



Effective: January 1996

CVD Relay

NEW INFORMATION



Before putting relays into service, remove all blocking which may have been inserted for the purpose of securing the parts during shipment, make sure that all moving parts operate freely, inspect the contacts to see that they are clean and close properly, and operate the relay to check the settings and electrical connections.

1.0 APPLICATION

These relays are used to initiate switching or control operations when the line voltage rises above a preset value or falls below a preset value. Thus the relay is a contact making voltmeter with high and low voltage contacts.

2.0 CONSTRUCTION AND OPERATION

2.1 Voltage Unit

The voltage unit operates on the induction disc principle. A main coil located on the center leg of an "E" type laminated structure produces a flux which divides and returns through the outer legs. A shading coil causes the flux through the left leg (front view) to lag the main pole flux. The out-of-phase fluxes thus produced in the air gap causes torque on the disc which moves to a position in its travel that corresponds to the voltage applied to the electromagnet. The disc will remain in this position until the applied voltage is changed at which time, the disc will move to a new position that corresponds to the new voltage.

2.2 Indicating Contactor Switch (ICS)

The indicating contactor switch is a small dc operated clapper type device. A magnetic armature, to which leaf-spring mounted contacts are attached, is attracted to the magnetic core upon energization of the switch. When the switch closes, the moving contacts bridge two stationary contacts, completing the trip circuit. Also during this operation, two fingers on the armature deflect a spring located on the front of the switch, which allows the operation indicator target to drop. The target is reset from the outside of the case by a push rod located at the bottom of the case.

The front spring, in addition to holding the target, provides restraint for the armature and thus controls the pickup value of the switch.

3.0 CHARACTERISTICS

3.1 Voltage Unit

The type CVD relay has adjustable lower and raise voltage contacts that can be set around a calibrated scale. The moving contacts will assume a position corresponding to the voltage applied to the relay and will stay in that position until the voltage changes. If the voltage changes either gradually or suddenly, the contact will assume a new position corresponding to the change unless the travel is limited by the setting of the adjustable contacts.

The voltage unit has inverse timing; that is, the greater the change in voltage, the faster the relay contact will travel. If the voltage on the voltage unit is barely sufficient to close the contacts, the contact resistance at this light pressure may reduce the voltage on the time-delay unit sufficiently to cause a substantial increase in the time. If the voltage change is 1/2 to 1 volt greater than that required to barely close

All possible contingencies which may arise during installation, operation or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding this particular installation, operation or maintenance of this equipment, the local ABB Power T&D Company Inc. representative should be contacted.

the voltage unit contacts, this effect is negligible.

3.2 Trip Circuit

The main contacts will close 30 amperes at 250 volts dc and the seal-in contacts of the indicating contactor switch (ICS) will carry this current long enough to trip a circuit breaker.

The indicating contactor switch (ICS) has two taps that provide a pickup setting of 0.2 or 2 amperes. To change taps requires connecting the lead located in front of the desired setting by means of a screw connection.

4.0 ENERGY REQUIREMENTS

See Table I.

5.0 SETTINGS

5.1 Voltage Unit

These are independent relay adjustments. These are the high voltage and low voltage contact settings as described under Section 3, Characteristics.

5.2 Indicating Contactor Switch (ICS)

No setting is required on the ICS unit except the selection of the 0.2 or 2.0 ampere tap setting. This selection is made by connecting the lead located in front of the tap block to the desired setting by means of the connecting screw.

6.0 INSTALLATION

The relays should be mounted on switchboard panels or their equivalent in a location free from dirt,

moisture, excessive vibration, and heat. Mount the relay vertically by means of the four mounting holes on the flange for semi-flush mounting or by means of the rear mounting stud or studs for projection mounting. Either a mounting stud or the mounting screws may be utilized for grounding the relay. The electrical connections may be made directly to the terminals by means of screws for steel panel mounting or to the terminal studs furnished with the relay for thick panel counting. The terminal studs may be easily removed or inserted by locking two nuts on the stud and then turning the proper nut with a wrench.

For detailed FT Case Information refer to I.L. 41-076.

7.0 ADJUSTMENTS AND MAINTENANCE

7.1 Acceptance Check

- Contacts
Set the left-hand adjustable contact in the center of the scale and adjust the voltage until the moving contact just makes. Set the left-hand contact back out of the way and bring the right-hand contact up until the contacts just make. The pointer should be within 1/32 inch of where the left-hand pointer was.
- Calibration Check
Check the scale markings by setting either of the two contacts at a value marked on the scale, then alternately apply this voltage $\pm 5\%$. Contacts should make and break respectively.

TABLE I
60 CYCLE BURDEN OF THE CVD RELAY AT CONTINUOUS RATING

Range	Continuous Rating	Burden	Power Factor Angle [†]	Watts
15 - 60	65 volts	7.85 VA	70°	2.68
30 - 120	132 volts	7.85 VA	70°	2.68
40 - 160	176 volts	7.85 VA	70°	2.68
80 - 320	352 volts	7.85 VA	70°	2.68
105 - 135	148 volts	16.5 VA	78°	3.43
180 - 320	254 volts	16.5 VA	78°	3.43
210 - 270	296 volts	16.5 VA	78°	3.43

[†] Degrees current lags voltage.

8.0 CALIBRATION

8.1 Voltage Unit

a. Contacts

Apply sufficient voltage to the relay to make the disc float in the center of its travel. Move both of the adjustable contacts until they just make with the moving contacts. If the contact pointers do not meet at the same point on the scale, adjust the follow on both stationary contacts. Approximately the same follow should be in each of the adjustable stationary contacts.

b. Calibration Check

The adjustment of the spring tension in calibrating the relay is most conveniently made with the damping magnet removed.

Set either of the adjustable stationary contacts in the center of its travel and apply this voltage to the relay. Wind up the spiral spring by means of the spring adjuster until the stationary contact and moving contact just makes.

Check the other scale markings by setting the adjustable contact on these markings and applying the corresponding voltage to the relay. The contacts should make within $\pm 5\%$ of scale markings.

c. Time-Curve

Adjust the permanent magnet keeper to calibrate for the operate times ($\pm 5\%$) given in Table II.

8.2 Indicating Contactor Switch (ICS)

Close the main relay contacts and pass sufficient dc current through the trip circuit to close the contacts of the ICS. This value of current should not be greater than the particular ICS setting being used. The indicator target should drop freely.

For proper contact adjustment, insert a .030" feeler gauge between the core pin and the armature. Hold the armature closed against the core pin and gauge and adjust the stationary contacts such that they just make with the moving contact. Both stationary contacts should make at approximately the same time. The contact follow will be approximately 1/64" to 3/64".

9.0 RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable parts can be furnished to the customers who are equipped for doing repair work. When ordering parts, always give the complete nameplate data.

TABLE II

Relay Rating (Volts)	Under Voltage Contact Setting	Over Voltage Contact Setting	Test Voltage From To	Operate Time (Seconds)
15 - 60	15	34	0 68	1.9
30 - 120 (1.5 sec.)	40	120	65 0	1.5
30 - 120 (2.0 sec.)	66	80	66 120	2.0
40 - 160	40	91	0 182	1.9
80 - 320	80	182	0 364	1.19
105 - 135 [†]	117	123	120 130	7.5
180 - 230	234	246 240	240 260 220	7.5
210 - 270 [†]	200	210 205	205 222 188	7.5

[†] Allow relay to heat for 30 minutes.

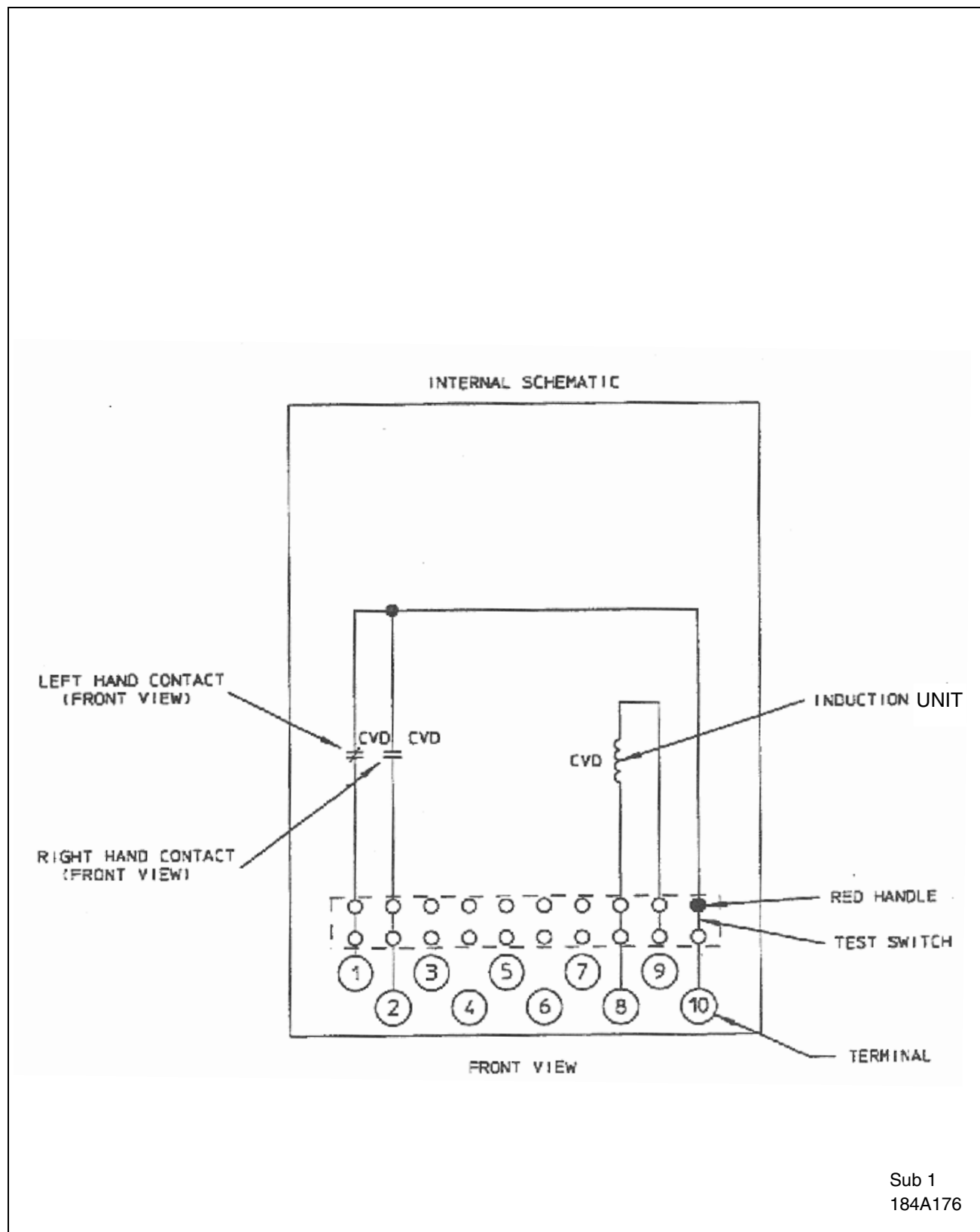


Figure 1. Type CVD Voltage Relay in Type FT-11 Case

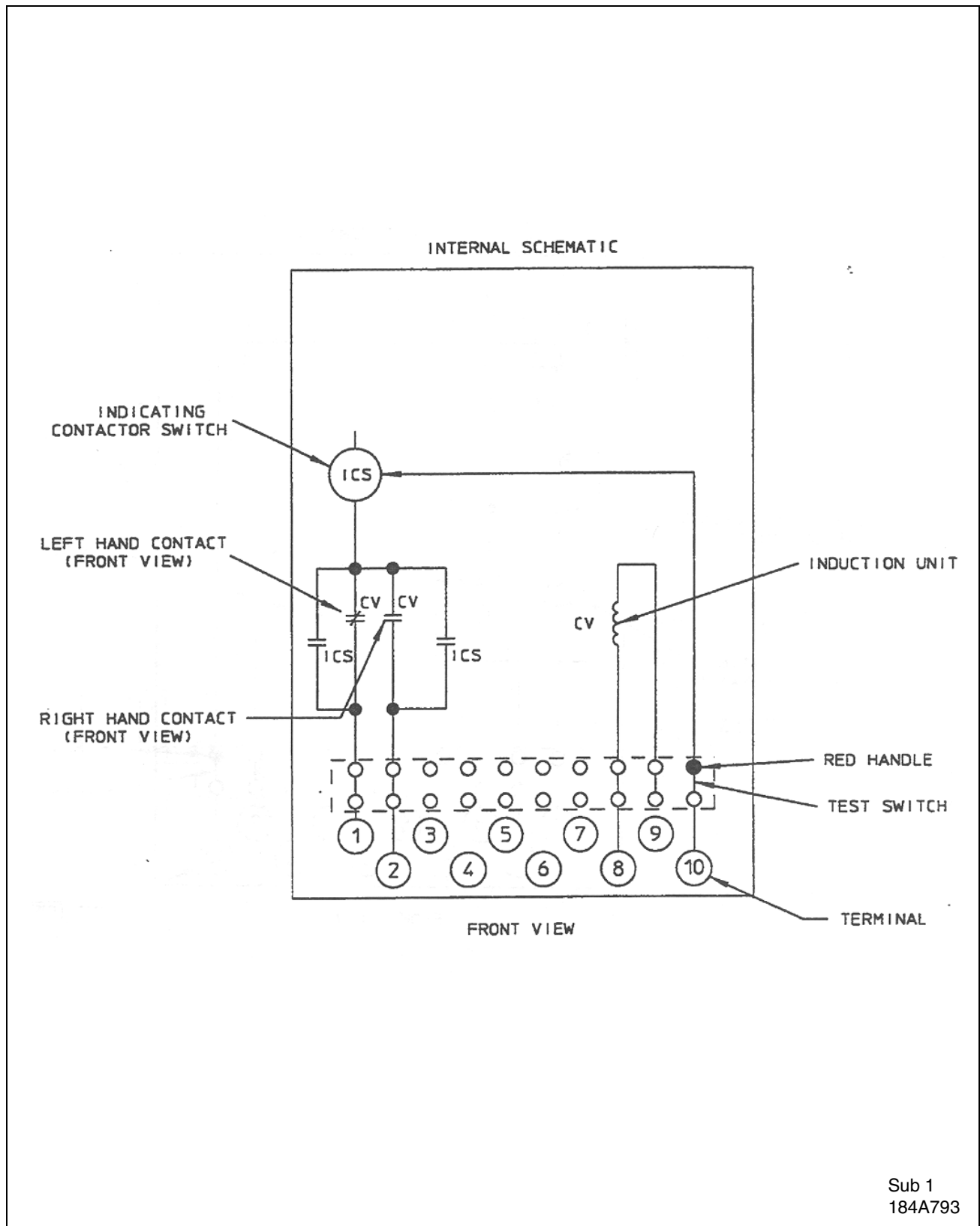


Figure 2. Type CVD Voltage Relay with ICS Unit in Type FT-11 Case

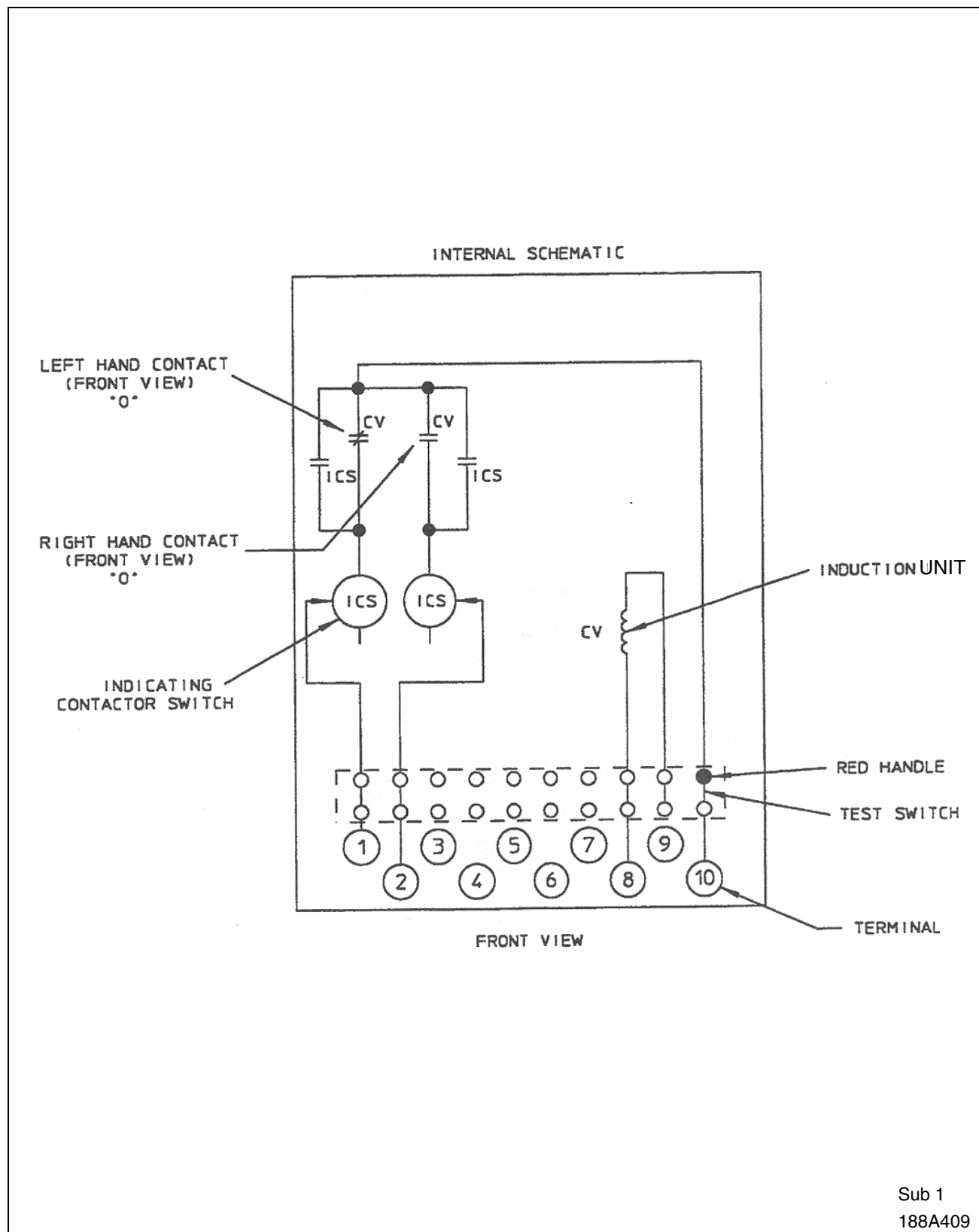


Figure 3. Type CVD Voltage Relay with Two (2) ICS Units in Type FT-11 Case

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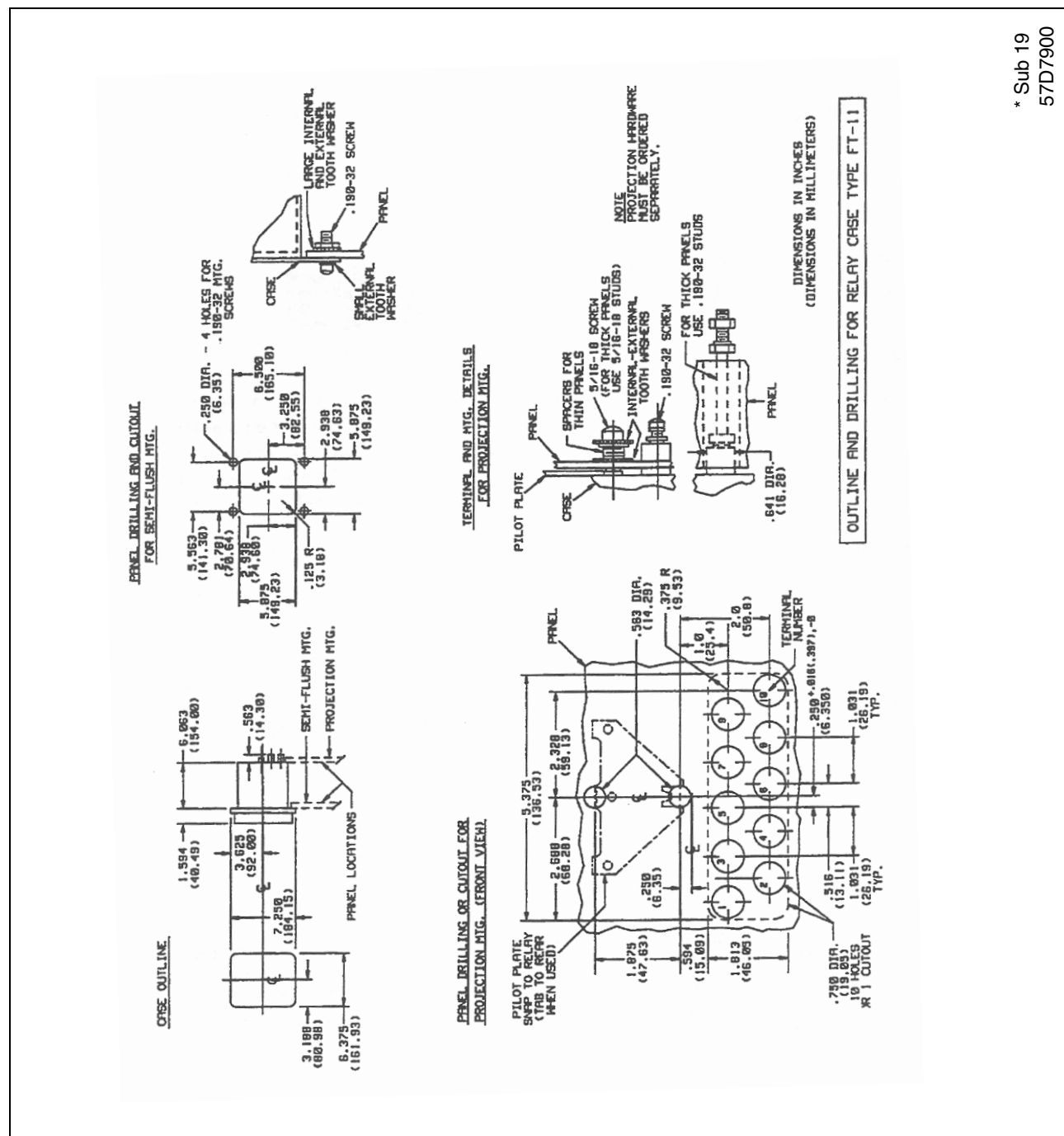


Figure 4. Outline and Drilling Plan for the FT-11 Case used for Projection and/or Semi-flush Case