

# 7SG11 Argus 8

Voltage and Frequency Relays

## Document Release History

This document is issue 2010/02 The list of revisions up to and including this issue is:

Pre release

2010/02	Document reformat due to rebrand

## Software Revision History

2011/11	2422H80004R7	Fault trigger when the voltage blocking threshold is OFF. IEC 60870-5-103 fault numbering for fault and its measurands
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## 1 General

The relay complies with the relevant clauses in the following specification :-

- IEC 60255 - 3

## 2 Characteristic Energizing Quantity

AC Voltage Vn	63.5 / 110 Vrms
Frequency	50 / 60Hz

## 3 Auxiliary Energising Quantity

### 3.1 DC Power Supply

	Nominal	Operating Range
V <sub>AUX</sub>	24, 30, 48V	18V to 60V dc
V <sub>AUX</sub>	110, 220V	88V to 280V dc

### 3.2 DC Status Inputs

Nominal Voltage	Operating Range
30	18V to 37.5V
48	37.5V to 60V
110	87.5V to 137.5V
220	175 to 280V

NB : the status operating voltage need not be the same as the main energising voltage. For 110/125V or 220/250V working, a standard Argus relay with 48/54V status can be supplied for use with external dropper resistors as follows:-

#### Status Input External Resistances

Nominal Voltage	Resistor Value (Wattage)
110	2k7 ± 5% ; (2.5W)
220	8k2 ± 5% ; (6.0W)

#### Status Input Performance

Minimum DC current for operation	10mA
Reset/Operate Voltage Ratio	≥ 90%
Typical response time	< 5ms
Typical response time when programmed to energise an output relay contact	< 15ms
Minimum pulse duration	40ms

Each status input has associated timers which can be programmed to give time delayed pick-up and time delayed drop-off. The drop-off timers have default settings of 20ms, thus providing immunity to an AC input signal. Status inputs will not respond to the following:

- 250V RMS 50/60Hz applied for two seconds through a 0.1μF capacitor.
- 500V RMS 50/60Hz applied between each terminal and earth.
- Discharge of a 10μF capacitor charged to maximum DC auxiliary supply voltage.

The inputs meet the requirements of ESI 48-4.

**Note :** special versions of status input are available for direct operation from 110V and 220V supplies. These do not comply with the ESI 48-4 specification and will operate with a DC current of less than 10mA.

## 4 Setting Ranges

### Voltage Element Settings

V Element Setting	5V – 200V step 0.5V
V Element Delay	0.00-20.00 step 0.01sec 20.0-100.0 step 0.5sec 100-600 step 1.0sec
V Element Hysteresis	1% – 90% step 1%

### Neutral Voltage Settings

3Vo Element Setting	1V – 100V step 0.5V
3Vo Element Delay	0.00-20.00 step 0.01sec 20.0-100.0 step 0.5sec 100-600 step 1.0sec

### NPS Overvoltage Settings

V2 Element Setting	1V – 100V step 0.5V
V2 Element Delay	0.00-20.00 step 0.01sec 20.0-100.0 step 0.5sec 100-600 step 1.0sec

### Frequency Element Settings

F Element Setting	47.00Hz - 62.00Hz step 0.01Hz
F Element Delay	0.00-20.00 step 0.01sec 20.0-100.0 step 0.5sec 100-600 step 1.0sec

### Voltage Blocking Element

Voltage Blocking Threshold	OFF, 1V – 100V step 1.0V
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## 5 Accuracy Reference Conditions

General	IEC 60255 –3
Auxiliary Supply	Nominal
Rating	63.5 or 110 Vrms
Frequency	50 or 60Hz
Ambient Temperature	20°C

## 6 Accuracy

The following accuracy is specified at reference conditions.

### 6.1 Overvoltage Element

Overvoltage Element	
Operate Level	Setting $\pm$ 1% or 0.25V
Reset Level	$\geq$ (operate level – hysteresis setting)
Operate Time (see Fig.1) – to output contact	
0V to 2x setting	$\leq$ 45ms
0V to 1.1x setting	$\leq$ 55ms
Reset Time	
1.1x to 0.9x setting	$\leq$ 50ms

## 6.2 Undervoltage Element

<b>Undervoltage Element</b>	
Operate Level	Setting $\pm$ 1% or 0.25V
Reset Level	$\leq$ (operate level + hysteresis setting)
Operate Time (see Fig.2)	
1.1x to 0.9x setting	$\leq$ 65ms
Reset Time	
0V to 1.1x setting	$\leq$ 75ms
0V to 2x setting	$\leq$ 65ms

## 6.3 Neutral Voltage Element

<b>Neutral Voltage Element</b>	
Operate Level	Setting $\pm$ 1% or 0.25V
Reset Level	> 95% of operate value <sup>1</sup>
Operate Time	
0V to 2x setting	$\leq$ 85ms
0V to 1.1x setting	$\leq$ 85ms
Reset Time	
1.1x to 0.9x setting	$\leq$ 80ms
1.1x to 0V	$\leq$ 70ms

<sup>1</sup> – For NVD settings below 7.5V the Reset Level can be up to 60% of operate value.

## 6.4 NPS Overvoltage Element

<b>Negative Phase Sequence Element</b>	
Operate Level	Setting $\pm$ 1% or 0.25V
Reset Level	> 95% of operate value <sup>2</sup>
Operate Time	
0V to 2x setting	$\leq$ 85ms
0V to 1.1x setting	$\leq$ 85ms
Reset Time	
1.1x to 0.9x setting	$\leq$ 80ms
1.1x to 0V	$\leq$ 70ms

<sup>2</sup> – For NPS settings below 3.5V the Reset Level can be up to 80% of operate value.

## 6.5 Overfrequency Element

<b>Overfrequency Element</b>	
Operate Level	Setting $\pm$ 10mHz
Reset Level	Operate – 20mHz
Operate Time	
For ROCOF between 0.1-10 Hz/sec	Typically < 140ms Maximum < 175ms
	Typically < 100ms : AG8 - 300 series only Maximum < 150ms

## 6.6 Underfrequency Element

<b>Underfrequency Element</b>	
Operate Level	Setting $\pm 10\text{mHz}$
Reset Level	Operate + 20mHz
Operate Time	
For ROCOF between 0.1-10 Hz/sec	Typically < 140ms Maximum < 175ms
	Typically < 100ms : AG8 - 300 series only Maximum < 150ms

## 6.7 DTL Timing Elements

<b>All Timers</b>	
Timing Accuracy	$\pm 1\%$ or 30ms

## 7 Accuracy General

### Measuring Accuracy (50 or 60 Hz)

Phase Voltage	$\pm 1\%$ or 0.25V
Vo (Measured)	$\pm 1\%$ or 0.5V
Vo (Calculated)	$\pm 1\%$ or 0.5V
V2 (NPS)	$\pm 1\%$ or 0.5V
Frequency	< $\pm 10\text{mHz}$

## 8 Accuracy Influencing Factors

### Temperature

Ambient Range	-10°C to +55°C
Variation over range	$\leq 5\%$

### Frequency

Range	47Hz to 52Hz 57Hz to 62Hz
Setting variation	$\leq 1\%$
Operating time variation	$\leq 1\%$

### Auxiliary DC Supply - IEC 60255-11

Allowable superimposed ac component	$\leq 12\%$ of DC voltage
Allowable breaks/dips in supply (collapse to zero from nominal voltage)	$\leq 20\text{ms}$

## 9 Thermal Withstand

### Continuous Overload

AC Voltage	250Vrms ( 353Vpk)
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## 10 Burdens

### AC Burden

	AC Burden
110Vrms Input	$\leq 0.1\text{VA}$
63.5Vrms Input	$\leq 0.05\text{VA}$

### DC Burden

	DC Burden
Quiescent (Typical)	3 Watts
Max	10 Watts

## 11 Output Contacts

Contact rating to IEC 60255-0-20.

**Carry continuously** 5A ac or dc

**Make and Carry**

(limit  $L/R \leq 40\text{ms}$  and  $V \leq 300$  volts)

For 0.5 sec	20A ac or dc
For 0.2 sec	30A ac or dc

**Break**

(limit  $\leq 5\text{A}$  or  $\leq 300$  volts)

Ac resistive	1250VA
Ac inductive	250VA @ PF $\leq 0.4$
Dc resistive	75W
Dc inductive	30W @ $L/R \leq 40$ ms 50W @ $L/R \leq 10$ ms

Minimum number of operations	1000 at maximum load
Minimum recommended load	0.5W, limits 10mA or 5V

## 12 Environmental Withstand

### 12.1 General

**Temperature - IEC 60068- 2-1/2**

Operating range	-10°C to +55°C
Storage range	-25°C to +70°C

**Humidity - IEC 60068- 2-3**

Operational test	56 days at 40°C and 95% RH
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**Transient Overvoltage – IEC 60255-5**

Between all terminals and earth or between any two independent circuits without damage or flashover	5kV 1.2 / 50μs 0.5J
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**Insulation - IEC 60255-5**

Between all terminals and earth	2.0kV rms for 1 min
Between independent circuits	2.0kV rms for 1 min
Across normally open contacts	1.0kV rms for 1 min

### 12.2 Immunity

**High Frequency Disturbance -  
IEC 60255-22-1 Class III**

	Variation
2.5kV Common (Longitudinal) Mode	$\leq 5\%$
1.0kV Series (Transverse) Mode	$\leq 5\%$

**Electrostatic Discharge -  
IEC 60255-22-2 Class 3**

	Variation
6kV contact discharge	$\leq 5\%$
8kV air discharge (to fascia)	$\leq 5\%$

**Radio Frequency Interference -  
IEC 60255-22-3 Class III**

	Variation
80MHz to 1000MHz, 10V/m	$\leq 5\%$

**Fast Transient – IEC 60255-22-4 Class IV**

	Variation
4kV 5/50ns 2.5kHz repetitive	≤ 5%

**Conducted RFI – IEC 60255-22-6**

	Variation
0.15 to 1000MHz - 10V	≤ 5%

## 12.3 Emissions

**Radiated Limits – IEC 60255-25**

Frequency Range	Limits at 10m Quasi-peak dB ( $\mu$ V/m)	
30 to 230MHz		40
230 to 1000MHz		47

**Conducted Limits – IEC 60255-25**

Frequency Range	Limits dB ( $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.5MHz	79	66
0.5 to 30MHz	73	60

## 12.4 Mechanical

**Vibration (Sinusoidal) – IEC 60255-21-1 Class 1**

		Variation
Vibration response	0.5gn	≤ 5%
Vibration endurance	1.0gn	≤ 5%

**Shock and Bump – IEC 60255-21-2 Class 1**

		Variation
Shock response	5 gn 11ms	≤ 5%
Shock withstand	15 gn 11ms	≤ 5%
Bump test	10 gn 16ms	≤ 5%

**Seismic – IEC 60255-21-3 Class 1**

		Variation
Seismic Response	1gn	≤ 5%

**Mechanical Classification**

Durability	In excess of $10^6$ operations
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**Qualification**

Product :- C compliant to all relevant EU directives.

Quality Systems :- accredited to ISO 9001

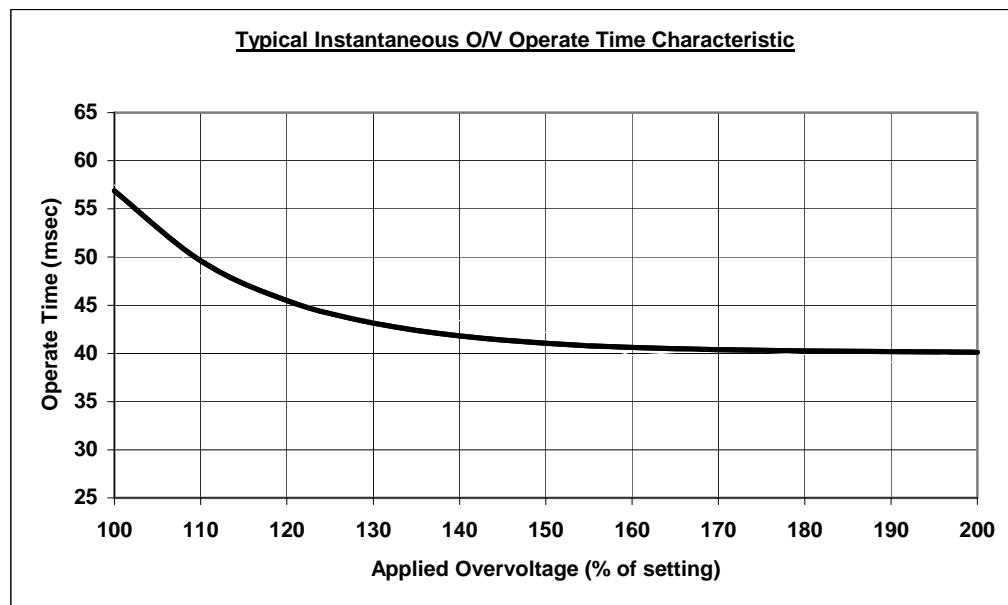


Figure 1 - Typical O/V Operate Time Characteristic

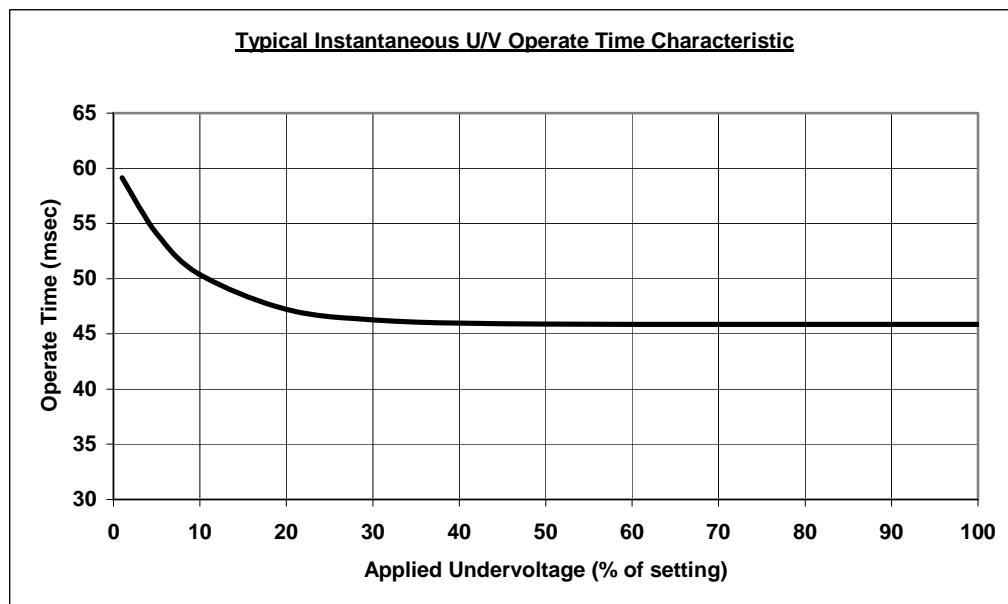


Figure 2 - Typical U/V Operate Time Characteristic