

United States District Court,  
E.D. Texas, Tyler Division.

**GSK TECHNOLOGIES INC,**  
Plaintiff.

v.

**EATON ELECTRICAL INC,**  
Defendant.

**GSK Technologies Inc,**  
Plaintiff.

v.

**General Electric Company,**  
Defendant.

**GSK Technologies Inc,**  
Plaintiff.

v.

**Schneider Electric SA, et al,**  
Defendant.

Nos. 606CV358, 606CV360, 606CV361

**April 1, 2008.**

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## **MEMORANDUM OPINION**

**LEONARD DAVIS, District Judge.**

This claim construction opinion construes the terms in U.S. Patent No. 4,949,214 (the "214 patent").

## BACKGROUND

The patent in issue is directed at detecting the difference on a circuit between normal start up current loads, such as turning on a hair dryer, and dangerous intermittent or high resistance shorts, such as those caused by defective connections. The technology provides for a protector circuit, which responds to an overloaded circuit condition described above by automatically overriding the trip delay of a circuit breaker. GSK Technologies, Inc. ("GSK") asserts that Eaton Electrical, Inc., General Electric Company, Schneider Electric, S.A., and Square D Company (collectively "Defendants") infringe on various claims of the '214 patent.

## APPLICABLE LAW

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.' " *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed.Cir.2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed.Cir.2004)). In claim construction, courts examine the patent's intrinsic evidence to define the patented invention's scope. *See id.*; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed.Cir.2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed.Cir.2001). This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312-13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed.Cir.2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314-15.

"[C]laims 'must be read in view of the specification, of which they are a part.' " *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.' " *Id.* (quoting *Vitronics Corp. v. Conceptronc, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed.Cir.2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id.* Also, the specification may resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex, Inc.*, 299 F.3d at 1325. But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims." " *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed.Cir.1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed.Cir.1988)); *see also Phillips*, 415 F.3d at 1323. The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed.Cir.2004) ("As in the case of the specification, a patent applicant may define a term in

prosecuting a patent.").

Although extrinsic evidence can be useful, it is " 'less significant than the intrinsic record in determining the legally operative meaning of claim language.' " Phillips, 415 F.3d at 1317 (quoting C.R. Bard, Inc., 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition is entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

The patents in suit also contain means-plus-function limitations that require construction. Where a claim limitation is expressed in "means plus function" language and does not recite definite structure in support of its function, the limitation is subject to 35 U.S.C. s. 112, para. 6. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1424 (Fed.Cir.1997). In relevant part, 35 U.S.C. s. 112, para. 6 mandates that "such a claim limitation 'be construed to cover the corresponding structure ... described in the specification and equivalents thereof.' " *Id.* (citing 35 U.S.C. s. 112, para. 6). Accordingly, when faced with means-plus-function limitations, courts "must turn to the written description of the patent to find the structure that corresponds to the means recited in the [limitations]." *Id.*

Construing a means-plus-function limitation involves multiple inquiries. "The first step in construing [a means-plus-function] limitation is a determination of the function of the means-plusfunction limitation." Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc., 248 F.3d 1303, 1311 (Fed.Cir.2001). Once a court has determined the limitation's function, "the next step is to determine the corresponding structure disclosed in the specification and equivalents thereof." *Id.* A "structure disclosed in the specification is 'corresponding' structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id.* Moreover, the focus of the "corresponding structure" inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is "clearly linked or associated with the [recited] function." *Id.*

## ANALYSIS FN1

FN1. Appendix A contains the relevant claims with the disputed terms in bold.

### *Current to voltage transforming means*

Claim 1 contains the term "current to voltage transforming means." The parties agree that the term is a means-plus-function limitation governed by 35 U.S.C. s. 112, para. 6, but they disagree as to the proper function and structure.

GSK contends that the function must account for the "current to voltage transforming" language that precedes the "means ... for" language. However, in means-plus-function limitations, the word "for" usually signals the recitation of the function. Seal Flex, Inc. v. Athletic Track & Court Constr., 172 F.3d 836, 859 (Fed.Cir.1999) (Rader, J. concurring); *see e.g.*, Lockheed Martin Corp. v. Space Sys./Loral Inc., 324 F.3d 1308, 1319 (Fed.Cir.2003) ("The phrase 'means for' ... is typically followed by the recited *function and claims limitations*." (emphasis in original)); Micro Chem., Inc. v. Great Plains Chem. Co., Inc., 194 F.3d

1250, 1258 (Fed.Cir.1999) ("the properly identified function of this means-plus-function element, signaled by the preposition 'for' "). The "current to voltage transforming" language is simply a descriptor of the means-plus-function limitation, which allows the inventor to avoid reciting the entire means-plus-function language in later claims when referring back to this limitation. Accordingly, the function is the language after the preposition "for," which is "producing a control voltage output signal having a magnitude proportional to the magnitude of current conducted through said selected power conductor."

The parties also disagree as to the proper structure. Defendants propose two alternative structures: (1) toroid transformer T and variable resistor R1 or (2) resistor R5. GSK contends that bridge rectifier B1 should also be included as it is used in combination with the above alternative structures. The specification states "the toroid transformer T, resistor R1 and diode bridge B1 in combination define an AC current to DC voltage converter." '214 patent, Col. 10:8-10. However, the function is "producing a control voltage output signal ...," not converting the AC current to DC voltage. The specification also teaches that bridge B1 may be eliminated, allowing the output of resistor R1 to be directly coupled to gate G of transistor switch Q. *Id.*, Fig. 8, 16, and 18 (illustrating that transformer T (Fig.16) and resistor R5 (Fig.18) are connected to switch Q without passing through bridge B1); Col. 9:58-61.

The specification identifies Defendants' proposed components as necessary structure for producing the control voltage output signal. For transformer T and resistor R1, the specification states "the purpose of the toroid transformer T is to transform AC load current conducted through the load power conductor 14 to an AC input voltage waveform  $V_S$ ." *Id.*, Fig. 2 (illustrating that transformer T coupled with resistor R1 produce control voltage output signal  $V_S$ ); Col. 6:51-54. For resistor R5, the specification states "resistor R5 ... produces an alternating voltage  $V_S$  in response to the flow of current through the load power conductor." *Id.* Fig. 3; Col. 10:34-38.

Accordingly, the necessary structure is either (1) toroid transformer T and variable resistor R1 (Figure 2) or (2) resistor R5 (Figure 3).

### ***Control voltage output signal***

The Court construes "control voltage output signal" as "a voltage output signal that directly or indirectly actuates a device."

Defendants' proposed construction is "a voltage output signal that controls the actuation of the control solenoid, has a magnitude proportional to the magnitude of current conducted through the selected power conductor, and is received by the gate terminal of the gate controlled switch." GSK argues that this construction is redundant, and the Court agrees. Claim 1 already includes the three limitations enumerated in Defendants' proposed construction. *See id.*, 13:65-14:21. Reading these limitations into the term "control voltage output signal" would create a redundancy and would add nothing to the construction. *See Labs. Perouse, S.A.A. v. W.L. Gore & Assocs., Inc.*, 528 F.Supp.2d 362, 2007 WL 4323000, at (S.D.N.Y. December 10, 2007) (declining to include limitations that were already enumerated in the claim language in a term because it would add nothing to the claim construction); *Retractable Techs. v. New Med. Techs.*, Nos. 4:02-CV-34 & 4:03-CV-49, 2004 WL 435054, at (E.D.Tex. March 3, 2004) (Davis, J.) (declining to "roll" all the extraneous claim limitations that the Defendant proposed into the disputed term because a person of ordinary skill in the art would not include those limitations into the disputed term).

The inventor does not provide a special meaning for "control voltage output signal," so its plain and

ordinary meaning applies. *Enercon GmbH v. Int'l Trade Comm'n*, 151 F.3d 1376, 1384 (Fed.Cir.1998). One of ordinary skill in the art would understand "control voltage output signal" to mean "a voltage output signal that directly or indirectly actuates a device." This is confirmed by the IEEE's dictionary definition of "control voltage." *See* GSK's Opening Brief, Ex. G. (defining "control voltage" as "the voltage applied to the operating mechanism of a device to actuate it, usually measured at the control power terminals of the mechanism"). As nothing in the intrinsic evidence rebuts the heavy presumption of applying the ordinary and plain meaning, the Court construes the term as one of ordinary skill in the art would interpret it to mean, "a voltage output signal that directly or indirectly actuates a device."

### ***Magnitude proportional to***

The Court adopts Defendants' proposed construction and construes "magnitude proportional to" as "a magnitude having the same or constant ratio to."

GSK proposes that the term means "a value that is a ratio of." As discussed above, the transforming means produces control voltage output signal  $V_S$ . Claim 1 requires this output signal to have a "magnitude proportional to the magnitude of current conducted through said selected power conductor." '214 patent, Col. 14:6-8. GSK's proposed construction reads the "proportional" limitation out of the claim by substituting the term "ratio." While GSK cites to the specification for support, none of the cited intrinsic evidence supports deviating from the plain and ordinary meaning of "proportional."

Defendants propose that the term's plain and ordinary meaning is "a magnitude having the same or constant ratio to." One of ordinary skill in the art would understand that for the short circuit protector to operate properly, the control voltage output signal amplitude must have a constant ratio with the load power conductor current. Defendants' construction is further underscored by the definition of proportional. *See* Defendants' Response Brief, Exs. 16 (defining proportional as "having the same or constant ratio") and 17 (defining proportional as "having a constant ratio"). Accordingly, the Court construes "magnitude proportional to" as "magnitude having the same or constant ratio to."

### ***Electrically coupled***

The Court construes "electrically coupled" to mean "arranged so that electrical signals may be passed either directly, or indirectly via intervening circuitry, from one component to another."

Defendants propose the term needs no construction or, in the alternative, means "electrically connected so as to transfer the current or voltage in a conductor to another conductor." Defendants dismiss this term in a footnote, offering only two lines from the specification as support. *See* '214 patent, Col. 6:1-2 ("movable power contact 30 which is electrically coupled to the load power conductor 14"). This language does not support that the inventor assigned a special meaning for "electrically coupled," so as to limit the term to transferring voltage or current from one conductor to another.

As the intrinsic evidence does not provide a special meaning for "electrically coupled," its plain and ordinary meaning applies. *Enercon*, 151 F.3d at 1384. One of ordinary skill in the art would understand "electrically coupled" to mean "arranged so that electrical signals may be passed either directly, or indirectly via intervening circuitry, from one component to another." *See, e.g., O2 Micro Int'l, Ltd. v. Rohm Co. Ltd.*, No. 2:05-cv-211, 2007 WL 4116803, at (E.D.Tex. November 16, 2007) (Everingham, Mag. J.) (construing "coupled" to mean "electrically connected, directly or indirectly") (citing prior Judge Ward claim

construction in *O2 Micro v. BiTEK*, 2:04-cv-32). Defendants offer no evidence to the contrary. Accordingly, the Court construes the term as, "arranged so that electrical signals may be passed either directly, or indirectly via intervening circuitry, from one component to another."

### ***Connected in series electrical relation***

The Court construes this phrase to mean "an arrangement between two electronic components connected end to end in which there is a single current path between the two components and in which the same quantity of current passes through each of the components."

GSK proposes that the phrase means "an electrical relationship in which a signal that passes through a first component causes the operation of a successive component." Although GSK contends that the phrase's plain and ordinary meaning should apply, GSK's construction does not account for the term "series," and GSK does not show why that term should be excluded from the construction. Furthermore, GSK does not cite any evidence to support why one skilled in the art would understand the phrase to include the "causes the operation of" language.

Conversely, Defendants propose a construction that is based on the plain and ordinary meaning of the phrase. In the '214 patent, the inventor uses the terms "electrical series circuit relation" and "series electrical relation" interchangeably. FN2 *See* '214 patent, Col. 7:66 (stating that the solenoid 24 having an armature winding 24W connected in electrical series circuit relation with the switched and unswitched power terminals d, s of field effect transistor switch Q); 14:15-18 ("a gate controlled switch having switched and unswitched power terminals connected in series electrical relation with the armature winding of said control solenoid). In the prosecution history, the inventor uses the term "series" interchangeably with "series electrical circuit relation." *See* GSK's Opening Brief, Ex. B at GSK000060 (stating that the output nodes of bridge rectifier B2 are in series with resistor R4, then stating that the output nodes are connected in series electrical circuit relation.)

FN2. As with "control voltage output signal," the inventor used many variations of the phrase "series electrical relation" throughout the '214 patent.

When terms are used interchangeably, they may be given the same meaning. *Tehrani v. Hamilton Med. Inc.*, 331 F.3d 13355, 1361 (Fed.Cir.2003). The terms "series" and "series circuit" have commonly understood meanings, and Defendants based their construction on those meanings. *See* Defendants' Response Brief, Exs. 18 (defining "series circuit" as "circuit supplying energy to a number of devices connected in series, that is, the same current passes through each device in completing its path to the source of supply") and 19 (defining "series" as "an arrangement of components end to end" and defining "series circuit" as "a circuit in which all parts are connected end to end to provide a single path for current). Accordingly, as the intrinsic evidence does not support otherwise, the Court construes the phrase as one of ordinary skilled in the art would understand it. Therefore, the Court adopts Defendants' construction.

### ***AC control voltage output signal & DC voltage control signal***

During the *Markman* hearing, both parties agreed that these terms do not need construction. Both parties also agreed that the control voltage output signal is not a current. The Court adopts the parties' positions.

### ***Predetermined count & Predetermined level***

The Court construes "predetermined count" as "a count determined beforehand" and "predetermined level" as a "level determined beforehand." The parties' only disagreement focuses on the meaning of the term "predetermined."

GSK proposes that the term should be construed as "a count [level] that is fixed or calculated beforehand." FN3 GSK contends that the predetermined count or level is variable because a calculation may be used to set the count or level. However, the specification teaches that the predetermined level or count is preset during manufacture.

FN3. Although GSK proposes that predetermined be construed as "fixed or calculated beforehand," it takes a seemingly contrary position in its briefing, where GSK states, "Predetermined does not mean 'fixed.'" GSK Reply Brief at 13.

The specification states, "the purpose of the short circuit protector 10 is to override the thermal trip delay to cause the circuit breaker 12 to trip, upon detection of current flow through the load conductor 14 which exceeds a predetermined maximum current overload level." '214 patent, Col. 6:14-18. The specification further teaches that the maximum short circuit current rating may be determined by referencing the National Electrical Code Council's published ratings. *Id.*, Col. 7:51-55. The values are predetermined and set during manufacture. *See id.*, Col. 7:58-63 ("During manufacture, the load power conductor 14 within the short circuit protector 10 is connected to a controlled current source to conduct current at the rated level. The wiper arm of resistor R1 is then adjusted to produce a gate threshold voltage  $V_G$  to cause turn on of the transistor switch Q.").

Defendants propose that the term should carry its plain and ordinary meaning, "determined beforehand." *See e.g. Pause Tech., LLC v. Tivo, Inc.*, 419 F.3d 1326, 1333-34 (Fed.Cir.2005) (construing the plain and ordinary meaning of "predetermined" as "to determine beforehand"); *Ferguson Beauregard/ Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC*, 350 F.3d 1327, 1340 (Fed.Cir.2003) (construing the plain and ordinary meaning of predetermined as "determined beforehand"); *O2 Micro Int'l Ltd. v. Samsung Elecs. Co., Ltd.*, No. 2:04-cv-323, 2006 WL 1804616, \*4-5 (E.D.Tex. June 28, 2006) (Ward, J.) (construing "predetermined" as "determined beforehand"). As discussed above, the specification supports according "predetermined" its plain and ordinary meaning. Accordingly, the Court construes "predetermined count" as "a count determined beforehand" and "predetermined level" as "a level determined beforehand."

***Means ... for generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level***

Claim 12 contains the phrase "means ... for generating a solenoid actuating signal." The parties agree that the phrase is a means-plus-function limitation governed by 35 U.S.C. s. 112, para. 6, but they disagree as to the proper function and structure.

The Court construes the function as "generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level." The parties agree with the language preceding "in response to," but GSK contends that the "in response to ..." language should be excluded. While it is improper to narrow the scope of the function beyond the claim language, "it is equally improper to broaden the scope of the claimed function by ignoring clear limitations

in the claim language." *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 296 F.3d 1106, 1113 (Fed.Cir.2002). The "in response to" language limits the claimed function of generating a solenoid actuating signal by requiring "a detection of current flow through the selected power conductor which exceeds said predetermined level." '214 patent, Col. 15:31-35; *see e.g.* *Lockheed Martin*, 324 F.3d at 1319 (construing the function to include the limitation following the "in accordance with" language); *Autobyte, Inc. v. Dealix Corp.*, No. 2:04-cv-338, 2006 WL 155683, at (E.D.Tex. Jan.18, 2006) (Davis, J.) (finding that "in response to" language was a limitation contained in the claim language and thus was included in the function). Accordingly, the Court construes the function as "generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level."

The parties also dispute the proper structure. GSK proposes that the structure is "the switch Q in combination with the bridge rectifier B2 from Figure 2; and the switch Q in combination with the resistor R4, the load power conductor 40, and the neutral power conductor 42 of Figure 3." GSK confuses the function of generating a solenoid actuating signal with the actual actuation of the solenoid. The proper focus is on the structure that generates the signal.

The specification teaches that solenoid 24 is actuated by control signal 26.FN4 ' 214 patent, Col. 5:65. Switch Q receives control signal 26; thus, it cannot generate control signal 26 as the function requires. *See id.*, Col. 7:26-30 ("The combination of resistor R3 with resistor R2 produces a voltage divider, thereby yielding a scaled DC input voltage  $V_G$  which is applied as the control signal 26 to the control gate terminal g of a normally open switch Q"). Accordingly, GSK's proposed structure cannot be correct because it includes switch Q and components that follow switch Q, which are located after the generation of control signal 26. *See id.*, Fig. 2.

FN4. Throughout the specification, control signal 26 is also referred to as the "gate input signal 26," "turn-on signal 26," and "gate turn-on signal 26." '214 patent, Col. 7:39, 8:30, 9:37.

The proper structure is (1) variable resistor R1 alone or in combination with the full-wave bridge rectifier B1, (2) a conductor, (3) resistor R1, bridge rectifier B1, resistor R2, resistor R3, capacitor C (Figure 2), or (4) bridge rectifier B1, resistor R1, counter (Figure 3). The specification teaches that variable resistor R1 alone, or in combination with the bridge rectifier B1, is linked to producing control signal 26. *See id.*, Col. 9:50-61. Figure 16 and Figure 18 illustrate that the detectors are connected to the gate of switch Q by a conductor 26; thus, a conductor is an alternative structure. *See id.*, Figs. 8, 16, and 18; Col. 9:50-61 (describing the simple circuit illustrated in Figures 8,16, and 18).

Figure 2 illustrates that resistor R1, bridge rectifier B1, resistor R2, resistor R3, and capacitor C are alternative structure. *See id.*, Fig. 2. The specification states that resistor R3 is connected in shunt across capacitor C. *See id.*, Col. 7:25-26. "The combination of resistor R3 with resistor R2 produces a voltage divider, thereby yielding a scaled DC input voltage  $V_G$  which is applied as the control signal 26 to control the gate terminal g of a normally opened switch Q." *Id.*, Col. 7:26-30. Thus, resistor R1 and bridge rectifier B1 can work in combination with resistor R2, resistor R3, and capacitor C to produce control signal 26; accordingly, these components are alternative structure.

Figure 3 illustrates alternative components to the structure illustrated in Figure 2. The specification teaches that a countercircuit may be used to perform the sample and hold function instead of using capacitor C,

resistor R2, and resistor R3 as illustrated in Figure 2. Id., Fig. 3; Col. 9:8-12. Thus, a countercircuit in combination with resistor R1 and bridge rectifier B1 is also alternative structure. *See id.*, Fig. 3. Accordingly, the proper structure is (1) variable resistor R1 alone or in combination with the full-wave bridge rectifier B1, (2) a conductor, (3) resistor R1, bridge rectifier B1, resistor R2, resistor R3, capacitor C (Figure 2), or (4) bridge rectifier B1, resistor R1, counter (Figure 3).

## CONCLUSION

For the foregoing reasons, the Court interprets the claim language in this case in the manner set forth above. For ease of reference, the Court's claim interpretations are set forth in Appendix B. The claims with the disputed terms in bold are set forth in Appendix A.

**So ORDERED.**

## APPENDIX A

U.S. Patent No. 4,949,214

1. A protector circuit for automatically overriding the trip delay of a circuit breaker of the type having a movable contact arm for making and breaking an electrical circuit in a power distribution system having first and second power conductors, said protector circuit comprising, in combination:

**current to voltage transforming means** having an input adapted to be coupled to a selected one of said power conductors for producing a **control voltage output signal** having a **magnitude proportional** to the magnitude of current conducted through said selected power conductor;

a control solenoid having an actuator linkage member movably coupled to the movable contact arm of the circuit breaker and having an armature winding **electrically coupled** to conduct current from the first power conductor to the second power conductor;

and, a gate controlled switch having switched and unswitched power terminals **connected in series electrical relation** with the armature winding of said control solenoid, said switch having a control gate terminal **electrically coupled** to said transforming means for receiving the **control voltage output signal**.

2. A protector circuit as defined in claim 1, including:

an AC to DC voltage converter coupled to said transforming means for converting an **AC control voltage output signal** to a **DC voltage control signal**, said control gate terminal being **electrically coupled** to said converter for receiving said **DC voltage control signal**.

3. A protector circuit as defined in claim 2, wherein said AC to DC converter comprises a full wave bridge rectifier having first and second input terminals **electrically coupled** to said transforming means and having first and second output terminals electrically coupled to the gate control terminal and the unswitched power terminal, respectively, of the gate controlled switch.

6. A protector circuit as defined in claim 1, including a voltage sample and hold circuit **electrically coupling** the control voltage signal output of said transforming means to the gate terminal of said gate controlled switch.

8. A protector circuit as defined in claim 6, wherein said sample and hold circuit comprises a counter having a pulse count input terminal **electrically coupled** to the control voltage signal output of said transforming means, and having an output terminal **electrically coupled** to the control gate of said switch, said counter being adapted to produce an output turn-on control signal in response to a **predetermined count** of control voltage signal pulses.

10. A protector circuit as defined in claim 1, wherein said **current to voltage transforming means** comprises a current sensing resistor **connected in series electrical relation** in said selected power conductor.

12. In a circuit breaker of the type having a movable contact arm for making and breaking an electrical circuit in a power distribution circuit having a first power conductor and a second power conductor, the improvement comprising a protector circuit for overriding the trip delay and tripping the movable contact arm to interrupt current flow through a selected one of said power conductors in response to current flow through said selected power conductor which exceeds a **predetermined level**, said protector circuit including a solenoid movably coupled to said contact arm for tripping said contact arm in response to an actuating control signal, a detector for detecting the magnitude of current flow through said selected power conductor, and **means coupled to said detector for generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level.**

## APPENDIX B

### U.S. Patent No. 4,949,214

Disputed Claim Terms	Court's Construction
current to voltage transforming means	<p><b>Function:</b> producing a control voltage output signal having a magnitude proportional to the magnitude of current conducted through said selected power conductor</p> <p><b>Structure:</b> toroid transformer T and variable resistor R1</p> <p>OR</p>
(Claim 1) control voltage output signal	resistor R5 a voltage output signal that directly or indirectly actuates a device
(Claim 1) magnitude proportional to	a magnitude having the same or constant ratio to
(Claim 1) electrically coupled	arranged so that electrical signals may be passed either directly, or indirectly via intervening circuitry, from one component to another
(Claims 1, 2, 3 and 8) connected in series electrical relation	an arrangement between two electronic components connected end to end in which there is a single current

path between the two components and in which the same quantity of current passes through each of the components

(Claims 1 and 10)	
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AC control voltage output signal	[AGREED] no construction
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(Claim 2)	
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DC voltage control signal	[AGREED] no construction
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(Claim 2)	
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predetermined count	a count determined beforehand
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(Claim 8)	
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predetermined level	a level determined beforehand
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(Claim 12)	
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means ... for generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level

**Function:** generating a solenoid actuating control signal in response to the detection of current flow through the selected power conductor which exceeds said predetermined level

**Structure:** variable resistor R1 alone or in combination with the full-wave bridge rectifier B1

OR

a conductor

OR

resistor R1, bridge rectifier B1, resistor R2, resistor R3, capacitor C (Figure 2)

OR

(Claim 12)	bridge rectifier B1, resistor R1, counter (Figure 3)
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