

## SECTION H — ELECTRICITY

### H02 GENERATION, CONVERSION, OR DISTRIBUTION OF ELECTRIC POWER

**H02H EMERGENCY PROTECTIVE CIRCUIT ARRANGEMENTS** (indicating or signalling undesired working conditions G01R, e.g. G01R 31/00, G08B; locating faults along lines G01R 31/08; emergency protective devices H01H)

#### Note(s)

This subclass covers only circuit arrangements for the automatic protection of electric lines or electric machines or apparatus in the event of an undesired change from normal working conditions.

#### Subclass index

#### EMERGENCY PROTECTIVE CIRCUIT ARRANGEMENTS

For automatic disconnection or switching responsive to variation of conditions:

electric; sensed non-electric; simulated non-electric.....3/00, 5/00, 6/00

adapted for specific machines or for sectionalised protection of cables or lines.....7/00

For limiting excess current or voltage.....9/00

For preventing switching-on in case of undesired conditions.....11/00

DETAILS.....1/00

#### **1/00 Details of emergency protective circuit arrangements [1, 2006.01]**

1/04 • Arrangements for preventing response to transient abnormal conditions, e.g. to lightning [1, 2006.01]

1/06 • Arrangements for supplying operative power [3, 2006.01]

**3/00 Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal electric working condition, with or without subsequent reconnection** (specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00; systems for change-over to standby supply H02J 9/00) [1, 2006.01]

3/02 • Details [1, 2006.01]

3/027 • • with automatic disconnection after a predetermined time (H02H 3/033, H02H 3/06 take precedence) [3, 2006.01]

3/033 • • with several disconnections in a preferential order (H02H 3/06 takes precedence) [3, 2006.01]

3/04 • • with warning or supervision in addition to disconnection, e.g. for indicating that protective apparatus has functioned [1, 2006.01]

3/05 • • with means for increasing reliability, e.g. redundancy arrangements [3, 2006.01]

3/06 • • with automatic reconnection [1, 2006.01]

3/07 • • • and with permanent disconnection after a predetermined number of reconnection cycles [3, 2006.01]

3/08 • responsive to excess current (responsive to abnormal temperature caused by excess current H02H 5/04) [1, 2006.01]

3/087 • • for dc applications [3, 2006.01]

3/093 • • with timing means [3, 2006.01]

3/10 • • additionally responsive to some other abnormal electrical conditions [1, 2006.01]

3/12 • responsive to underload or no-load [1, 2006.01]

3/13 • • for multiphase applications, e.g. phase interruption [3, 2006.01]

3/14 • responsive to occurrence of voltage on parts normally at earth potential [1, 2006.01]

3/16 • responsive to fault current to earth, frame or mass (with balanced or differential arrangement H02H 3/26) [1, 2006.01]

3/17 • • by means of an auxiliary voltage injected into the installation to be protected [3, 2006.01]

3/18 • responsive to reversal of direct current [1, 2006.01]

3/20 • responsive to excess voltage [1, 2006.01]

3/22 • • of short duration, e.g. lightning [1, 2006.01]

3/24 • responsive to undervoltage or no-voltage [1, 2006.01]

3/247 • • having timing means [3, 2006.01]

3/253 • • for multiphase applications, e.g. phase interruption [3, 2006.01]

3/26 • responsive to difference between voltages or between currents; responsive to phase angle between voltages or between currents [1, 2006.01]

3/28 • • involving comparison of the voltage or current values at two spaced portions of a single system, e.g. at opposite ends of one line, at input and output of apparatus [1, 2006.01]

3/30 • • • using pilot wires or other signalling channel [1, 2006.01]

3/32 • • involving comparison of the voltage or current values at corresponding points in different conductors of a single system, e.g. of currents in go and return conductors [1, 2006.01]

3/33 • • • using summation current transformers (H02H 3/347 takes precedence) [3, 2006.01]

3/34 • • • of a three-phase system [1, 2006.01]

## H02H

- 3/347 • • • using summation current transformers [3, 2006.01]
- 3/353 • • • involving comparison of phase voltages [3, 2006.01]
- 3/36 • • involving comparison of the voltage or current values at corresponding points of different systems, e.g. of parallel feeder systems [1, 2006.01]
- 3/38 • responsive to both voltage and current; responsive to phase angle between voltage and current [1, 2006.01]
- 3/40 • responsive to ratio of voltage and current [1, 2006.01]
- 3/42 • responsive to product of voltage and current [1, 2006.01]
- 3/44 • responsive to the rate of change of electrical quantities [3, 2006.01]
- 3/46 • responsive to frequency deviations [3, 2006.01]
- 3/48 • responsive to loss of synchronism [3, 2006.01]
- 3/50 • responsive to the appearance of abnormal wave forms, e.g. ac in dc installations [3, 2006.01]
- 3/52 • • responsive to the appearance of harmonics [3, 2006.01]
- 5/00 **Emergency protective circuit arrangements for automatic disconnection directly responsive to an undesired change from normal non-electric working conditions with or without subsequent reconnection** (using simulators of the apparatus being protected H02H 6/00; specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems H02H 7/00) [1, 3, 2006.01]
  - 5/04 • responsive to abnormal temperature [1, 2006.01]
  - 5/06 • • in oil-filled electric apparatus [1, 2006.01]
  - 5/08 • responsive to abnormal fluid pressure, liquid level or liquid displacement, e.g. Buchholz relays [1, 2006.01]
  - 5/10 • responsive to mechanical injury, e.g. rupture of line, breakage of earth connection [1, 2006.01]
  - 5/12 • responsive to undesired approach to, or touching of, live parts by living beings [1, 2006.01]
- 6/00 **Emergency protective circuit arrangements responsive to undesired changes from normal non-electric working conditions using simulators of the apparatus being protected, e.g. using thermal images** [3, 2006.01]
- 7/00 **Emergency protective circuit arrangements specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems, and effecting automatic switching in the event of an undesired change from normal working conditions** (structural association of protective devices with specific machines or apparatus and their protection without automatic disconnection, see the relevant subclass for the machine or apparatus) [1, 2006.01]
  - 7/04 • for transformers [1, 2006.01]
  - 7/045 • • Differential protection of transformers [3, 2006.01]
  - 7/05 • • for capacitive voltage transformers, e.g. against resonant conditions [3, 2006.01]
  - 7/055 • • for tapped transformers or tap-changing means thereof [3, 2006.01]
  - 7/06 • for dynamo-electric generators; for synchronous capacitors [1, 2006.01]
  - 7/08 • for dynamo-electric motors [1, 2006.01]
  - 7/085 • • against excessive load [1, 2006.01]
  - 7/09 • • against over-voltage; against reduction of voltage; against phase interruption [1, 2006.01]
  - 7/093 • • against increase beyond, or decrease below, a predetermined level of rotational speed (centrifugal switches H01H 35/10) [1, 2006.01]
  - 7/097 • • against wrong direction of rotation [1, 2006.01]
  - 7/10 • for converters; for rectifiers [1, 2006.01]
  - 7/12 • • for static converters or rectifiers [1, 2006.01]
  - 7/122 • • • for inverters, i.e. dc/ac converters [2, 2006.01]
  - 7/125 • • • for rectifiers [2, 2006.01]
  - 7/127 • • • having auxiliary control electrode to which blocking control voltages or currents are applied in case of emergency [2, 2006.01]
  - 7/16 • for capacitors (for synchronous capacitors H02H 7/06) [1, 2006.01]
  - 7/18 • for batteries; for accumulators [1, 2006.01]
  - 7/20 • for electronic equipment (for converters H02H 7/10; for electric measuring instruments G01R 1/36; for dc voltage or current semiconductor regulators G05F 1/569; for amplifiers H03F 1/52; for electronic switching circuits H03K 17/08) [1, 2006.01]
  - 7/22 • for distribution gear, e.g. bus-bar systems; for switching devices [1, 2006.01]
  - 7/24 • for spark-gap arresters [1, 2006.01]
  - 7/26 • Sectionalised protection of cable or line systems, e.g. for disconnecting a section on which a short-circuit, earth fault, or arc discharge has occurred (locating faults in cables G01R 31/08) [1, 2006.01]
  - 7/28 • • for meshed systems [1, 2006.01]
  - 7/30 • • Staggered disconnection [3, 2006.01]
  - 9/00 **Emergency protective circuit arrangements for limiting excess current or voltage without disconnection** (structural association of protective devices with specific machines or apparatus, see the relevant subclass for the machine or apparatus) [1, 2006.01]
    - 9/02 • responsive to excess current [1, 2006.01]
    - 9/04 • responsive to excess voltage (lightning arrestors H01C 7/12, H01C 8/04, H01G 9/18, H01T) [1, 2006.01]
    - 9/06 • • using spark-gap arresters [1, 2006.01]
    - 9/08 • Limitation or suppression of earth fault currents, e.g. Petersen coil [3, 2006.01]
  - 11/00 **Emergency protective circuit arrangements for preventing the switching-on in case an undesired electric working condition might result** [1, 2006.01]
  - 99/00 **Subject matter not provided for in other groups of this subclass** [2009.01]