

PURPOSE:

This drawing provides the information and connection diagram necessary to install the "INTERRUPTIBLE SERVICE" rate schedule option, when selected by the electric service customer, at their facility

INTERRUPTION AND RESTORATION OF SERVICE

AUTOMATIC INTERRUPTION

Electrical power delivered shall be subject to automatic interruption in the event of a reduction of frequency on the PG&E system to the scheduled frequency.

INTERRUPTION BY CUSTOMER

Electrical power delivered shall be subject to manual interruption by customer upon notice from PG&E when system conditions warrant.

SERVICE RESUMPTION

After any interruption, whether automatic or manually activated, the customer shall "NOT" resume use of electric power except by permission from PG&E'S designated switching center.

GENERAL NOTES

- The automatic interruption of electric power occurs when the fundamental frequency of 60 HERTZ lowers to a scheduled frequency of 59.75 HERTZ, for 6 cycles or longer.
- An underfrequency tripping action will cause the customer's electric power circuit breaker or switch to automatically open and stay open (while blocking any automatic reclosing) until the underfrequency relay is manually reset. This manual reset action is performed by the customer. See Note 10.
- During automatic interruption the customer's circuit breaker "OPEN" status is communicated to a PG&E designated switching center as a continuous signal alarm which turns off only when the customer's breaker is in the "CLOSED" (energized) position. No status (alarm) is sent when the customer manually interrupts the service.

RELAY POTENTIAL:

- The 120 Volts 60 HERTZ AC potential source for energizing the underfrequency relay is also the underfrequency signal source.
- The underfrequency relay potential shall be obtained from the "SOURCE SIDE" of the customer's interruptible service circuit breaker or switch. Any phase of any potential instrument transformer located on the source side of the customer's interruptible circuit breaker can be used.
- The underfrequency relay potential may be obtained from any phase of any potential instrument transformer located on the source side of the customer's interruptible circuit breaker.

PG&E PROVIDED EQUIPMENT

- PG&E shall install, own, and maintain the automatic interrupting initiating facilities and all revenue metering, recording devices and the 120 Volt A.C. potential source.

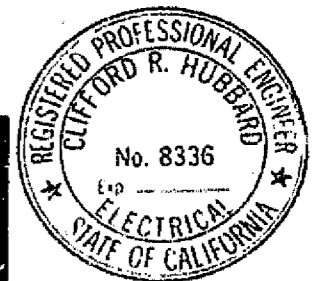
CUSTOMER PROVIDED EQUIPMENT & FACILITIES

- The customer shall provide and maintain an exclusive telephone company type 3002 communications circuit from the PG&E provided terminal block at the customer's facilities (See Note 11a or 11b) to PG&E'S designated switching center. (The type 3002 telephone circuit is a 4 wire full duplex unconditioned line).
- A normally closed Form "B" contact for alarm purposes, shall be provided from each interruptible service circuit breaker or switch. Also a tripping circuit will allow a contact from PG&E's underfrequency relay to trip the customer's circuit breaker or switch. These circuits shall be wired and terminated on the PG&E provided terminal blocks.
- A reclose blocking (interlock) circuit shall be wired and terminated on the PG&E provided terminal blocks when the customer's circuit breaker or switch has automatic reclose capability. (See sheet 4 for connections)
- Space shall be provided for the mounting and installation of PG&E supplied equipment, consisting of either:
 - A surface mounted enclosure located on the outside of the customer's metal clad switchgear (See Fig. 1 sheet 6) or on an adjacent wall or structure, convenient for the customer's wiring and access for resetting the underfrequency relay or
 - A switchboard or panel mounted at the same location where the controls for the customer's interruptible circuit breaker or switch are installed. (See Fig. 2 Sheet 8).
- The customer shall provide and install all the necessary conduits, control wiring interconnections and telecommunication circuitry and terminate at a PG&E provided terminal in the enclosure or switchboard. See Notes 11a & 11b.
- A ground resistance value of the customer's facility shall be provided to the phone company at their request for the calculation of voltage rise during ground fault conditions. Upon Request PG&E will supply the customer with the phase-to-ground short circuit current at his facility.

REFERENCES:

- Diagram of Connections Metering Polyphase Loads Using Transformer Rated Meters -----Dwg. 028163
 Instrument Transformers for Distribution Application -----Dwg. 054340
 Operation and Maintenance Manual for PUF-59 Underfrequency Relay -----Record 6005984

GENERAL NOTES AND REFERENCES

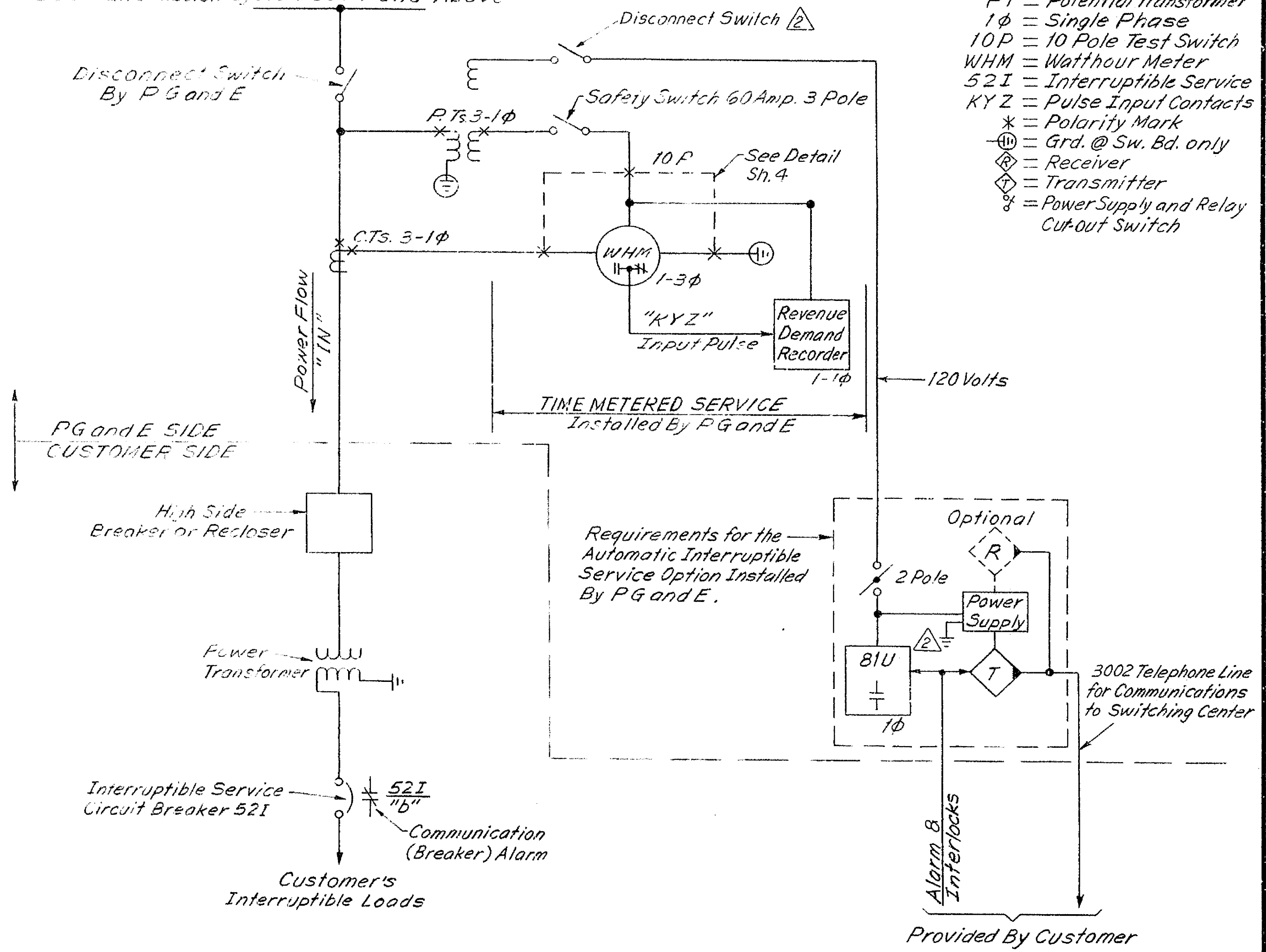


APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
506 TAD	3	3-21-89	Added Sheet 9 Revised Note 11 (b)	K.G.	MM	MM	WRT
MM	2	5-9-88	Revised Note 5	K.G.	MM	MM	WRT
MM	1	3-24-87	Approved for Construction	MM	MM	MM	WRT

GM	ENGINEERING STANDARD	SUPERSEDES
SUPV N.N. GRAF	<p align="center">INSTALLATION REQUIREMENTS FOR TIME METERED INTERRUPTIBLE SERVICE</p> <p align="center">ELECTRIC OPERATIONS PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA</p>	SUPERSEDED BY
DSGN G.S. LIM		SHEET NO 1 OF 9 SHEETS
DWN G.S. LIM		DRAWING NUMBER
CHKD N.N. GRAF		REV
O.K. MM		062143 3
DATE 3-24-87	SCALE	MICROFILM

PG&E Transmission System 60kV and Above

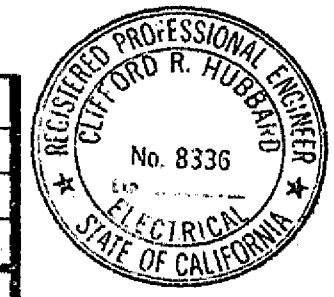
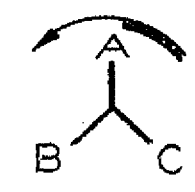
- LEGEND**
 CT = Current Transformer
 PT = Potential Transformer
 1φ = Single Phase
 10P = 10 Pole Test Switch
 WHM = Watthour Meter
 52I = Interruptible Service
 KYZ = Pulse Input Contacts
 * = Polarity Mark
 ⊕ = Grd. @ Sw. Bd. only
 ⊕ = Receiver
 ⊕ = Transmitter
 ⊕ = Power Supply and Relay Cut-out Switch



NOTES:

- (a) Customer's Instrumentation and Protection Devices are not shown.
- (b) PG&E's Metering Instrument Transformers (CTs & PTs) shall be sized and selected for each installation, for voltage, current and ratio values.

**TYPICAL SINGLE LINE METER AND RELAY DIAGRAM
 (FOR HIGH VOLTAGE TRANSMISSION SERVICE)**



APPROVED BY	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
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CRH	3-24-87	Approved for Construction				WRT

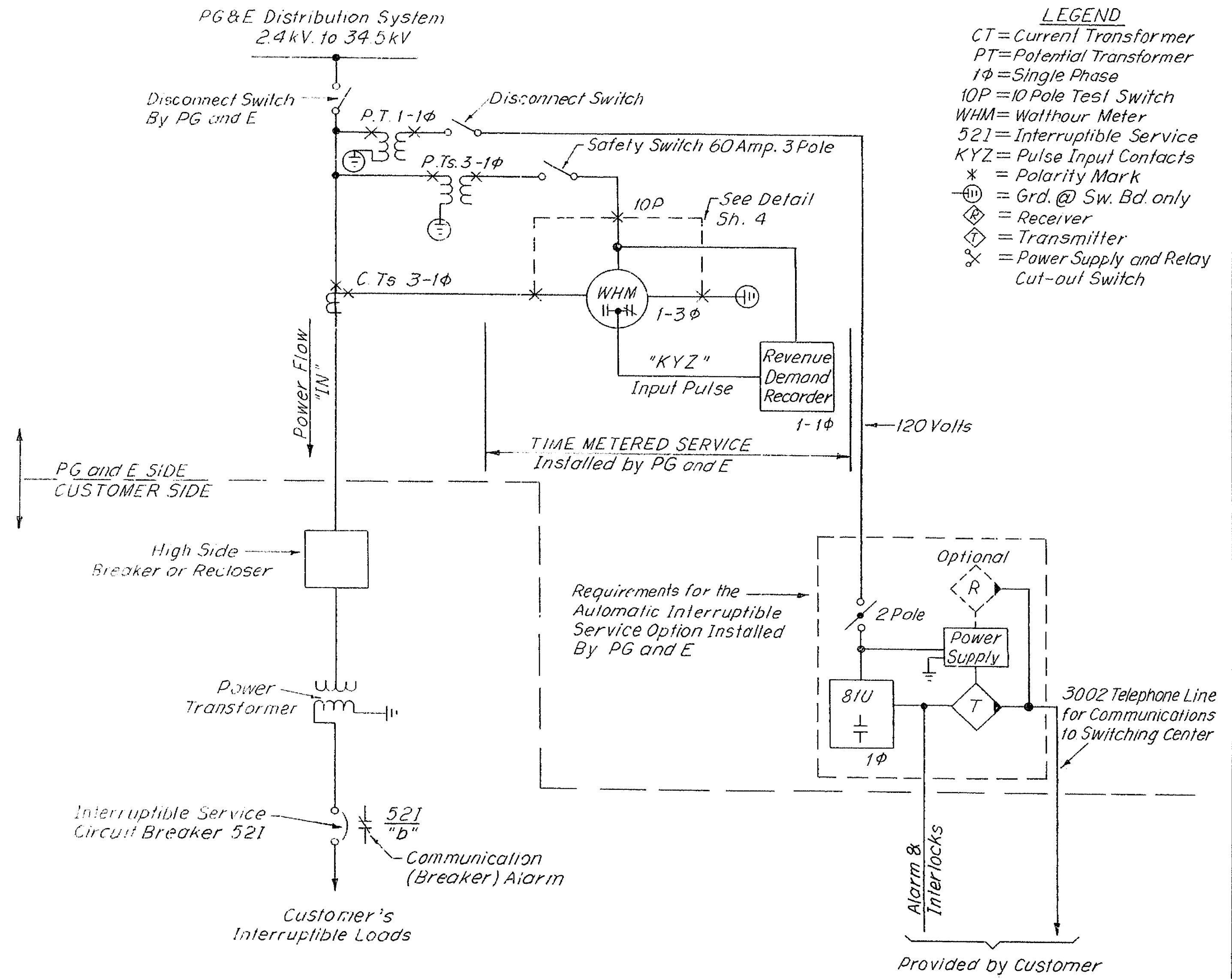
GM	
SUPV	N.N.GRAF
DSGN	G.S.LIM
DWN	G.S.LIM
CHKD	N.N.GRAF
O.K.	
DATE	SCALE
3-24-87	

ENGINEERING STANDARD
INSTALLATION REQUIREMENTS FOR
TIME METERED INTERRUPTIBLE SERVICE
 ELECTRIC OPERATIONS
PACIFIC GAS AND ELECTRIC COMPANY
 SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO 2	OF SHEETS
DRAWING NUMBER	REV
062143	2
MICROFILM	

LEGEND

- CT = Current Transformer
- PT = Potential Transformer
- 1 ϕ = Single Phase
- 10P = 10 Pole Test Switch
- WHM = Watthour Meter
- 521 = Interruptible Service
- KYZ = Pulse Input Contacts
- * = Polarity Mark
- ⊖ = Grd. @ Sw. Bd. only
- ⊕ = Receiver
- ⊖ = Transmitter
- ⊗ = Power Supply and Relay Cut-out Switch



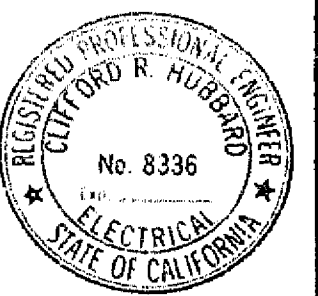
NOTES

(a) Customer's Instrumentation and Protection Devices are not shown

(b) PG & E's Metering Instrument Transformers (CTs & PTs) shall be sized and selected for each installation, for voltage, current and ratio values.

TYPICAL SINGLE LINE METER AND RELAY DIAGRAM
(FOR PRIMARY METERED SERVICE)

APPROVED BY										
WRT										
Jaw										
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	REV	DATE	DESCRIPTION				DWN	CHKD	SUPV	APVD



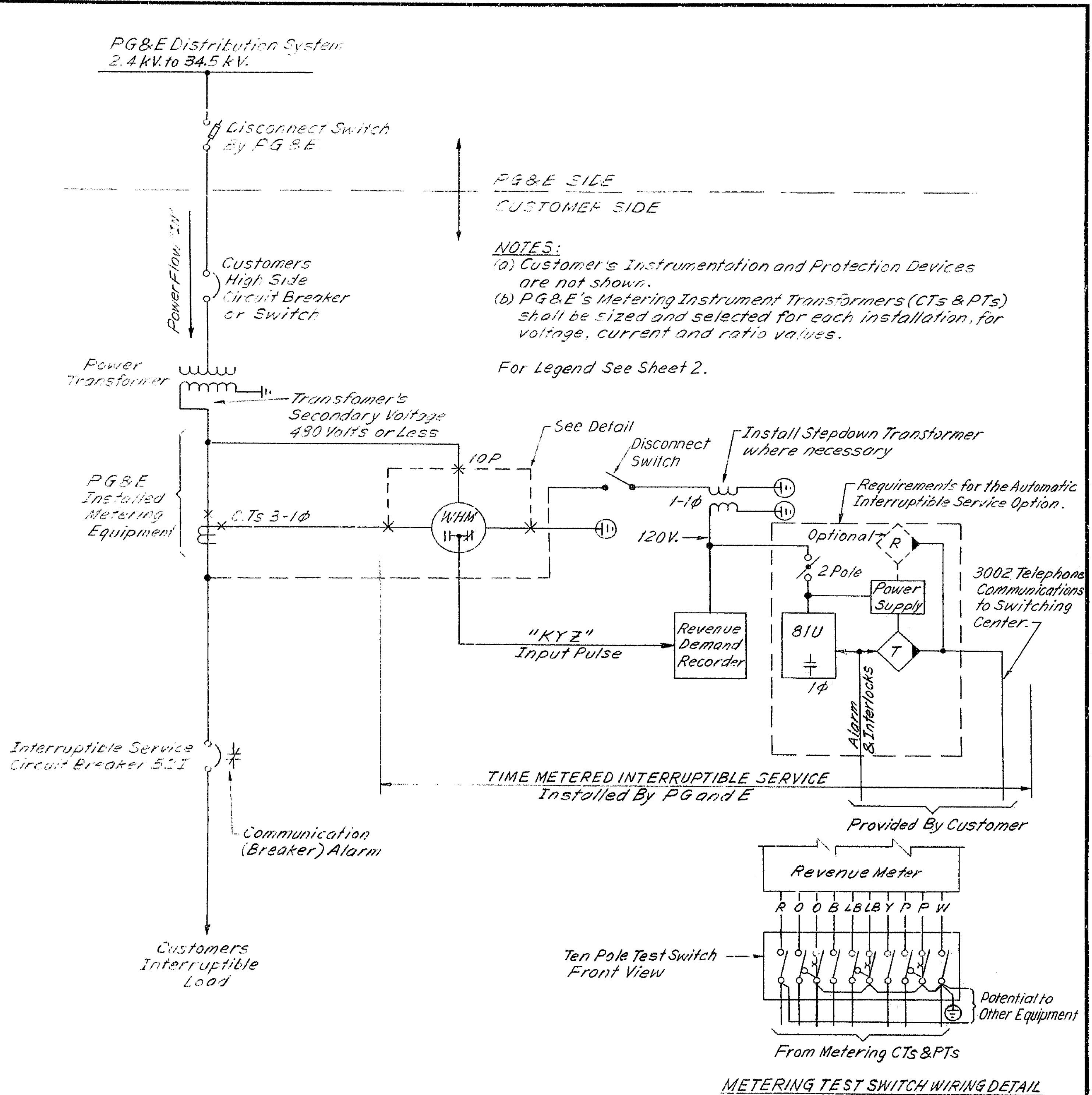
GM	
SUPV	N. N. GRAF
DSGN	A. V. PODOINIT SIN
DWN	K. GOLDBERG
CHKD	N. N. GRAF
O.K.	
DATE	SCALE
1-6-89	

ENGINEERING STANDARD

**INSTALLATION REQUIREMENTS FOR
TIME METERED INTERRUPTIBLE SERVICE**

ELECTRIC DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO 3	OF SHEETS
DRAWING NUMBER	REV
062143	3
MICROFILM	



TYPICAL SINGLE LINE METER AND RELAY DIAGRAM
(FOR HIGH VOLTAGE DISTRIBUTION SERVICE)

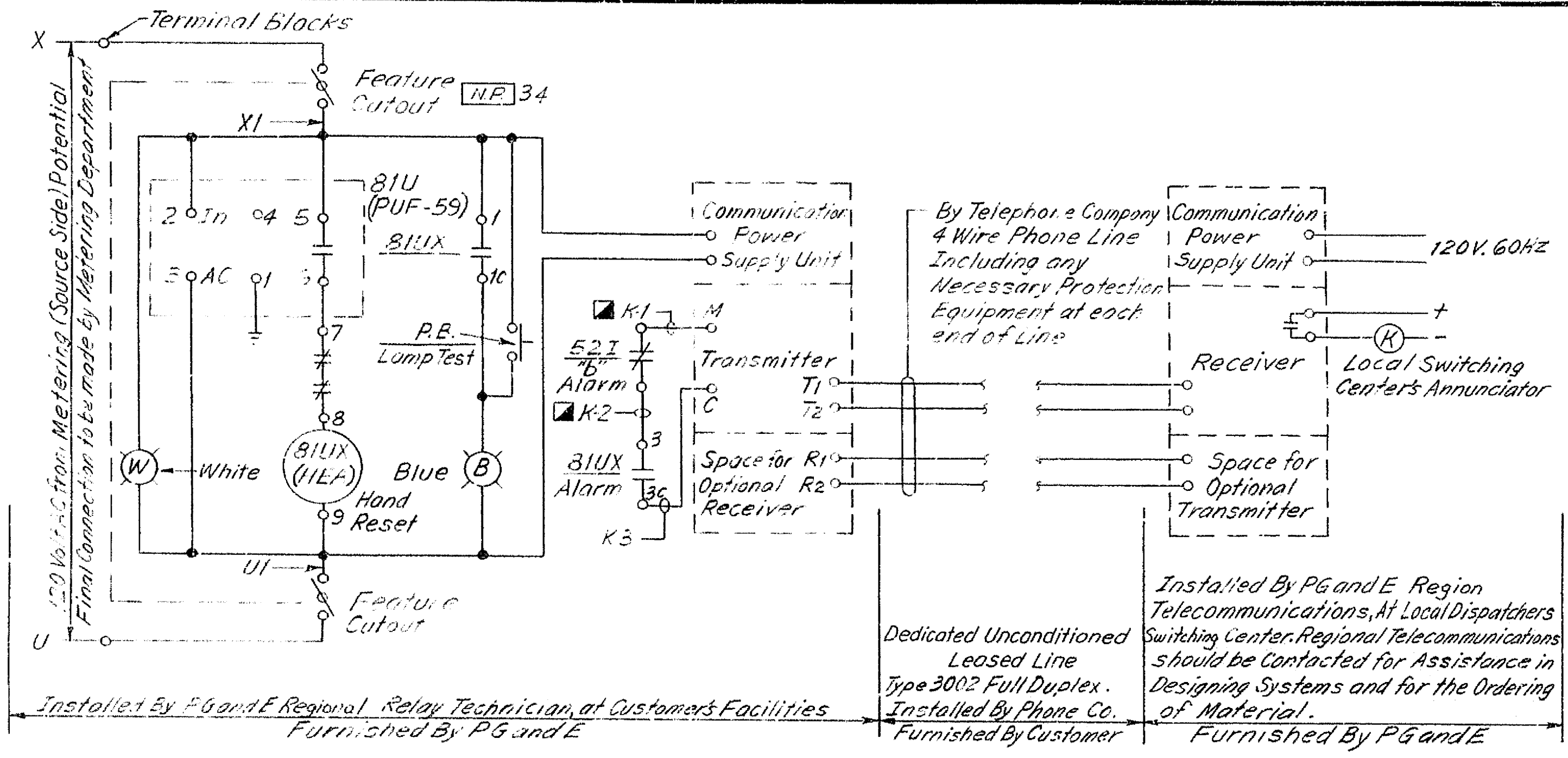
APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
EOG TLD	3	3-21-89	Rev Pwr 10 Step Dwn Transf after CTs Former Sh 4 made Sh 5	K.G.	DPSP	MM	WRT
DPH	2	5-9-88	Rev'd "Potential to Other Equipment" in Wiring Detail	K.G.	DPSP	MM	WRT
MH	1	3-24-87	Approved for Construction			MM	WRT



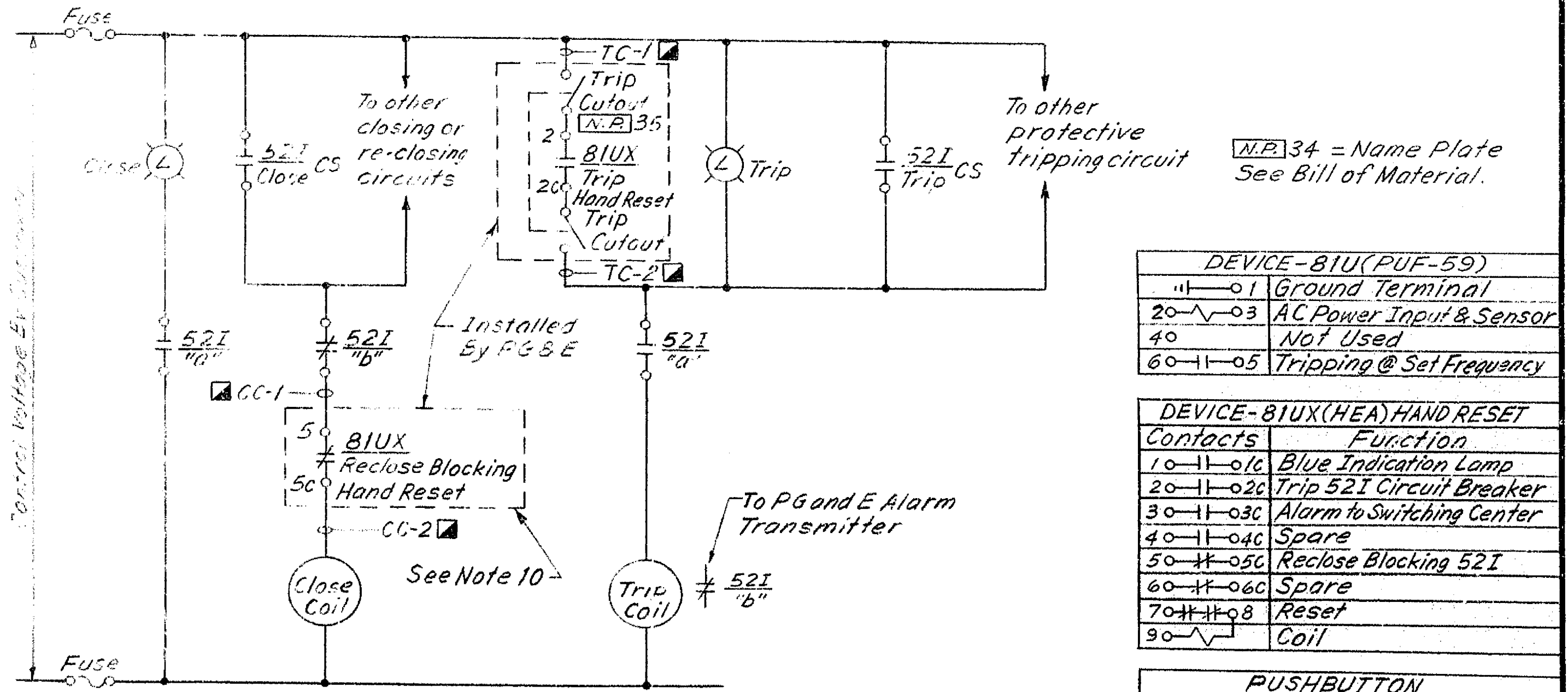
GM	
SUPV	N.N. GRAF
DSGN	G.S. LIM
DWN	G.S. LIM
CHKD	N.N. GRAF
O.K.	MM
DATE	SCALE
3-24-87	

**INSTALLATION REQUIREMENTS FOR
TIME METERED INTERRUPTIBLE SERVICE**
ELECTRIC OPERATIONS
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO 4	OF 3 SHEETS
DRAWING NUMBER	REV
062143	3
MICROFILM	



TYPICAL PG and E FURNISHED EQUIPMENT INTERCONNECTION



TYPICAL CUSTOMER'S CIRCUIT BREAKER CONTROL

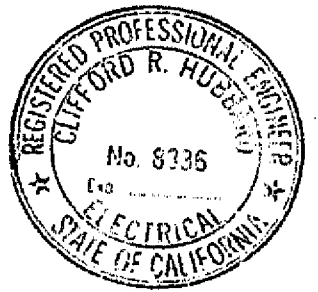
Customer installed wiring to PG & E provided terminal blocks (See Note "b" on Sh. 9 for wire size)

NOTE:

Alarm will occur at the dispatcher's switching control center when underfrequency interruption load shedding is enacted.

TYPICAL CONTROL DIAGRAM FOR CUSTOMERS INTERRUPTIBLE SERVICE

APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
E.O.G. <i>[Signature]</i>	3	3-21-89	Chgd. Sh. No. Former Sh 5 made Sh. 6	K.G.	<i>[Signature]</i>	<i>[Signature]</i>	WRT
<i>[Signature]</i>	1	3-24-87	Approved for Construction	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	WRT
C.R.H.							
ENGINEERING STANDARD							
INSTALLATION REQUIREMENTS FOR TIME METERED INTERRUPTIBLE SERVICE							
ELECTRIC OPERATIONS PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA							
SUPV N. N. GRAF DSGN G. S. LIM DWN G. S. LIM CHKD N. N. GRAF O.K. <i>[Signature]</i> DATE 3-24-87 SCALE				SUPERSEDES SUPERSEDED BY SHEET NO 5 OF 3 SHEETS DRAWING NUMBER 062143 REV 3 MICROFILM			



MATERIAL TO BE SUPPLIED BY PG&E AT CUSTOMERS FACILITIES

ITEM	QUAN.	DESCRIPTION	DWG. NO.	CODE
1	1	Completely Factory Assembled Unit. The Assembly Shall Comprise of all the Following Itemized (● As Identified) Components, Securely Mounted and Safely Wired as a Integral Unit. All Mounted in an Outdoor Type NEMA 3R Lockable Enclosure with Hinged Interior Panel. Provide six 3/4" Knockouts in Bottom of Enclosure and an External Grounding Stud. Finish Color-Gray. Enclosure to be Sized to Suit. (Approximately 24"W X 24"H X 16"D.) See Sh. 7.	Ingalls Associates Model No. IALC-T	24-5296
2	1	Relay, Digital, Underfrequency, 70-140V AC a 60 Hertz, Type PUF-59 W/4VA Burden. Frequency Range Setting 49-59.99 Hertz. Time Delay 6-130, Cycles in 0.1 cycle increments. w/one Output Tripping Contact. Adjustable 0.2A to 2A Target Relay. Furnish Back Connected In Molded Case 6-3/4" Sq. X 8" Deep W/Glass Window Cover. Semi-flush Mtg. on 1/8" Steel Panel. E-Mcx Instruments, Type PUF-59. Part No. 707D045 Device 81U	Record 6005984	59-1248
3	1	Relay, Type HEA, Auxiliary, Multi-contact, Hand Reset, 120 Volt AC, 25 Amp, 60 Hertz, 4 Normally Open-2 Normally Closed Contacts, With Oval Handle. Escutcheon plate marked: "Trip-Reset" For Mounting 1/8" Steel Panel (Device:81UX) GE Co. Model 12HEA61A294 or Equivalent	Record 655355	01-2281
4	1	Switch, Test, 2 Pole, Double Pole Potential Assembly, Yellow Handles, Front Connected, W/O cover	053449	24-8780
5	1	Feature Cutout Switch, Toggle, Double Pole, 20 Amp. 250V. Heavy Duty with screw Type Terminals Cuttler-Hammer Co. Cat. No. 7402K4 or Equivalent	---	39-4118
6	1	Pushbutton, Ollight, HD, DPDT, Momentary Contact, 10A Cont., 600V Max. Operator W/Double Block (2 No-2 NC) with Red Button. For Mounting on 1/8" Steel Panel, G.E. CR2940WA203C	---	34-9913
7	1	Lamp, Indicating, Type ET-6, 115V AC, W/Type T2 Code 24 EX Lamp, Resistor & Transparent Blue Cap for Mtg. on 1/8" Steel Panel, G.E. 6105700649B	---	34-9677
8	6	Terminal Block, Medium Duty, Screw Terminals Both Sides, 12 Terminals, G.F. Co. Cat. No. EB25A12W	057384	34-9977
9	1	Door Mounted Card Rack. Similar to Da-Tel Research Model G7304, Except Equipped with G6800-F Power Supply, Two Line Transformers, One Transmitter Model G-8080-1 a 1275 Hertz frequency. The Rack to be Quad Module. The Rack shall be wired to Accomodate, a Future Receiver model G7606 and Modules G7801, G7205 and G7802FS Applications	Da-Tel Research #GB3940-1	24-5297
10	1	Terminal Block, Medium Duty, Screw Terminals Both Sides, 6 Terminals, G.E. Co. Cat. No. EB25A06W	057384	34-9964
11	1	Guard for Handle of Feature Cut-out Switch (Use with Item 5)	027686	34-9726
12	1	Nameplate for Feature Cut-out Switch Part "A" (Use with Item 5)	024025	37-3159
13	Future	AM-FS Receiver Model G-7606-3F/CD with Mark, Space and CD Relays. Frequency 1445 Hertz. DA-TEL Research Co.	---	---
14	Future	Relay Module I/O Cards Nos. G7801, G7802FS and G7205 DA-TEL Research Co.	---	---
15	Future	Recorder, Load Data Survey, - (OPTIONAL EQUIPMENT By PG&E INSTALLED WHEN SO SPECIFIED.)	---	---
16	1	Lamp, Indicating, Type ET-6, 115 Volts AC, Complete with Type T2 Code 24EX Lamp, Resistor, and Translucent White Cap for Mtg. on 1/8" Steel Panel, G.E. 6105700649w	---	34-9677
17	1	Elbow, Type LB, PVC 3/4", Female, Slip Fit	---	---
18	As req'd	Conduit, Rigid PVC, 3/4" Schedule 80	---	---
19	1	Bushing, for 3/4" PVC Conduit	---	---
20	As req'd	Cable, 1/2, No. 16 AWG. Cu. 600V. 19 Strand (Flexible Swbd. Hinge Wire) Black Jacket-Symbol SIS	055672	29-8294
21	As req'd	Wire, Solid, BC, #2 AWG, or 1/0 kcmil as req'd. (For Enclosure Grounding)	---	---
22	As req'd	Cable 1/2 No. 10 AWG. Cu. 600V. 19 Strand (Flexible Swbd. Hinge Wire) Black Jacket-Symbol SIS	055672	29-8272
30-38	See below	Nameplates. (See Table Below)	027818	37-3312

NAMEPLATES

ITEM	QUAN.	FACE COLOR	FIG. NO.	LETTER SIZE	LINE	ENGRAVING	ITEM	QUAN.	FACE COLOR	FIG. NO.	LETTER SIZE	LINE	ENGRAVING
30	2	840	5	7	1	AUTOMATIC INTERRUPTING UNDERFREQUENCY RELAY DEVICE 81U	36	1	840	6	7	1	PG&E INTERRUPTIBLE SERVICE ENCLOSURE
31	2	840	5	7	2	UNDERFREQUENCY LOCK-OUT RELAY DEVICE 81UX, HAND RESET.	37	1	840	6	7	2	120 VOLT A.C. POWER INDICATION
32	1	840	5	7	3	LAMP TEST PUSH BUTTON	38	1	275	---	3	1	CAUTION RATE PENALTY WHEN RESET WITHOUT PG&E APPROVAL
33	1	840	6	7	1	UNDERFREQUENCY TRIP INDICATION LOCK-OUT	39	1	840	5	7	1	OPEN DOOR TO HAND RESET LOCKOUT RELAY
34	1	840	6	7	2	120V A.C. POWER AND FEATURE CUT-OUT						2	
35	1	840	5	7	1	UNDERFREQUENCY RELAY CUSTOMER BREAKER TRIP CUT-OUT						3	

▲ Mount on front and back of panel.

■ Nameplate size 6"l. X 2 1/2"W.

● Components of Factory Assembled Unit.

MATERIAL

APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
EOG	3	3-21-89	Chgd Code for Item 3. Chgd Sh No. Former Sh. 6 made Sh. 7	K.G.	mm	mm	WRT
WV	2	5-9-88	Revised Items 3 and 5	K.G.	mm	mm	WRT
CRH	1	3-24-87	Approved for Construction	WV	mm	mm	WRT



GM	
SUPV	N.N. GRAF
DSGN	G.S. LIM
DWN	G.S. LIM
CHKD	N.N. GRAF
O.K.	mm
DATE	3-24-87
SCALE	

ENGINEERING STANDARD
INSTALLATION REQUIREMENTS FOR
TIME METERED INTERRUPTIBLE SERVICE
 ELECTRIC OPERATIONS
PACIFIC GAS AND ELECTRIC COMPANY
 SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO 6	OF 3 SHEETS
DRAWING NUMBER	REV
062143	3

MICROFILM

SCAN 3 IC

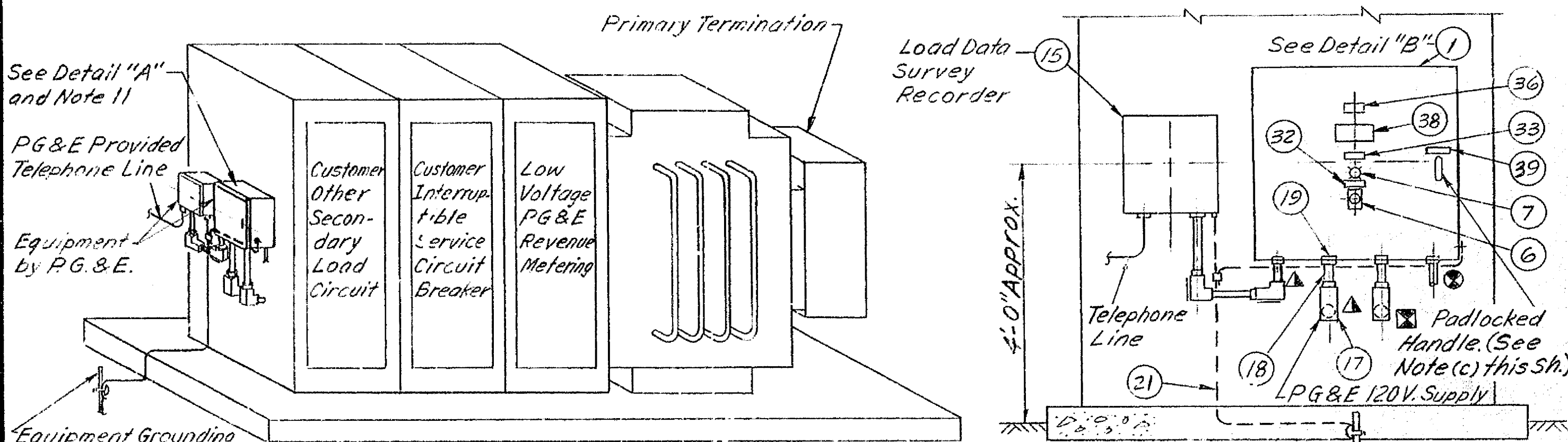
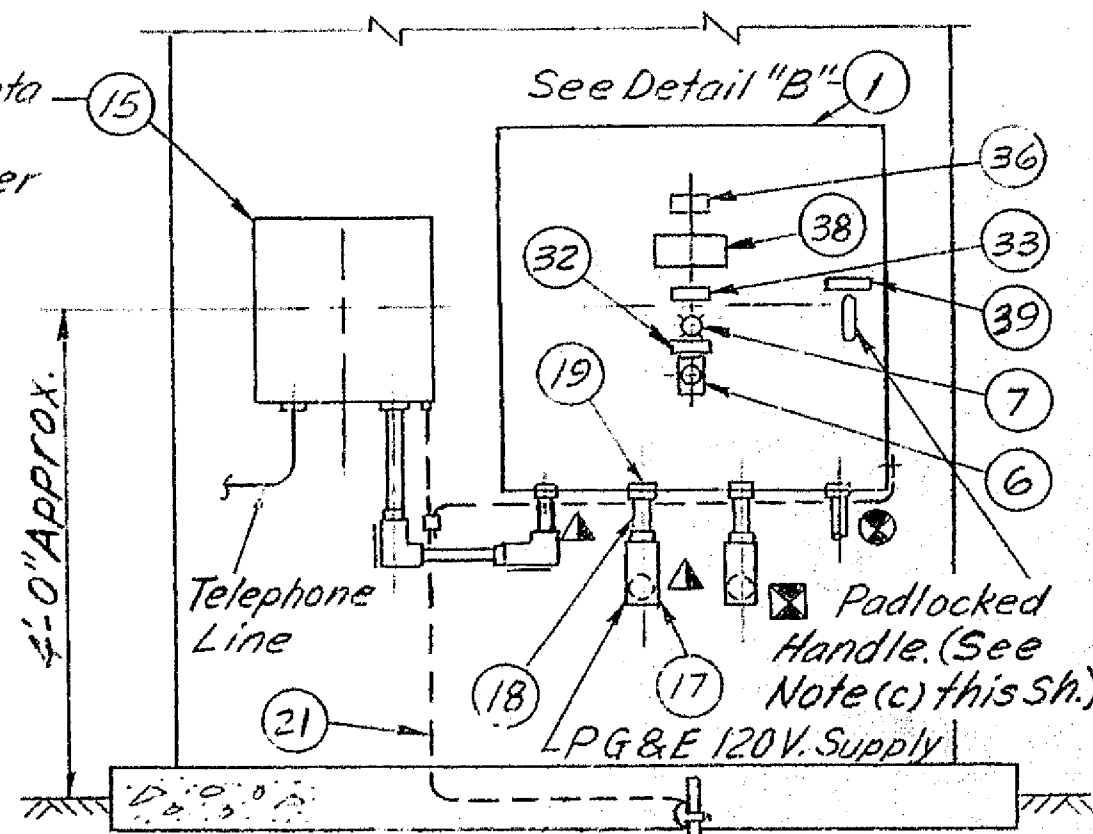
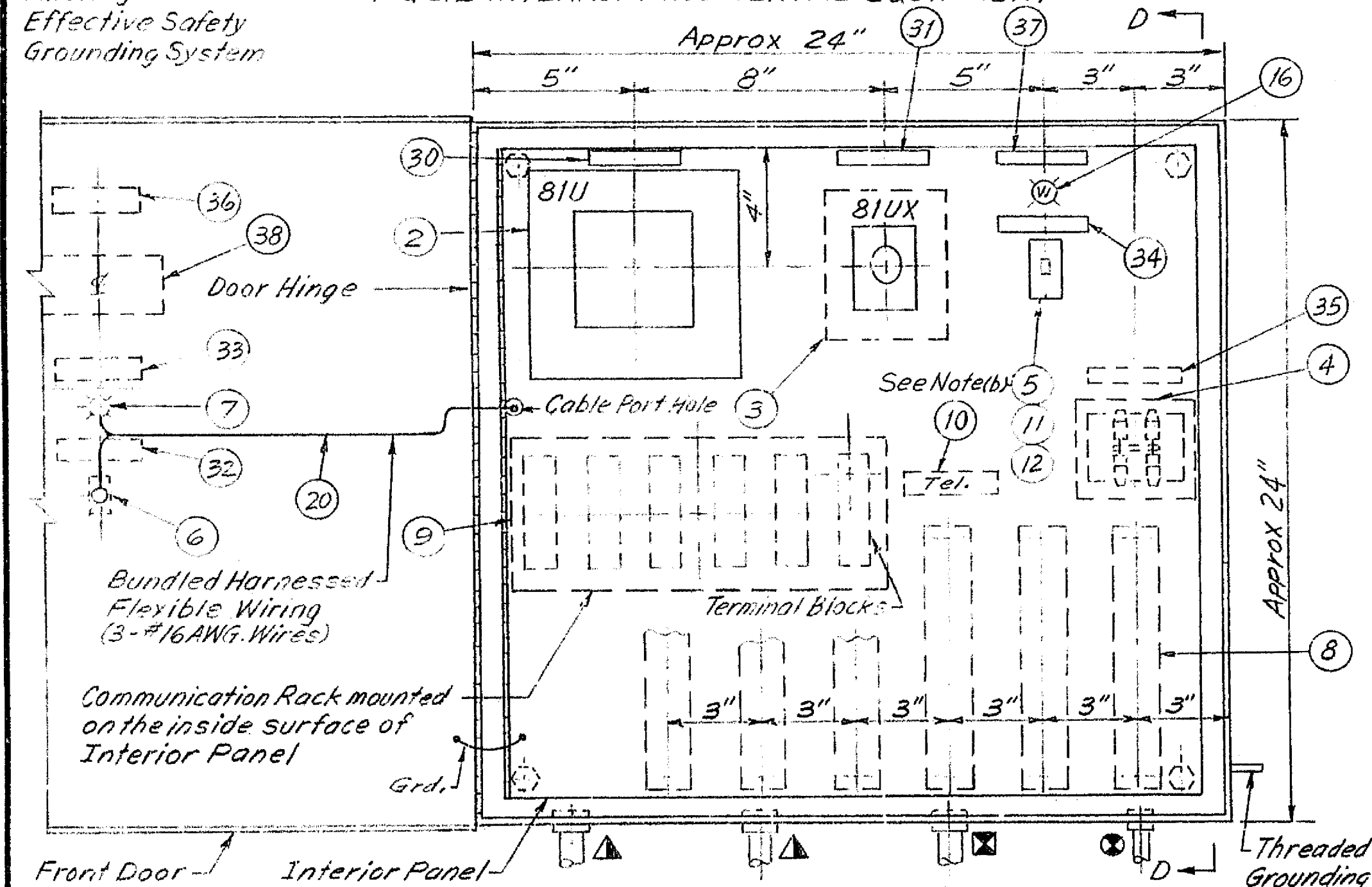


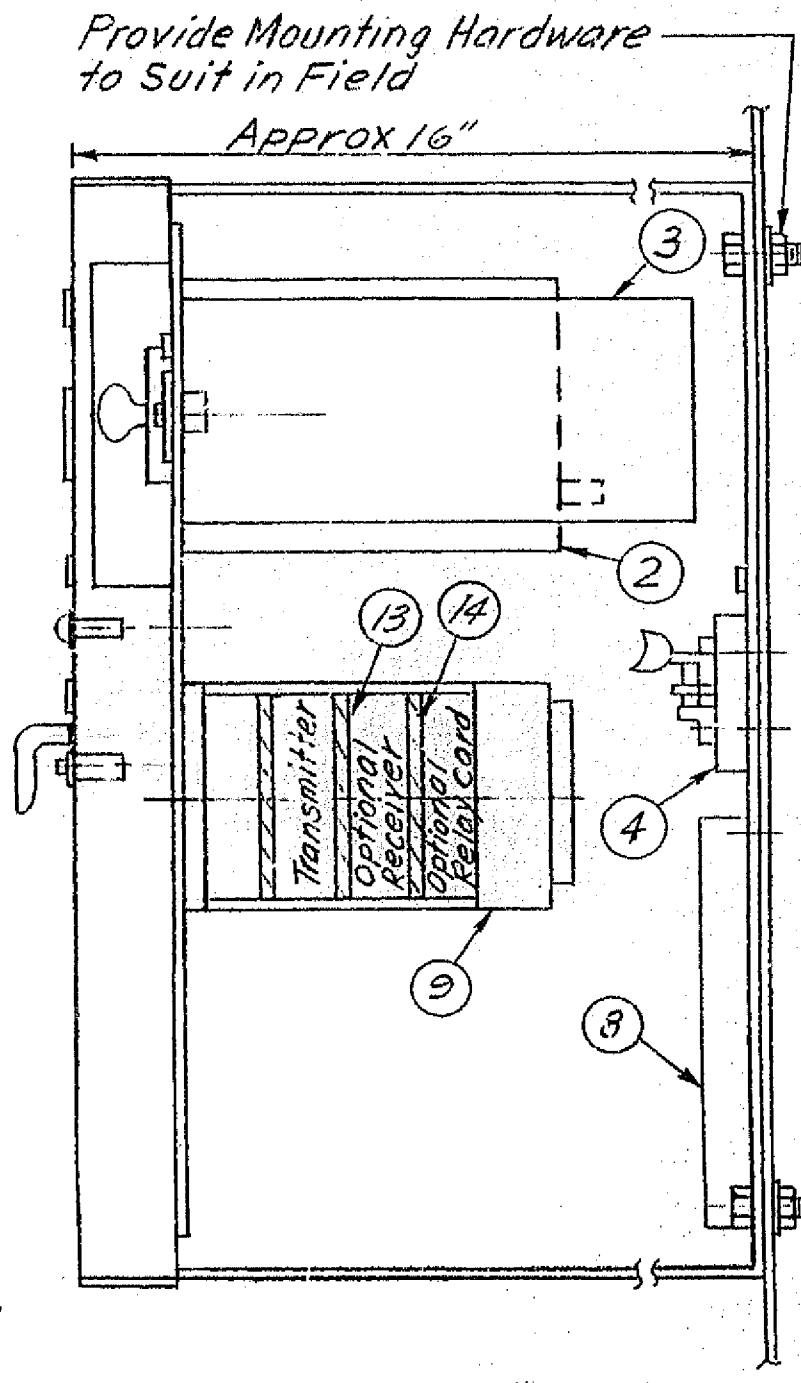
FIG. 1
TYPICAL CUSTOMER'S CIRCUIT BREAKER SWITCHGEAR AND
PG&E INTERRUPTIBLE SERVICE EQUIPMENT



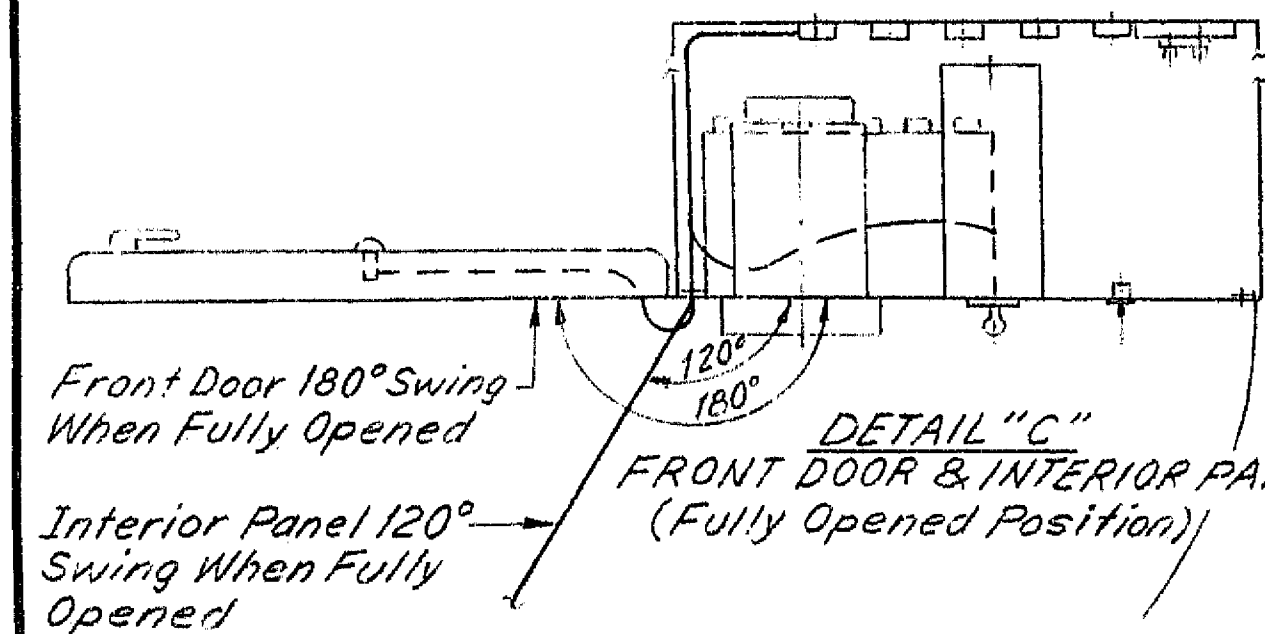
DETAIL "A"
END VIEW OF CUSTOMER'S SWITCHGEAR



DETAIL "B"
PG & E Interruptible Service Enclosure



SECTION "D-D"



TYPICAL ARRANGEMENT OF INTERRUPTIBLE SERVICE ENCLOSURE

- NOTES:**
- (a) The PG&E installed equipment may be physically located on the end of the switchgear if space is available, or on an adjacent wall or structure - which is convenient for the customers access for hand resetting the underfrequency lock-out relay.
 - (b) Install PG&E seal on the feature cut-out switch handle guard with the switch in the closed (cut-in) position.
 - (c) The enclosure shall be locked by two padlocks. One provided by PG&E and other by customer. Removal of either padlock to provide access to hand reset the lockout relay.
 - ⊗ Customer installed type 3002 telephone line, bottom entrance.
 - ⊗ Customer installed and wired circuit breaker controls bottom entrance.
 - △ By PG and E.

APPROVED BY													
E.O.G. Tol		2		3-2-89		Chg'd. Sh. No. Former Sh. 7 made Sh. 8		K. G. [Signature]		WRT			
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CRH		REV	DATE	DESCRIPTION		DWN	CHKD	SUPV	APVD				
GM				ENGINEERING STANDARD						SUPERSEDES			
SUPV N.N. GRAF				INSTALLATION REQUIREMENTS FOR TIME METERED INTERRUPTIBLE SERVICE ELECTRIC OPERATIONS PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA						SUPERSEDED BY			
DSGN G.S. LIM												SHEET NO 7 OF SHEETS	
DWN G.S. LIM												DRAWING NUMBER	
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DATE 3-24-87		SCALE								MICROFILM			



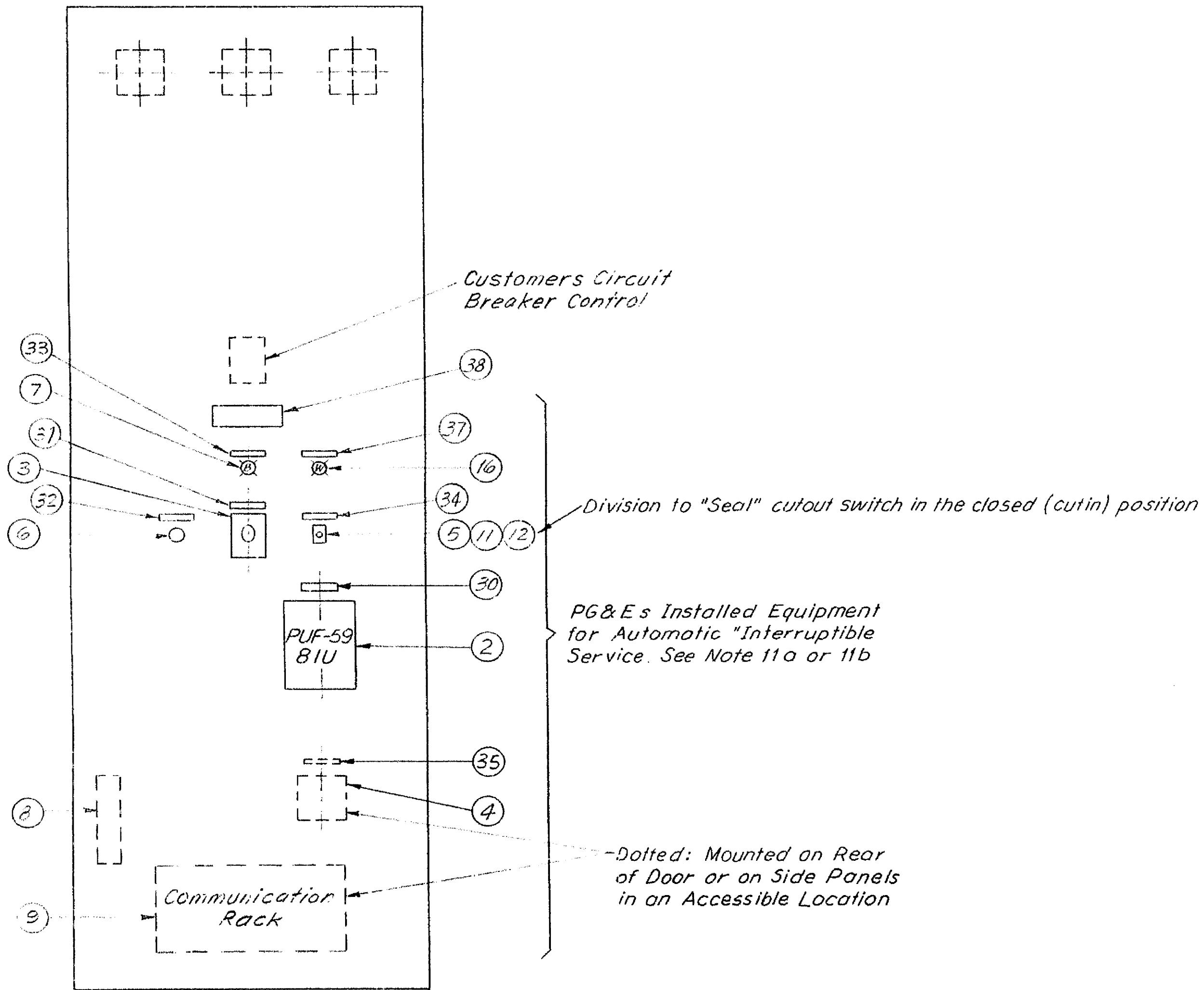


FIG. 2
TYPICAL CUSTOMER'S SWITCHBOARD OR FRONT DOOR OF CIRCUIT BREAKER SWITCHGEAR CONTROLLING THE INTERRUPTIBLE LOAD

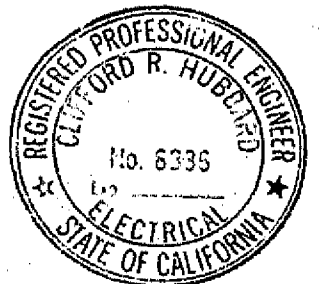
NOTE:

The PG and E installed equipment may be physically located on the switchboard if space is available. The communication rack may require mounting on an adjacent wall or structure, for telephone and auxiliary wiring access. The telephone line may then terminate directly at the communication racks terminal blocks.

TYPICAL ARRANGEMENT OF CUSTOMER'S SWITCHBOARD

APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
<i>[Signature]</i>	3	3-21-89	Chg'd Sh. No. Former Sh. 8 made Sh. 9	K.G.	<i>[Signature]</i>	<i>[Signature]</i>	WRT
<i>[Signature]</i>	1	3-24-87	Approved for Construction	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	WRT
<i>[Signature]</i>							

GM	ENGINEERING STANDARD	SUPERSEDES
SUPV N.N.GRAF	<p align="center">INSTALLATION REQUIREMENTS FOR TIME METERED INTERRUPTIBLE SERVICE</p> <p align="center">ELECTRIC OPERATIONS PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA</p>	SUPERSEDED BY
DSGN G.S.LIM		SHEET NO 8 Δ 3 OF SHEETS
DWN K.GOLDENBERG		DRAWING NUMBER
CHKD G.S.LIM		REV
O.K. <i>[Signature]</i>		062143 3
DATE 3-24-87	SCALE	MICROFILM



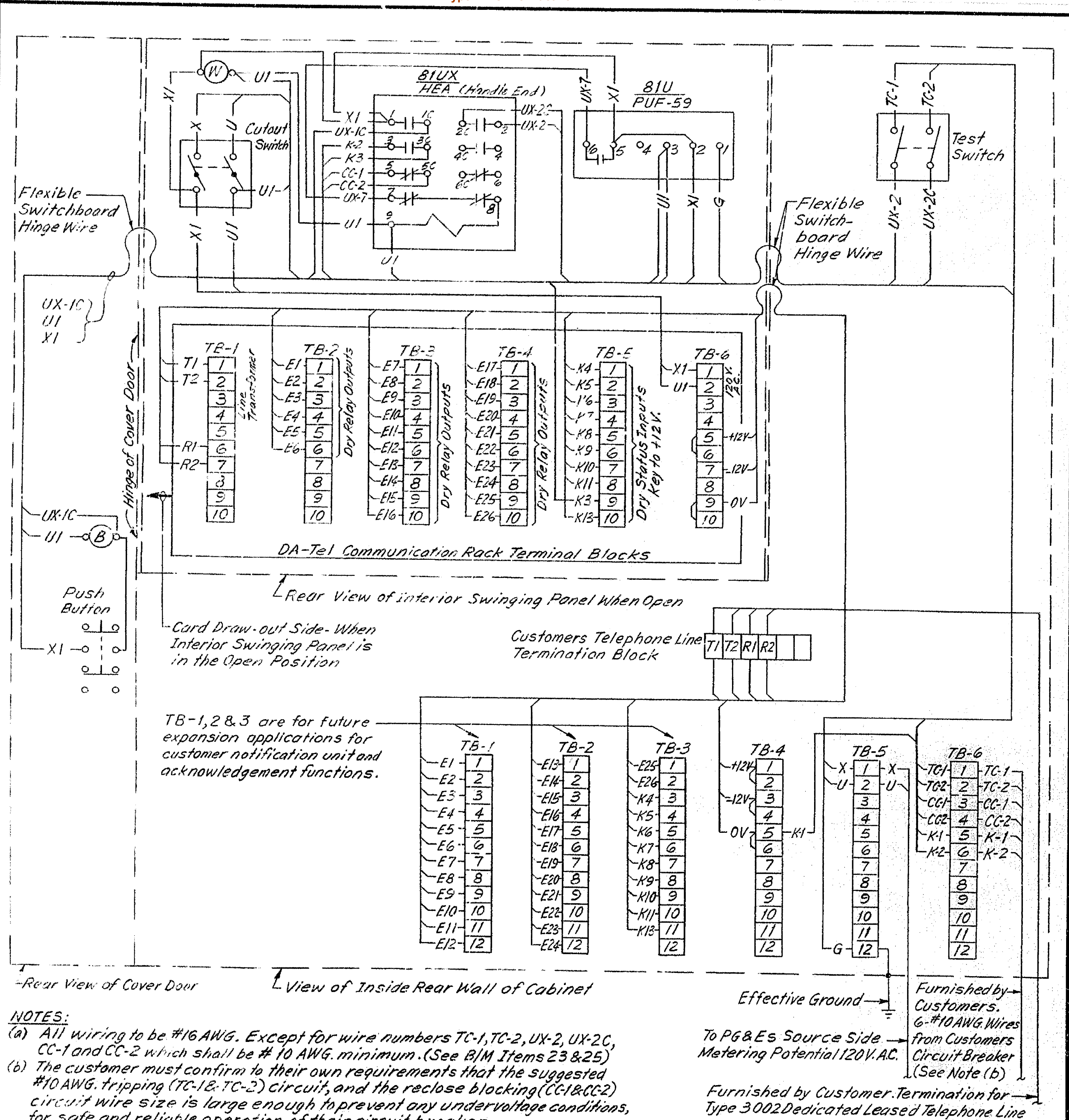
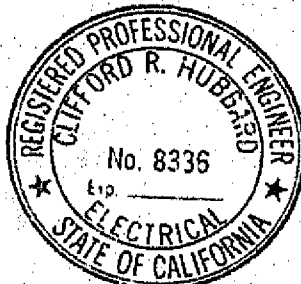


DIAGRAM OF CONNECTIONS FOR INTERRUPTIBLE SERVICE ENCLOSURE

APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	SUPV	APVD
ED-6	3	3-21-89	Chg'd Sh. No. This sheet formerly Sh. 8	K.G.	MM	WRT	
MM	2	5-9-88	Revised TB-1 in Da-Tel Communication Rack	K.G.	MM	WRT	
MM	1	3-24-87	Approved for Construction	WRT			



GM	
SUPV	N.N. GRAF
DSGN	G.S. LIM
DWN	G.S. LIM
CHKD	N.N. GRAF
O.K.	
DATE	SCALE
3-24-87	

ENGINEERING STANDARD

INSTALLATION REQUIREMENTS FOR TIME METERED INTERRUPTIBLE SERVICE

ELECTRIC OPERATIONS
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO	9 OF 9 SHEETS
DRAWING NUMBER	062143
REV	3