GE 489

This relay implements a complete generator protection.
The relay type model contains most of the elements of the actual relay, it has been divided in seven sub-relays:
- distance elements (F21)
- frequency (F87)
- loss of field (F40)
- overcurrent (F50/51)
- Power(F32)
- differential (F87)
- voltage (f27/59)

The Distance sub relay consists of the following elements:
- o 2 Mho elements
- o Current starting

The Frequency sub relay consists of the following elements:
- o Overfrequency alarm
- o 2 Overfrequency elements
- o Underfrequency alarm
- o 2 Underfrequency elements

The Loss of field sub relay consists of the following elements:
- o 2 Mho elements
- o Voltage supervision
- o Current starting

The Overcurrent sub relay consists of the following elements:
- o Overcurrent alarm
- o Offline overcurrent
- o Phase overcurrent with voltage restraint
- o Negative sequence alarm
- o Negative sequence
- o Ground overcurrent alarm
- o Ground overcurrent
- o Ground directional alarm
- o Ground directional
- o High set phase overcurrent
- o Thermal image (simplified)

The Power sub relay consists of the following elements:
- o Low Forward Power alarm
- o Low Forward Power
- o Reverse Power alarm
- o Reverse Power
- o Negative Mvar alarm
- o Negative Mvar
- o Positive Mvar alarm
- o Positive Mvar

The Differential sub relay consists of the following elements:
- o differential block with double bias slope

The Voltage sub relay consists of the following elements:
- o Udervoltage alarm
- o Undervoltage
- o Overvoltage alarm
- o Overvoltage

- o   Neutral overvoltage alarm
- o   Neutral overvoltage
- o   Volts/hertz alarm
- o   Volts/hertz

Not supported features:
- Inadvertent energization
- Neutral undervoltage (3rd harmonic)
- Phase reversal
- Overcurrent element reset time