaying Terminal
024-195-300—Maintenance—1A Protective Relaying Terminal
024-195-500—Test Procedure—1A Protective Relaying Terminal
X-78627—Manufacturing Testing Requirements—1A Protective Relaying Terminal
KS-21010—Converter (DC-to-DC)

Current Drain Data—See Table A

3. DRAWINGS

For additional drawings forming a part of this specification, see listings under Subdivisions of Equipment and Detailed Index.

ED-1D160-( )—
ED-1D161-( )—
ED-1D162-( )—
ED-1D163-( )—
ED-1D164-( )—
ED-1D165-( )—
ED-1D166-( )—

Data Systems—Printed Wiring Board Subassemblies

4. EQUIPMENT

J1G030A—AT&TCo Std—Transceiver Control Panel

Equipment—J1G030A-( )

List 1—Main transmitter plus supervisory transmitter per SD-1G267-01, App Fig. 1, option ZH. (See Note A.)
List 2—Supervisory transmitter only per SD-1G267-01, App Fig. 1. (See Note A.)
List 3—Main receiver plus supervisory receiver per SD-1G267-01, App Fig. 2, option ZG. (See Note A.)
List 4—Main receiver plus supervisory receiver for channel A of dual-channel system per SD-1G267-01, App Fig. 2, options ZG and Q. One required per dual-channel system. (See Note A.)
List 5—Supervisory receiver only per SD-1G267-01, App Fig. 2. (See Note A.)
List 6—Dummy panel used to conceal vacant position when only one of the two positions on a mounting is occupied. (See Note A.)

Note

A. Assembly, wiring, and equipment for one control panel designed to mount in either the left or right position (must specify) on the J1G030B, List 1 transceiver mounting unit; equipped with plug for connection to associated J1G030C backplane.

J1G030B—AT&TCo Std—Transceiver Mounting Unit

Equipment—J1G030B-( )

List 1—Framework, assembly, and equipment for one circuit pack mounting unit. Designed to mount any combination of two transmitters or receivers comprising control panels, backplanes, and circuit packs. Arranged to mount on a standard 19-inch relay rack. (See Note A.)
List 2—Assembly, wiring, and equipment required in addition to list 1 to provide one main transmitter plus supervisory transmitter per SD-1G267-01, App Fig. 1 (option ZH),

TABLE A

CURRENT, POWER DRAINS, AND DISSIPATION

UNIT	TITLE	CURRENT DRAIN (mA)		POWER DRAIN (WATTS)		MAXIMUM HEAT DISSIPATION (WATTS)		
						STATION BATTERY		
		+15 VOLTS	−15 VOLTS	+15 VOLTS	−15 VOLTS	48 VOLTS	125 VOLTS	250 VOLTS
								(See Note 1)
T/R Circuit Packs								
J1G030AA	Main Transmitter	280	170	4.2	2.6	6.8	6.8	
BA	Supervisory Transmitter	300	10	4.5	0.2	4.7	4.7	
CA, CB, CC	Main Receiver	435	245	6.5	3.7	10.2	10.2	
DA	Supervisory Receiver	500	20	7.5	0.3	7.8	7.8	
EA	Multipoint Combiner	100		1.5		1.5	1.5	
I/F Modules								
J1G030GA	Keying Input					13	17	35
GA	Keying Input (Dual Channel)					25	30	53
GB	Alarm		480		7.2	7.2	7.2	
GC	Converter Input					2.5	1.5	
GD,L1	Trip Output	25		0.38		3.6	8.9	17.4
L2	Trip Output (SSTD)	37		0.56		3.8	9.1	17.6
GE,L1&L2	Fuse and Converter	(See Note 2)	(See Note 2)	(See Note 2)	(See Note 2)	23 (See Note 3)	23 (See Note 3)	

Note 1: Where keyer and trip output are powered by 250-volt station battery.

Note 2: Converter Specifications:
A. Maximum input power: 100 watts.
B. Maximum output current: 2,500 mA at +15 volts; 1,000 mA at −15 volts.
C. Maximum output power: 52 watts.

Note 3: At full load.

3, and 4. (See Note B.) List 2 is made up of the following equipment:

J1G030A, L1—Control Panel
J1G030C, L1—Backplane
J1G030AA-( )—Main Transmitter Circuit Pack (See Note C.)
J1G030BA-( )—Supervisory Transmitter Circuit Pack (See Note C.)

List 3—Assembly, wiring, and equipment required in addition to list 1 to provide one supervisory transmitter per SD-1G267-01, App Fig. 1 and 4. (See Note B.) List 3 is made up of the following equipment:

J1G030A, L2—Control Panel
J1G030C, L1—Backplane
J1G030BA-( )—Supervisory Transmitter Circuit Pack (See Note C.)

List 4—Assembly, wiring, and equipment required in addition to list 1 to provide one main receiver plus supervisory receiver per SD-1G267-01, App Fig. 2 (option ZG), 6, and 7. (See Note B.) List 4 is made up of the following equipment:

J1G030A, L3—Control Panel
J1G030C, L2—Backplane
J1G030CA-( )—Main Receiver—Input Circuit Pack (See Note C.)
J1G030CB-( )—Main Receiver—High Trip Detection Circuit Pack (See Note C.)
J1G030CC-( )—Main Receiver—Logic Circuit Pack (See Note C.)
J1G030DA-( )—Supervisory Receiver Circuit Pack (See Note C.)

List 5—Assembly, wiring, and equipment required in addition to list 1 to provide one main receiver plus supervisory receiver for receiver A in dual-channel arrangements per SD-1G267-01, App Fig. 2 (options ZG and Q), 6, and 7. (See Note B.) List 5 is made up of the following equipment:

J1G030A, L4—Control Panel
J1G030C, L2—Backplane
J1G030CA-( )—Main Receiver—Input Circuit Pack (See Note C.)
J1G030CB-( )—Main Receiver—High Trip Detection Circuit Pack (See Note C.)
J1G030CC-( )—Main Receiver—Logic Circuit Pack (See Note C.)
J1G030DA-( )—Supervisory Receiver Circuit Pack (See Note C.)

List 6—Assembly, wiring, and equipment required in addition to list 1 to provide one supervisory receiver per SD-1G267-01, App Fig. 2 and 7. (See Note B.) List 6 is made up of the following equipment:

J1G030A, L5—Control Panel
J1G030C, L2—Backplane
J1G030DA-( )—Supervisory Receiver Circuit Pack (See Note C.)

List 7—Assembly and equipment required in addition to list 1 to provide one dummy panel for use in an unequipped position. List 7 is made up of the following equipment:

J1G030A, L6—Control Panel

Notes

A. Adjustable mounting ears permit variable depth mounting on rack.

B. Specify left or right mounting position.

C. To be shipped separately.

J1G030C—AT&TCo Std—Transceiver Backplane

Equipment—J1G030C-( )

List 1—Transmitter (includes supervisory transmitter and multipoint combiner wiring) per SD-1G267-01 (CAD Fig. 2).
List 2—Receiver (includes supervisory receiver wiring) per SD-1G267-01 (CAD Fig. 1).

Note

A. Assembly, wiring, and equipment for one backplane designed to mount in either the left or right position on the rear of J1G030B, List 1 transceiver mounting unit; equipped with

flat connector cable for connection to associated J1G030A control panel.

J1G030D, E, and F—Reserved

J1G030G—AT&TCo Std—Interface Mounting Unit

Equipment—J1G030G-( )

List 1—Framework, assembly, wiring, and equipment for one interface mounting unit per SD-1G267-01, App Fig. 8. Designed to mount up to five interface modules. Arranged for 19-inch relay rack mounting. (See Note A.)

List 2—Equipment required in addition to list 1 to provide power and alarming for ±48 volt customer station battery per SD-1G267-01, App Fig. 10 (option P), 11 (option P), and 13. (See Note B.) List 2 is made up of the following equipment:

J1G030GB-( )—Alarm Module
J1G030GC, L1—Converter Input Module
J1G030GE, L1—Fuse and Converter Module

List 3—Equipment required in addition to list 1 to provide power and alarming for ±125 volt customer station battery per SD-1G267-01, App Fig. 10 (option S), 11 (option S), and 13. (See Note B.) List 3 is made up of the following equipment:

J1G030GB-( )—Alarm Module
J1G030GC, L2—Converter Input Module
J1G030GE, L2—Fuse and Converter Module

List 4—Equipment required in addition to list 1 and list 2 or 3 to provide one keying input module per SD-1G267-01, App Fig. 9. (See Note B.) Must specify option Z (48V), Y (125V), or X (250V) per customer keying battery. In addition, specify option W for dual-channel operation. List 4 is made up of the following equipment:

J1G030GA-( )—Keying Input Module

List 5—Equipment required in addition to list 1 and list 2 or 3 to provide one receiver trip output module equipped with trip relay for direct connection to customer trip circuit per SD-1G267-01, App Fig. 12 (option J or G). (See Note B.) Must specify option Z (48V), Y (125V), or X (250V) per customer tripping battery. List 5 is made up of the following equipment:

J1G030GD, L1—Receiver Trip Output Module

List 6—Equipment required in addition to list 1 and list 2 or 3 to provide one receiver trip output module equipped with trip driver for high-current operation per SD-1G267-01, App Fig. 12 (option F or E). (See Note B.) Must specify option Z (48V), Y (125V), or X (250V) per customer tripping battery. List 6 is made up of the following equipment:

J1G030GD, L2—Receiver Trip Output Module

Notes

A. Adjustable mounting ears permit variable depth mounting on rack.

B. To be shipped separately.

J1G030AA—AT&TCo Std—Main Transmitter

Equipment—J1G030AA-( )
ED-1D160-( ), G1 (Mother Board), G2 (Daughter Board)

List 1—Assembly and wiring for one main transmitter circuit per SD-1G267-01, App Fig. 3.

J1G030BA—AT&TCo Std—Supervisory Transmitter

Equipment—J1G030BA-( )
ED-1D161-( ), G1, G2

List 1—Assembly and wiring for one supervisory transmitter circuit per SD-1G267-01, App Fig. 4.

J1G030CA—AT&TCo Std—Main Receiver—Input

Equipment—J1G030CA-( )
ED-1D162-( ), G1, G2

List 1—Assembly and wiring for one main receiver input circuit per SD-1G267-01, App Fig. 6. (See Note A.)

Note

A. One of three circuit packs comprising the main receiver.

J1G030CB—AT&TCo Std—Main Receiver—High Trip Detection

Equipment—J1G030CB-( )

List 1—Assembly and wiring for one main receiver high-trip detection circuit per SD-1G267-01, App Fig. 6. (See Note A.)

Note

A. One of three circuit packs comprising the main receiver.

J1G030CC—AT&TCo Std—Main Receiver—Logic

Equipment—J1G030CC-( )

List 1—Assembly and wiring for one main receiver logic circuit per SD-1G267-01, App Fig. 6. (See Note A.)

Note

A. One of three circuit packs comprising the main receiver.

J1G030DA—AT&TCo Std—Supervisory Receiver

Equipment—J1G030DA-( )

List 1—Assembly and wiring for one supervisory receiver circuit per SD-1G267-01, App Fig. 7. (See Note A.)

Note

A. One of three circuit packs comprising the main receiver.

J1G030EA—AT&TCo Std—Multipoint Combiner

Equipment—J1G030EA-( )

List 1—Assembly and wiring for one multipoint combiner circuit per SD-1G267-01, App Fig. 5. One required per multipoint system (maximum of 4 receivers); physically associated with transmitter.

J1G030GA—AT&TCo Std—Keying Input Module

Equipment—J1G030GA-( )

List 1—Assembly and wiring for one keying input circuit per SD-1G267-01, App Fig. 9. (See Notes A, B, and C.)

Notes

A. All interface modules are identical in size (except for J1G030GE fuse and converter) and are arranged to mount in any of five positions in the J1G030G interface mounting unit. The ***preferred*** order of mounting is:

Position (as viewed from front)

1 (left): Keying input or trip output

2: Trip output or keying input

3: Alarm

4: Converter input

5 (right): Fuse and converter only.

The fuse and converter, being slightly wider, may in some cases be mounted in position 3, provided the adjacent equipment locations (2 and 4) are vacant.

B. One required per transmitter terminal except in dual-channel applications which utilize one keying input module for the two transmitter channels.

C. Must specify option Z (48V), Y (125V), or X (250V) per customer keying battery. In addition, specify option W for dual-channel operation.

J1G030GB—AT&TCo Std—Alarm Module

Equipment—J1G030GB-( )

List 1—Assembly and wiring for one alarm circuit per SD-1G267-01, App Fig. 13. (See Note A.)

Note

A. All interface modules are identical in size (except for J1G030GE fuse and converter) and are arranged to mount in any of five positions in the J1G030G interface mounting unit. The ***preferred*** order of mounting is:

Position (as viewed from front)

1 (left): Keying input or trip output

2: Trip output or keying input

3: Alarm

4: Converter input

5 (right): Fuse and converter only.

The fuse and converter, being slightly wider, may in some cases be mounted in position 3, provided the adjacent equipment locations (2 and 4) are vacant.

J1G030GC—AT&TCo Std—Converter Input Module

Equipment—J1G030GC-( )

List 1—Assembly and wiring for one converter input circuit designed to operate from ±48 volt station battery per SD-1G267-01, App Fig. 10 (option P). One required for each J1G030GE, L1 fuse and converter module. (See Note A.)

List 2—Assembly and wiring for one converter input circuit designed to operate from ±125 volt station battery per SD-1G267-01, App Fig. 10 (option S). One required for each J1G030GE, L2 fuse and converter module. (See Note A.)

Note

A. All interface modules are identical in size (except for J1G030GE fuse and converter) and are arranged to mount in any of five positions in the J1G030G interface mounting unit. The ***preferred*** order of mounting is:

Position (as viewed from front)

1 (left): Keying input or trip output

2: Trip output or keying input

3: Alarm

4: Converter input

5 (right): Fuse and converter only.

The fuse and converter, being slightly wider, may in some cases be mounted in position 3, provided the adjacent equipment locations (2 and 4) are vacant.

J1G030GD—AT&TCo Std—Receiver Trip Output Module

Equipment—J1G030GD-( )

List 1—Assembly and wiring for one receiver trip output circuit equipped with trip relay for direct connection to customer trip circuit per SD-1G267-01, App Fig. 12 (option J or G). (See Notes A, B, and C.)

List 2—Assembly and wiring for one receiver trip output circuit equipped with trip driver for high-current operation per SD-1G267-01, App Fig. 12 (option F or E). (See Notes A, B, and C.)

Notes

A. All interface modules are identical in size (except for J1G030GE fuse and converter) and are arranged to mount in any of five positions in the J1G030G interface mounting unit. The ***preferred*** order of mounting is:

Position (as viewed from front)

1 (left): Keying input or trip output

2: Trip output or keying input

3: Alarm

4: Converter input

5 (right): Fuse and converter only.

The fuse and converter, being slightly wider, may in some cases be mounted in position 3, provided the adjacent equipment locations (2 and 4) are vacant.

B. One required per receiver terminal except in dual-channel applications which utilize one output module for the two receiver channels.

C. Must specify option Z (48V), Y (125V), or X (250V) per customer tripping battery.

J1G030GE—AT&TCo Std—Fuse and Converter Module

Equipment—J1G030GE-( )

List 1—Assembly and wiring for one fuse and converter circuit designed to operate from ±48 volt dc input per SD-1G267-01, App Fig. 11 (option P). Provides two sets of fused +15 and −15 volt outputs rated at 50-watt total output power. (See Notes A and B.)

List 2—Assembly and wiring for one fuse and converter circuit designed to operate from ±125 volt dc input per SD-1G267-01, App Fig. 11 (option S). Provides two sets of fused +15 and −15 volt outputs rated at approximately 50-watt total output power. (See Notes A and B.)

Notes

A. All interface modules are identical in size (except for J1G030GE fuse and converter) and are arranged to mount in any of five positions in the J1G030G interface mounting unit. The ***preferred*** order of mounting is:

Position (as viewed from front)

1 (left): Keying input or trip output

2: Trip output or keying input

3: Alarm

4: Converter input

5 (right): Fuse and converter only.

The fuse and converter, being sightly wider, may in some cases be mounted in position 3, provided the adjacent equipment locations (2 and 4) are vacant.

B. J1G030GE, L1 and L2 fuse and converter modules contain the KS-21010, L1 and L2 dc-to-dc converters, respectively.

Working Limits

4.01 Environment:

(a) Ambient Temperature: −20° to +60°C (−22° to +140°F).

(b) Relative Humidity: Short term 15 to 95 percent (32°C maximum).

Recommended operating range: 20 to 55 percent.

(c) Station Battery: 40 to 54 volts dc or 100 to 145 volts dc.

(d) Ground: Positive, negative, or floating.

(e) Transmission Facility: 4-wire private line 3002 channel with C2 conditioning.

5. GENERAL NOTES

5.01 All necessary field options are implemented by means of readily accessible screw switches; circuit packs and interface modules shall not be disassembled for any adjustments.

5.02 Codes J1G030H through J1G030Y, J1G030AB through J1G030AY, J1G030BB through J1G030BY, J1G030CD through J1G030CY, J1G030DB through DY, and J1G030EB through J1G030FY are unassigned.

5.03 An ordering guide and system data are presented in Tables B and C. Table B is a guide for ordering; it is not an exhaustive listing of all possible arrangements.

TABLE B

SYSTEM ARRANGEMENTS AND ORDERING MATRIX

EQUIPMENT REQUIRED		SYSTEM CONFIGURATION											
		BIDIRECTIONAL (SYMMETRICAL)					UNIDIRECTIONAL (NONSYMMETRICAL)					
		2 POINT		MULTIPOINT SINGLE CHANNEL			2 POINT				3 POINT	
		SINGLE CHANNEL	DUAL CHANNEL	3 POINT	4 POINT	5 POINT	SINGLE CHANNEL		DUAL CHANNEL		SINGLE CHANNEL	
							TRMT ONLY	RCV ONLY	TRMT ONLY	RCV ONLY	TRMT ONLY	RCV ONLY
Transceiver												
	L1 T/R Mounting	1	2	2	2	3	1	1	2	2	2	1
	L2	1	2	1	1	1	1		2		1	
	L3							1		2		1
J1G030B	L4	1	1	2	3	4		1		1		1
	L5		1							1		
	L6						1		2		2	
	L7			1		1					1	
Circuit Pack J1G030EA	Multipoint Combiner			1	1	1						
Interface												
	L1 I/F Mounting	1	2	2	2	3	1	1	2	2	1	1
	L2 or L3	1	2	1	1	1	1	1	2	2	1	1
J1G030G	L4	1	1	1	1	1	1		1		1	
	L5 or L6	1	1	2	3	4		1		1		1
GC	L1 or L2			1	1	2						
GE	L1 or L2			1	1	2						

Note 1: Numbers represent quantities required at each location.

Note 2: All terminals include supervisory test features.

Note 3: For dual-channel applications, odd terminals of each route can share the same transceiver mounting, yielding a more compact arrangement.

Note 4: Separate transceiver mountings are recommended for odd terminals of separate systems.

Note 5: The following combinations of terminals can be powered from a single fuse and converter module.

TRANSMITTER	RECEIVER
1	1
2	1
0	2
3	0

TABLE C

PHYSICAL DATA

UNIT	TITLE OF UNIT AND DESCRIPTION	OVERALL DIMENSIONS (INCHES)			WEIGHT (POUNDS)
		WIDTH	HEIGHT	DEPTH	
J1G030A	Transceiver Control Panel	8.56	6.36	1.5	0.8
B,L1	Transceiver Mounting Unit	19.00	7.00	16.00	22.5
C	Transceiver Backplane	8.00	5.88	1.6	1.9
J1G030AA	Main Transmitter Circuit Pack	2.78	5.55	12.4	1.7
BA	Supervisory Transmitter Circuit Pack	1.70	5.55	12.4	1.3
CA	Main Receiver — Input Circuit Pack	1.70	5.55	12.4	1.5
CB	Main Receiver — High Trip Detector Circuit Pack	1.56	5.55	12.4	1.1
CC	Main Receiver Logic Circuit Pack	1.91	5.55	12.4	1.3
DA	Supervisory Receiver Circuit Pack	1.79	5.55	12.4	1.6
EA	Multipoint Combiner Circuit Pack	0.76	5.55	12.4	0.4
J1G030G	Interface Mounting Unit	19.00	7.00	16.00	22.9
GA	Keying Input Module	3.22	5.74	14.4	6.5
GB	Alarm Module	3.22	5.74	14.2	3.4
GC,L1&L2	Converter Input Module	3.22	5.74	14.2	7.2
GD,L1	Receiver Trip Output Module	3.22	5.74	14.4	8.1
L2	Receiver Trip Output Module	3.22	5.74	14.4	7.8
GE,L1&L2	Fuse and Converter Module	3.38	5.74	14.4	11.8

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