

# | 9660 SERIES

## MOTOR STARTING RELAYS CURRENT TYPE

### Introduction

The KLIXON 9660 Series motor starting relays are designated for use on single phase a-c hermetic refrigeration motors and other splitphase and capacitor – start single-phase a-c motors. The 9660 is UL, ENEC and IECEx approved. Sensata Technologies has been a leading global supplier of pressure sensors & switches for over 50 years.



### Operation

The KLIXON 9600 Series motor starting relays are designated for use on singlephase a-c hermetic refrigeration motors and other split-phase and capacitor-start single-phase a-c motors. The standard relays are rated at 10 amp, 120 voltages and 5 amp, 240 volts start winding current. The Various 9660 relays are available and are rated as followings: 9660 10.0 amp, 120 volts Standard operating ratings are available from 1.0 to 20.0 amp.

### Features

- Smallest current-type relay available
- Easy-to-install plug-on type
- Useful service life to 1 million cycles
- Wide range of pickup and dropout ratings
- Use in equipment using flammable refrigerant

## SPECIFICATIONS

### Operation

Standard operating ratings are available from 1.0 to 20.0 amp.

The coil of the normally open relay is connected in series with the main winding of the motor. The relay contacts are connected in series with the starting winding. When the motor is started, the relay coil is energized and lifts the armature to close the contacts. In turn, the motors starting winding (and capacitor, if used) is energized. As the motor comes up to speed, the current in the relays coil decreases until the armature drops to open the contacts and disconnect the motors starting winding.

Ultra-reliable drop-out force is provided by gravity which requires the relay be vertically mounted.

### Mounting

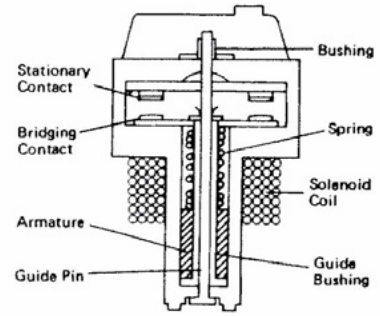
The plug-on relay is identical to the standard relay except that pin connectors are used to engage the compressor terminals. The connectors accept pins from 0.089 to 0.091 in. dia. and 0.459 in. on center.

### U/L-CSA Recognition

U/L Report File SA3745; August 13 1958. CSA Report File LRI 1372-11C; March 17, 1959

## Construction

The relay consists of a solenoid coil, a sliding Steel armature centered around a nylon guide Bushing and brass guide pin, and a bridging-type Contact arm actuated by the armature. All Movable parts are fully enclosed. A double pair of fine silver contacts provide two breaks in series and contribute to the long life of the devices.



## PICKUP AND DROPOUT RATINGS

The pickup current is the current required to close the relay contacts. Dropout current is the current at which the contacts open. Standard maximum pickup and minimum dropout ratings are shown in the table.

For motors with pick-up current of below 3.9 amperes (primarily 230 volt, fine wire relays.)

Klixon Rating Numbers	Maximum Pick-up (Amperes)	Minimum Drop-out (Amperes)
9660-077	1.01	0.86
-078	1.06	0.91
-079	1.12	0.96
-080	1.16	0.99
-081	1.22	1.04
-082	1.27	1.09
-083	1.32	1.13
-084	1.37	1.17
-085	1.42	1.21
-086	1.48	1.26
-087	1.52	1.30
-088	1.58	1.35
-089	1.62	1.38
-090	1.73	1.48
-091	1.78	1.52
-092	1.83	1.56
-093	1.88	1.60
-094	1.92	1.64
-095	1.98	1.69
-096	2.04	1.74
-097	2.09	1.79
-098	2.13	1.82
-099	2.19	1.87
-100	2.24	1.92
-101	2.29	1.96
-102	2.33	1.99
-106	2.43	2.07
-107	2.54	2.17
-108	2.68	2.28
-109	2.78	2.37
-110	2.89	2.46
-111	3.00	2.56
-112	3.14	2.68
-113	3.25	2.77
-114	3.35	2.85
-115	3.50	3.00
-116	3.60	3.05
-117	3.76	3.15
-118	3.80	3.25

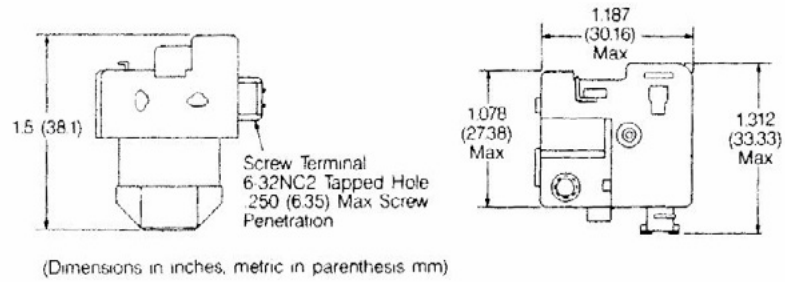
For 115 and 230 volt motors, 50 and 60 cycles, up to 1/3 hp capacitor start-split phase

Klixon Rating Numbers	Maximum Pick-up (Amperes)	Minimum Drop-out (Amperes)
9660-119	3.95	3.35
-121	4.20	3.55
-123	4.45	3.75
-125	4.65	3.95
-127	4.90	4.15
-129	5.15	4.35
-131	5.40	4.55
-133	5.70	4.80
-135	5.90	5.00
-138	6.20	5.25
-140	6.50	5.50
-143	6.8	5.75
-145	7.0	5.90
-147	7.4	6.2
-149	7.7	6.5
-152	8.1	6.8
-155	8.5	7.15
-158	9.15	7.7
-161	9.75	8.2
-163	10.3	8.6
-166	11.0	9.2
-168	11.6	9.7
-170	12.2	10.2
-171	12.9	10.8
-172	13.2	11.1
-173	13.7	11.5
-175	14.3	12.0
-176	14.9	12.5
-177	15.2	12.8
-178	15.8	13.3
-179	16.5	13.8
-180	16.7	14.0
-181	17.4	14.6
-182	17.8	14.9
-183	18.2	15.3
-184	18.7	15.6
-185	19.2	16.0
-186	19.9	16.6
-187	20.5	17.1
-189	21.9	18.2
-190	23.4	19.4
-191	24.4	20.3



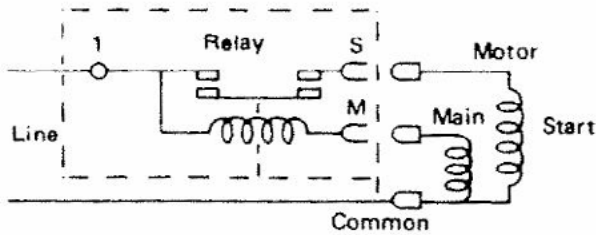
## TYPICAL PHYSICAL CONFIGURATIONS

### Plug-on Type

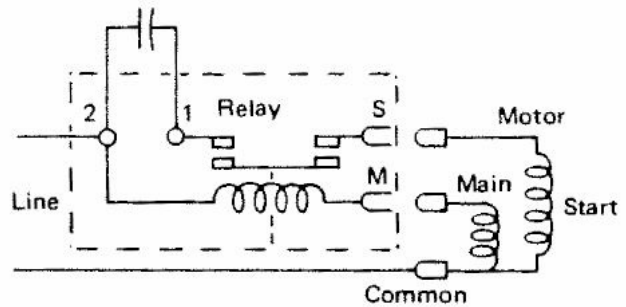


## PLUG-ON TYPES FOR COMPRESSORS

### 9660-040 Type for Split Phase Motors

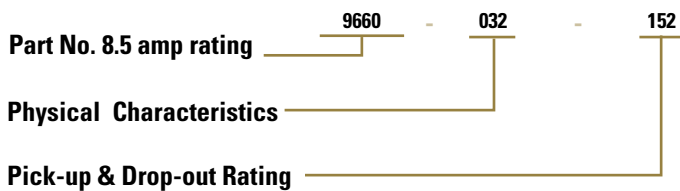


### 9660-041 Type for Capacitor Start Motors



## ORDERING OPTIONS

Example : 9660-032-152



## APPLICATION INFORMATION

It is usually practical and for motor manufacturers and hermetic compressor manufacturers to and apply these relays because of the testing and data required. All inquiries should include:

1. Motor start winding current
2. Cycle life required for application
3. Motor voltage and frequency
4. Pickup and dropout rating

Detailed relay and selection procedures data sheets are available on request



## AGENCY APPROVALS AND CERTIFICATIONS

Agency	File/Certificate No.	Category/Standard No.
UL (USA) <sup>1</sup>	SA3745	Category SDFY2
DEKRA (ENEC)	2135985.01	EN60730-1, EN60730-2-10
DEKRA (IECEX <sup>2</sup> )	Ex nC IIA Gc IECEX DEK17.0017U	IEC60079-0, IEC60079-15

<sup>1</sup> Recognized to US requirements by Underwriters Laboratories (UL873).

<sup>2</sup> Ex Component Certificate, comply with IEC60079-0:2011 and IEC60079-15:2010.

Schedule of Limitation:

The service temperature range of this product is -10°C to 100°C;

During installation of the motor starting relays the Voltage, Current, Cos  $\phi$  (240V/6A, cos  $\phi$  0.6), mechanical securement of the factory connection, protection against electrical shock as well as Creepage- and Clearances distances shall be evaluated in the end product (per table 2 od IEC60079-15, creepage distance minimum 4 mm and clearance minimum 2.5 mm between conductive parts at different potentials are required when material group IIIa, work voltage  $\leq$  250Vac);

This product has not been evaluated to the enclosure requirements for the required protection method. They shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to IEC 60079-15, taking into account the environmental conditions under which the equipment will be used.



## WARNINGS



### RISK OF MATERIAL DAMAGE AND HOT ENCLOSURE

- The product's side panels may be hot, allow the product to cool before touching
- Follow proper mounting instructions including torque values
- Do not allow liquids or foreign objects to enter this product

**Failure to follow these instructions can result in serious injury, or equipment damage.**



### HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power before installing or working with this equipment
- Verify all connections and replace all covers before turning on power

**Failure to follow these instructions will result in death or serious injury.**

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Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA.

## CONTACT US

### Americas

+1 508 236 2551  
electrical-protection-sales@  
sensata.com

### Europe, Middle East & Africa

+3 174 357 8156  
info-sse@list.sensata.com

### Asia Pacific

sales.isasia@list.sensata.com

**China** +86 (21) 2306 1500

**Japan** +81 (45) 277 7117

**Korea** +82 (31) 601 2004

**India** +91 (80) 67920890

**Rest of Asia** +886 (2) 27602006  
ext 2808