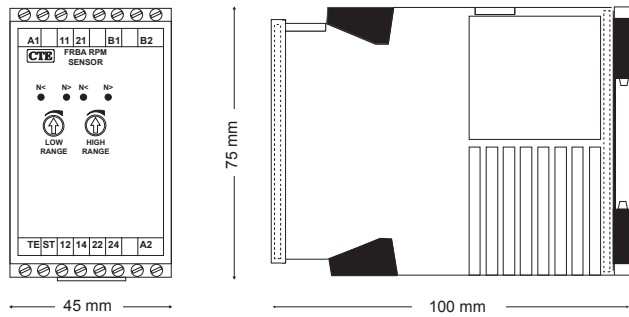




## COMBINED STARTER INHIBIT & OVER-SPEED RELAYS

Type: FRAA for 12 V  
Type: FRBA for 24 V



### FEATURES

- **Extremely resistant to supply voltage drops**
- **Measurement of r.p.m. is based on frequency**
- **Both relays detect high frequency in less than 300 msec.**
- **The high range setting can be adjusted and tested at normal speed**
- **LEDs indicate the state of the input**

### Description:

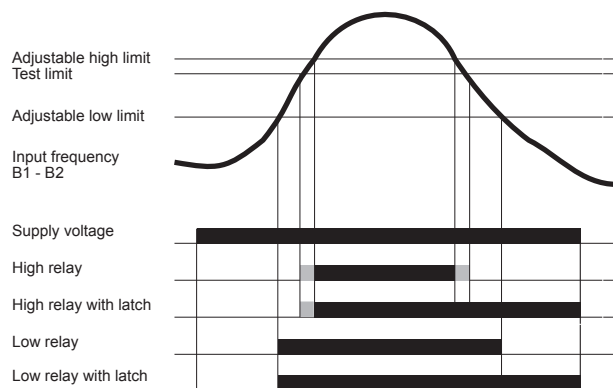
The starter inhibit & over-speed relay are designed for automatic start of petrol, gas or diesel engines and to prevent engine damage due to failure in the automatic speed control system.

The relays are very accurate monitoring the frequency from either a magnetic pick-up, a tacho generator or the main generator.

### Operation:

When the supply voltage is applied, the LED corresponding to the input frequency (r.p.m.) is switched on. If the frequency (r.p.m.) exceeds the setting the relay pulls in with a time delay of max. 300 msec. When the frequency comes below the setpoint, the relay is de-energized with a delay of approximately 1.5 sec. If the latch function is specified, though, the relay remains energized. The latch function is released by removing the power supply.

### FUNCTION DIAGRAM



### Test function:

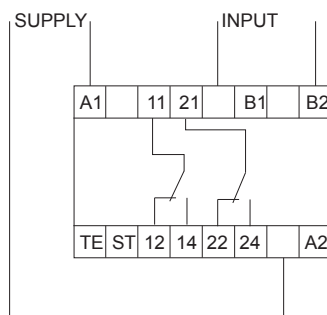
If the testfunction is included, the over-speed limit can be adjusted by connecting the terminals TE and ST and adjust the limit to normal speed. When the connection TE - ST is removed the r.p.m. setting will be increased with e.g. 10% again. Standard test limits over normal speed are 10%, 15%, 20% or 25% of setting.

### Application:

Automatic starters for engines in generator sets, refrigerators and pump units.

### CONNECTION DIAGRAM

Rail mounting



Low range                    11, 12, 14

High range                    21, 22, 24

## SPECIFICATIONS

<b>INPUT</b>	Frequency For Namur sensor DIN 19 234 Optocoupler for external 24 VDC supply NPN - PNP Transformer, 30 - 500 VAC
Sensitivity	Adjustable A version 10 - 5120 Hz 50 -100 % of specified range in order code
Max frequency input	approx. 2 x high range
Input resistance	2.0 k $\Omega$ for 20 V input range 20 k $\Omega$ for 100 V input range 360 k $\Omega$ for 500 V input range
Min. voltage req.	0.5 V for 20 V input range 10 V for 100 V input range 30 V for 500 V input range

### PERFORMANCE PARAMETERS

<b>TIMING</b>	
Response time	Max. 300 msec.
<b>ELECTRICAL</b>	
Temp. dependence	Typ. $\pm 0.04\%$ / $^{\circ}\text{C}$
Supply dependence	Typ. $\pm 0.01\%$ / $\% \Delta U$

### OUTPUT

Relay, 2 x 1 C/O	Relay, 2 x 1 C/O
Contact rating	6 A, 250 VAC, 1250 W
Mechanical life	30 Million operations
Optocoupler	
Transistor rating	10 mA, 50 VDC

### SUPPLY

AC / DC voltage	AC / DC voltage
Housing 45mm VOX:	Whitout supply module
FRAA	12V AC/DC
FRBA	24V AC/DC
Voltage range	AC: - 20 % to + 15 % DC: - 25 % to + 33 %
Power consumption	8 VA, 4 W

### GENERAL

Temperature range	- 25 $^{\circ}\text{C}$ to + 55 $^{\circ}\text{C}$
Humidity	Up to 90 % RH non-condensing
Dielectric test voltage	Input to supply 3000 VAC Coil to relay contacts 4000 VAC Relay contact to relay contact 2500 VAC
Weight	0.23 kg



International Standards  
EMC directive 89/336: EN50081 - Emission  
EN50082 - Immunity  
Low voltage directive 73/23: EN60255 - Electrical Relays

## ORDERING INFORMATION

### EXAMPLE:

**TYPE**  
FRAA 12 V supply  
FRBA 24 V supply

### LOW RANGE INPUT FREQUENCY RANGE

10 - 20 Hz
20 - 40 Hz
40 - 80 Hz
80 - 160 Hz
160 - 320 Hz
320 - 640 Hz
640 - 1280 Hz
1280 - 2560 Hz
2560 - 5120 Hz

### HIGH RANGE INPUT FREQUENCY RANGE

10 - 20 Hz
20 - 40 Hz
40 - 80 Hz
80 - 160 Hz
160 - 320 Hz
320 - 640 Hz
640 - 1280 Hz
1280 - 2560 Hz
2560 - 5120 Hz

### INPUT

Namur	DIN 19 234
Optocoupler	NPN - PNP
Transformer	0.5 to 20 V 10 to 100 V 30 to 500 V

### LATCHING

Relay not latching	0
Relay latching only LOW RANGE	1
Relay latching only HIGH RANGE	2
Relay latching LOW and HIGH RANGE	3

no test 00  
test HIGH RANGE set point - 10 % 10

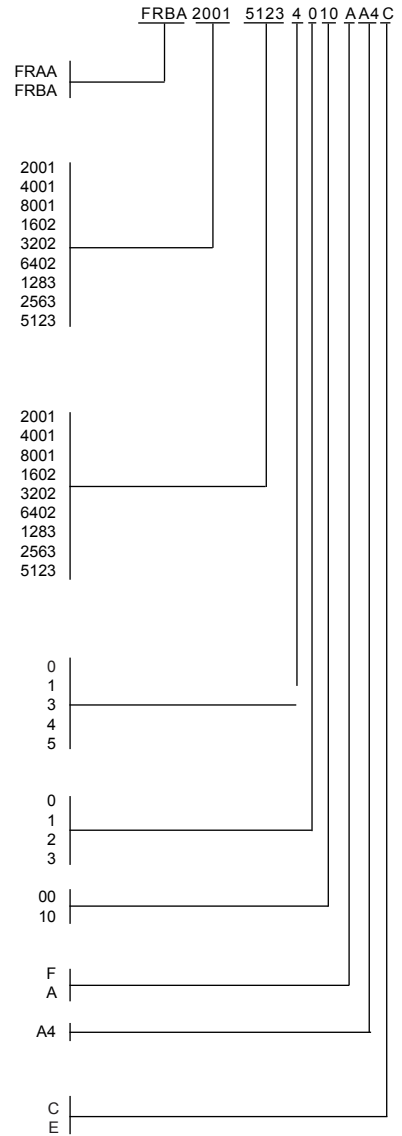
### ADJUSTMENT

Fixed sensitivity F  
Trimpot. adj. A

45 mm. 2 x 1 C/O - contact DIN RAIL A4

### CODE

Code end C  
Extended code E



### OPTOCOUPLER INPUT:

