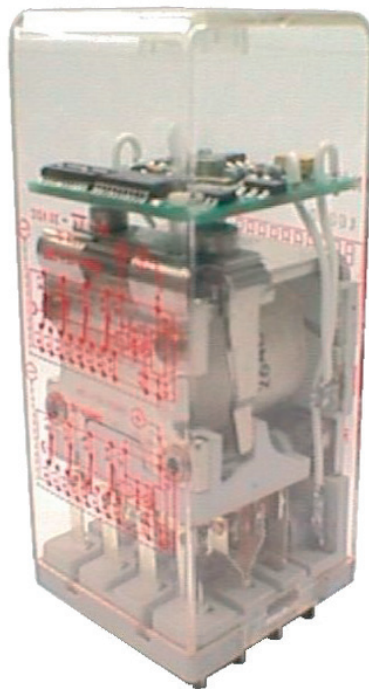


TBAU 400 relay - Delay-on pull-in or drop-out, 4 C/O

Datasheet



Description

The TBAU 400 is a delay-on pull-in or drop-out relay with 4 double make / double break C/O contacts (form Z). The delay is fully programmable with a dip switch) from 0.25 s to 63 min. The access to dip switch is available by removing time delay cover. This feature prohibits frivolous field time delay setting.

The plug-in design offers secure locking feature for maximum ease of maintenance (no wires need to be disconnected or other hardware removed for relay inspection or replacement). The resistance to impact and vibration is conform to standards in force for Railway Transported Equipment.

Positive mechanical keying of relay to socket is built into relay and socket during manufacture and terminal identifications are clearly marked on identification plate that is permanently attached to the relay..

The TBAU 400 relay is pluggable in the following sockets: EA 102 B, EA 102 BF, EA 103 BF, EA 104 B, EA 104 BF, EA 105 BF, EA 112 BF.

Application

The TBAU 400 timing relay is designed for heavy duty applications with a programmable timing function used for example in HVAC and lighting.

Features

- Delay-on plug-in or drop-out relay
- Delay range from 0.25 s...63.75 min
- Time delay fully programmable by dip switch
- Status LED indicator
- Plug-in design with secure locking feature for maximum ease of maintenance
- 4 double make / double break C/O contacts (form Z), 8 A
- Optional weld no transfer contacts
- Contact life (mechanical) of 100 million cycles
- -40 °C...+8 5°C operating temperature

Benefits

- Proven reliable in heavy duty application
- Long life cycle
- Accurate timing selection finger safe
- Easy to maintain and replace
- Low life cycle cost
- No maintenance

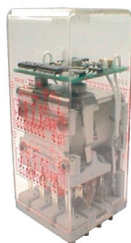
Railway compliancy

- NF F 62-002 Rolling stock - Instantaneous relays contacts and sockets
- NF F 16-101/102 Fire behaviour - Railway rolling stock
- EN 50155 Railway application - Electronic equipment used on rolling stock
- IEC 61373 Railway application - shock and vibration tests



TBAU 400 relay

Technical specifications



Functional and connection diagrams

| Timing diagram | Relay pin correspondence |
|---|--|
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Delay on pull-in</p> </div> <div style="text-align: center;"> <p>Delay on drop-out</p> </div> </div> | <p>Relay pin correspondence</p> <p>Example: KP keying</p> |

| Connection diagram | Dip switch setting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------|--------------------|--------------------|------|-----------|-------------|------|-----------|-------------|------|--------|----------|------|--------|----------|------|--------|----------|------|--------|----------|------|---------|-----------|------|---------|-----------|------|------------|-------------|-------|------------|------------|-------|--------------|--------------|
| <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Delay on pull-in (dip switch 10 = ON)</p> <p>Delay on drop-out (dip switch 10 = OFF)</p> </div> <div style="width: 40%;"> </div> <div style="width: 25%;"> <p>Dip switch setting</p> <ul style="list-style-type: none"> - Set DS 1 to 8 in ON or OFF position - The final time delay is the sum of each individual ON value given in second if DS 9 is ON or in minute if DS 9 is OFF - DS 10 selects pull-in or drop-out <table border="1"> <thead> <tr> <th>DS no</th> <th>Range 1 DS 9 = ON</th> <th>Range 2 DS 9 = OFF</th> </tr> </thead> <tbody> <tr><td>DS 1</td><td>ON 0.25 s</td><td>ON 0.25 min</td></tr> <tr><td>DS 2</td><td>ON 0.50 s</td><td>ON 0.50 min</td></tr> <tr><td>DS 3</td><td>ON 1 s</td><td>ON 1 min</td></tr> <tr><td>DS 4</td><td>ON 2 s</td><td>ON 2 min</td></tr> <tr><td>DS 5</td><td>ON 4 s</td><td>ON 4 min</td></tr> <tr><td>DS 6</td><td>ON 8 s</td><td>ON 8 min</td></tr> <tr><td>DS 7</td><td>ON 16 s</td><td>ON 16 min</td></tr> <tr><td>DS 8</td><td>ON 32 s</td><td>ON 32 min</td></tr> <tr><td>DS 9</td><td>ON Range 1</td><td>OFF Range 2</td></tr> <tr><td>DS 10</td><td>ON Pull-in</td><td>ON Pull-in</td></tr> <tr><td>DS 10</td><td>OFF Drop-out</td><td>OFF Drop-out</td></tr> </tbody> </table> <p>Example: The sample dip switch above is set to 22.5 s with delay on drop-out</p> </div> </div> | DS no | Range 1 DS 9 = ON | Range 2 DS 9 = OFF | DS 1 | ON 0.25 s | ON 0.25 min | DS 2 | ON 0.50 s | ON 0.50 min | DS 3 | ON 1 s | ON 1 min | DS 4 | ON 2 s | ON 2 min | DS 5 | ON 4 s | ON 4 min | DS 6 | ON 8 s | ON 8 min | DS 7 | ON 16 s | ON 16 min | DS 8 | ON 32 s | ON 32 min | DS 9 | ON Range 1 | OFF Range 2 | DS 10 | ON Pull-in | ON Pull-in | DS 10 | OFF Drop-out | OFF Drop-out |
| DS no | Range 1 DS 9 = ON | Range 2 DS 9 = OFF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 1 | ON 0.25 s | ON 0.25 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 2 | ON 0.50 s | ON 0.50 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 3 | ON 1 s | ON 1 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 4 | ON 2 s | ON 2 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 5 | ON 4 s | ON 4 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 6 | ON 8 s | ON 8 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 7 | ON 16 s | ON 16 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 8 | ON 32 s | ON 32 min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 9 | ON Range 1 | OFF Range 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 10 | ON Pull-in | ON Pull-in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DS 10 | OFF Drop-out | OFF Drop-out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



TBAU 400 relay

Technical specifications

Timing characteristics

| | |
|-------------------------------------|---|
| Time function | Delay-on pull-in or delay on drop-out (selection by dip switch) |
| Total time delay range | 0.25 s...63.75 min |
| Time delay adjustment | Fixed after setting the dip switch (access available by removing relay cover) |
| Adjustment / repeatability accuract | < 2% (td > 5 s), < 10% (td = 0.25 s...5 s) / 0.1% (td = time delay) (adjustment with power off) |

Coil data

| Keying | U _{nom} (VDC) | U _{operating} (VDC) | P _{nom} (W) | R coil (Ω) ⁽¹⁾ | L/R (ms) ⁽²⁾ |
|--------|------------------------|------------------------------|----------------------|---------------------------|-------------------------|
| GR | 12 | 8 / 16 | 3 | 40 | 30 |
| GP | 24 | 16 / 33 | 3 | 185 | 30 |
| HP | 36 | 25 / 45 | 3 | 475 | 30 |
| JP | 48 | 33 / 60 | 3 | 750 | 30 |
| KP | 72 | 48 / 90 | 3 | 1700 | 30 |
| MP | 96 | 65 / 120 | 3 | 3000 | 30 |
| LP | 110 | 75 / 138 | 3 | 4000 | 30 |

(1) Coil resistance tol.: ± 8% at 20 °C

(2) Valid for closed relay - AC versions on request

Contact data

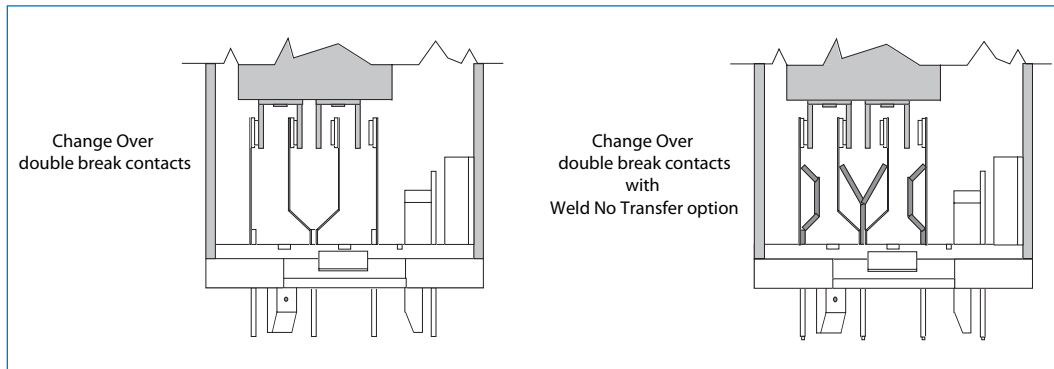
| | | | |
|------------------------------------|--|----------------------------|--|
| Nominal current | 8 A resistive | | |
| Nominal breaking capacity and life | 1 A at 72 VDC | L/R : 0 ms | Electrical life: 5 x 10 ⁶ op. |
| | 350 mA at 72 VDC | L/R: 30 ms | Electrical life: 2.5 x 10 ⁶ op. |
| | 1 A at 220 VAC 50 Hz | cosØ=1 | Electrical life: 2.5 x 10 ⁶ op. |
| | Lamp filament circuit: 120 W at 72 VDC | | Electrical life: 5 x 10 ⁵ op. |
| Contact overload withstand | At 24 VDC: 100 A at L/R = 0 for 10 ms (10 operations at the rate of 1 operation per minute) | | |
| Contact closure time | Pick-up time N/O < 40 ms | Drop-out* time N/C < 15 ms | |
| Contact opening time | Pick-up time N/C < 35 ms | Drop-out* time N/O < 6 ms | |
| Minimum contact continuity | 20 mA at 24 VDC | | |
| Number of contacts | 4 double make / double break contacts (form Z) | | |
| Contact material | Hard silver overlay laminated to copper | | |
| Contact resistance | initial | 10 mΩ max at 5 A | |
| | end of life | 40 mΩ max at 5 A | |



TBAU 400 relay

Technical specifications

Contact design



Electrical characteristics

| | |
|-----------------------|--|
| Dielectric strength | 2000 VAC, 1 min between contacts 2600 VAC, 1 min between contacts, coil and frame |
| Insulation resistance | ≥ 1000 MΩ at 500 VDC |

Mechanical & environmental characteristics

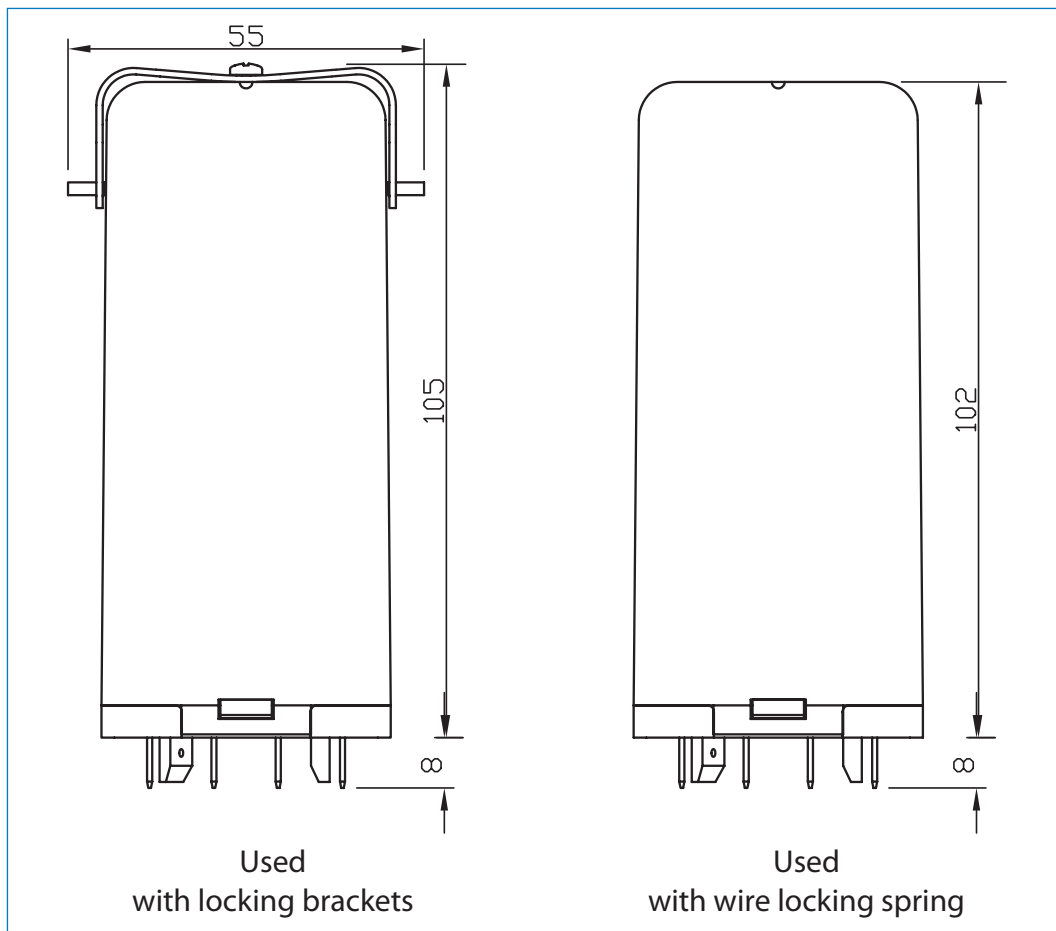
| | |
|-----------------|--|
| Vibration | NF F 62-002 The tests are conducted in the X, Y , Z planes at frequency between 10 & 150 cycles (sinusoidal) at 2 g |
| Shock | NF F 62-002 Tests are applied in both directions in the X, Y & Z planes. Then successive shocks are administered consisting of the positive component of sinusoidal with a value of 30 g, 11 ms Other vibration and shock tests can be performed on request |
| Mechanical life | > 100 x 10 ⁶ operations |
| Weight | 300 g (10.6 ounces) |
| Temperature | -40 °C...+85 °C |
| Humidity | 93% RH, 40° C for 4 days |
| Salt mist | 5% NaCl, 35° C for 4 days |
| Protection | IP40 (relay on socket) |
| Fire & smoke | Materials: Polycarbonate (cover) / polyester melamine (base) Note: These materials have been tested for fire propagation and smoke emission according standards NF F 16-101, NF F 16-102. And have been approved for use on the English/French train channel shuttle. |



TBAU 400 relay

Technical specifications

Dimensions (mm)



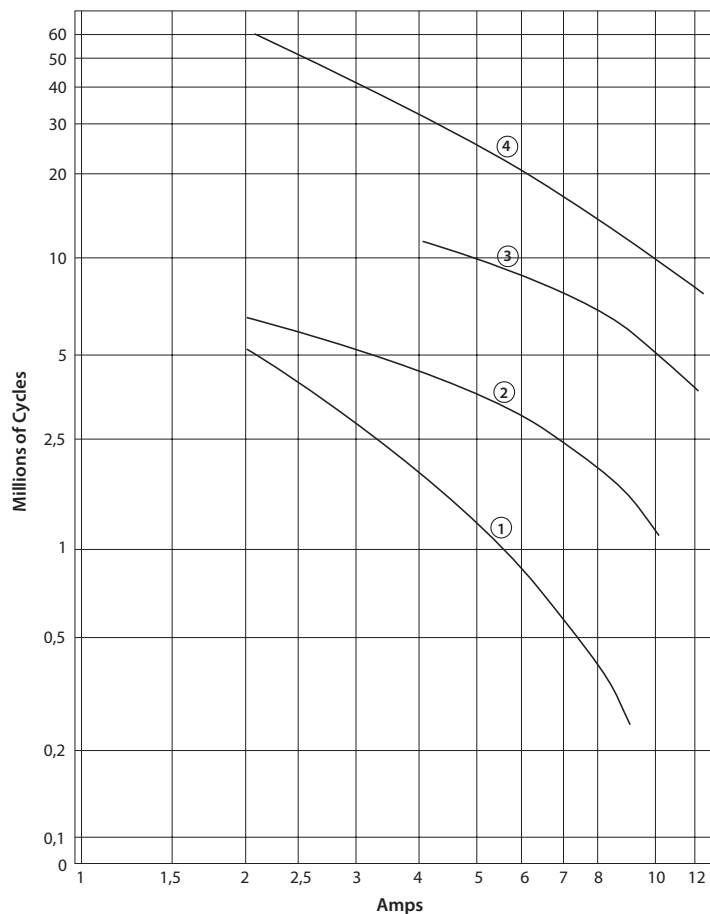
TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 1

AC Current breaking capacity versus life expectancy in millions of cycles.
Rate of contacts opening and closing = 1200 operations per hour.
Curves shown for resistive load (Power Factor = 1).

| Curve | 1 | 2 | 3 | 4 |
|-------|-----|-----|----|----|
| VAC | 220 | 125 | 48 | 24 |



TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 2

DC Current breaking capacity versus life expectancy in millions of cycles.

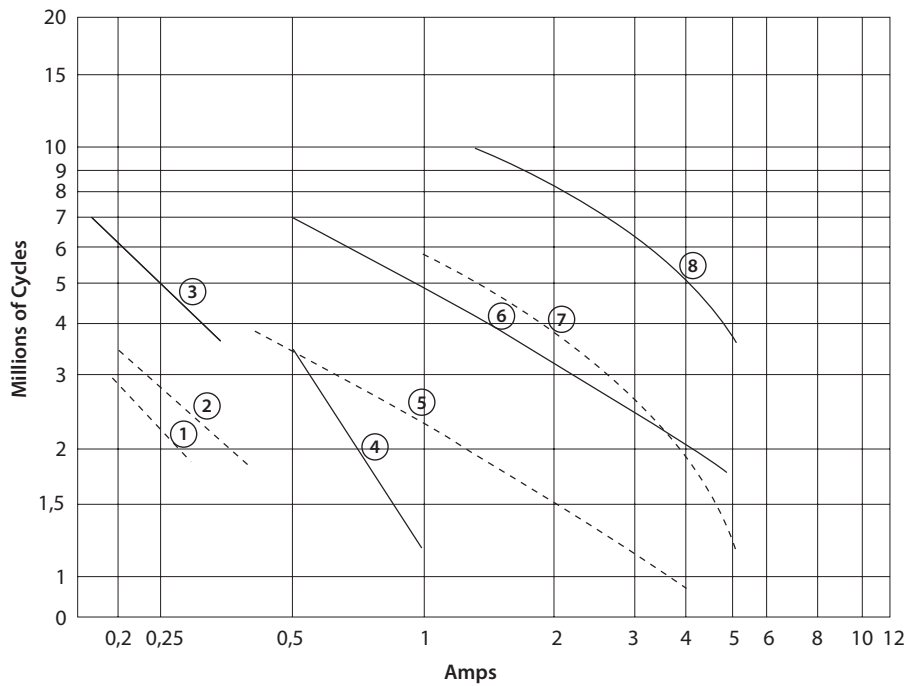
Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for inductive load:

- L/R= 20 ms continuous current
- - - L/R= 40 ms continuous current

* By connecting 2 contacts in series, DC current breaking capacity increases by 50 %

| Curves | 1-3 | 2-4 | 5-6 | 7-8 |
|--------|-----|-----|-----|-----|
| VDC | 220 | 125 | 48 | 24 |



TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 3

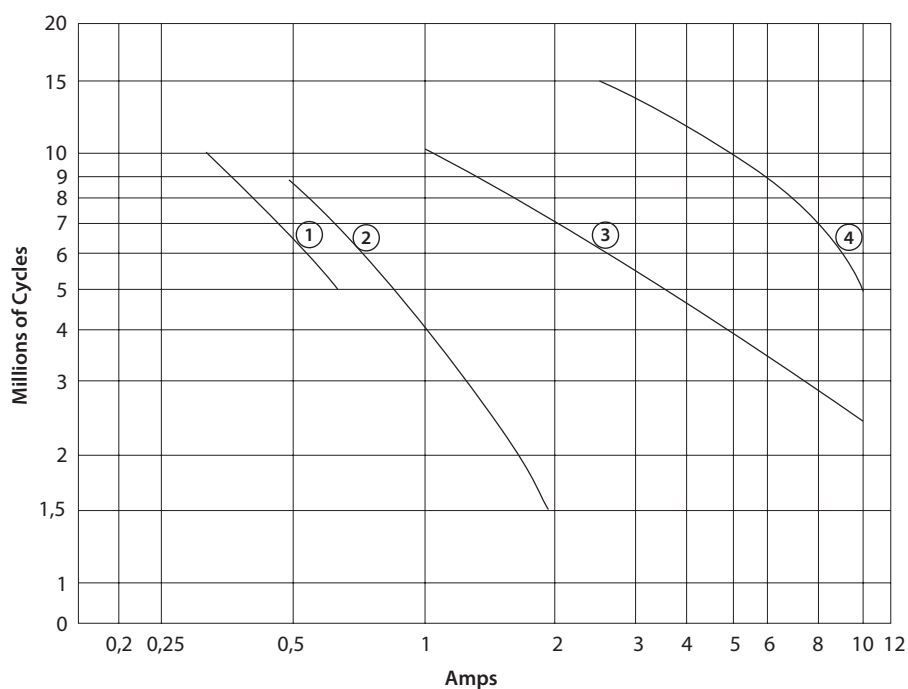
DC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

Curves shown for resistive load (L/R = 0). Continuous current.

* By connecting 2 contacts in series, DC current breaking capacity increases by 50 %

| Curve | 1 | 2 | 3 | 4 |
|-------|-----|-----|----|----|
| VDC | 220 | 125 | 48 | 24 |



TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 4

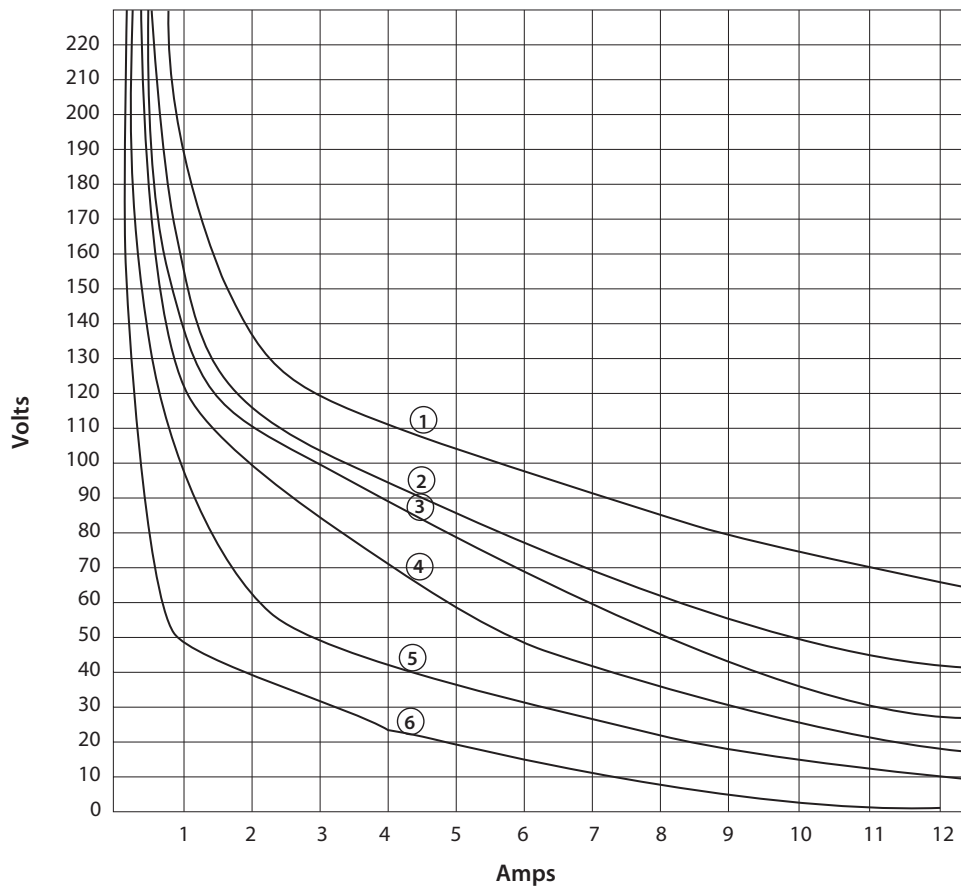
Maximum contact breaking capacity versus voltage for a given L/R.

Rate of contacts opening and closing = 600 operations per hour.

Curves shown for resistive load (L/R=0) and inductive loads. Continuous current.

Life expectancy: 2 Millions of Cycles

| Curve | 1 | 2 | 3 | 4 | 5 | 6 |
|-------|-----|------|------|------|------|-------|
| L/R= | 0ms | 15ms | 20ms | 40ms | 60ms | 100ms |



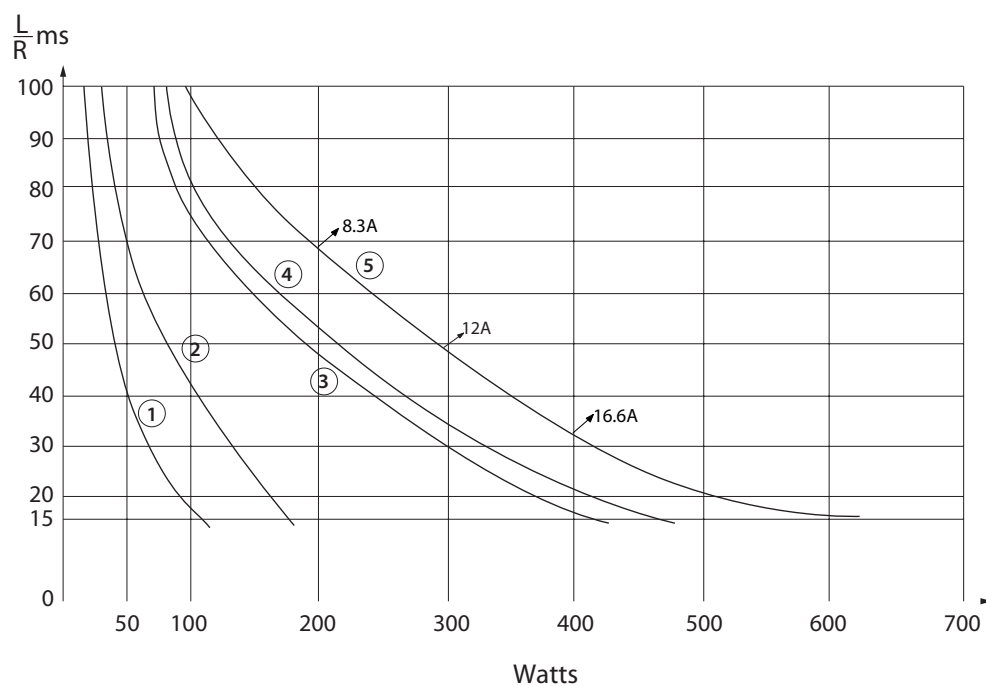
TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 5

Maximum power interruption versus load time constant (L/R) for a given voltage.
Curves shown for resistive loads. $I = P/V$.

| Curve | 1 | 2 | 3 | 4 | 5 |
|-------|-----|-----|----|----|----|
| VDC | 220 | 125 | 72 | 48 | 24 |



TBAU 400 relay

Technical specifications

Dynamic relay selection curve No 6

AC Current breaking capacity versus life expectancy in millions of cycles.

Rate of contacts opening and closing = 1200 operations per hour.

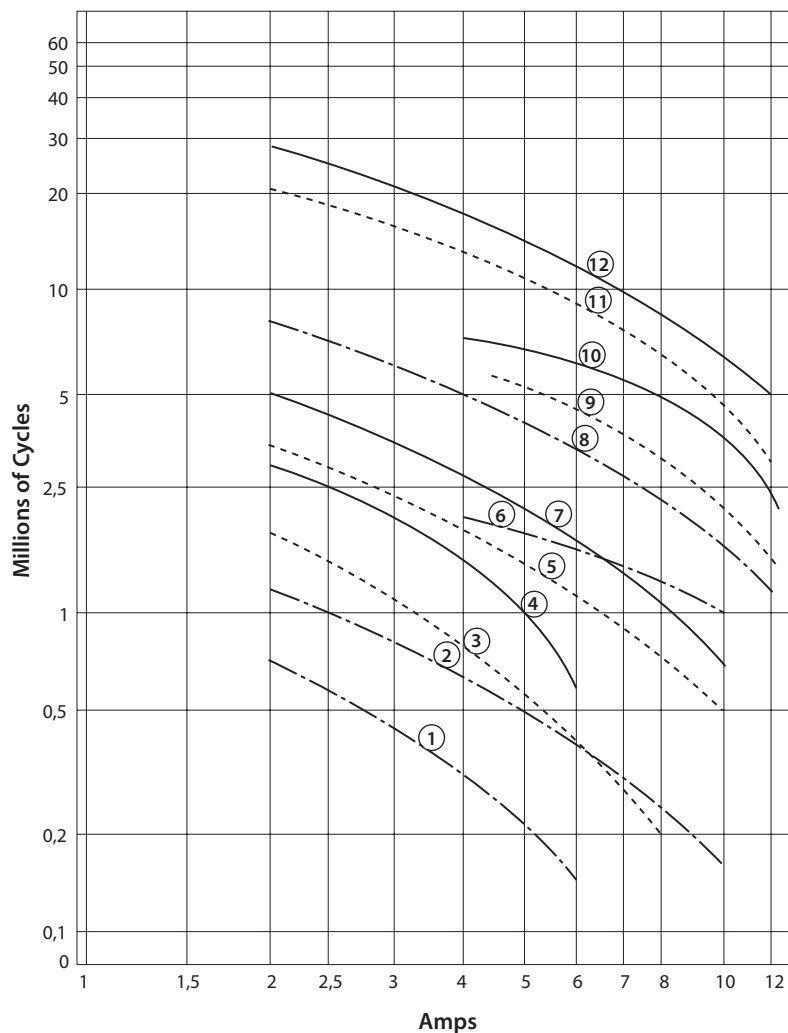
Values shown for inductive loads -

——— Cos ϕ = 0.7

----- Cos ϕ = 0.5

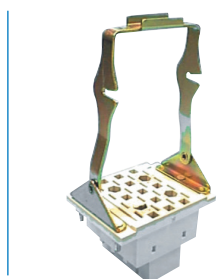
----- Cos ϕ = 0.3

| Curves | 1,3 &4 | 2,5 &7 | 6,9 &10 | 8,11 &12 |
|--------|--------|--------|---------|----------|
| VAC | 220 | 125 | 48 | 24 |

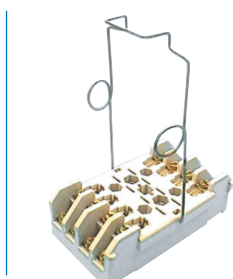


TBAU 400 relay

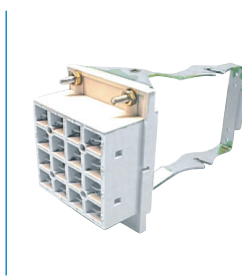
Mounting possibilities / sockets



EA 102 B



EA 103 BF



EA 104 B



EA 112 BF

Panel/flush mounting

| | |
|-----------|---|
| EA 102 B | Locking bracket (905843), rear connection, double Faston 5 mm |
| EA 102 BF | Wire locking spring (926853), rear connection, single Faston 5 mm |
| EA 104 B | Locking bracket (905843), rear connection, single Faston 5 x 0.8 mm |
| EA 104 BF | Wire locking spring (926853), rear connection, single Faston 5 x 0.8 mm |
| EA 112 BF | Wire locking spring (926853), rear connection, crimp contact |

Surface/wall mounting

| | |
|------------|---|
| EA 103 BF* | Wire locking spring (926853), front connection, M3 screw 6.5 mm ring terminals (2,5 mm ²) |
| EA 105 BF* | Wire locking spring (926853), front connection, single Faston 5 mm |




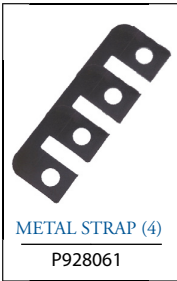
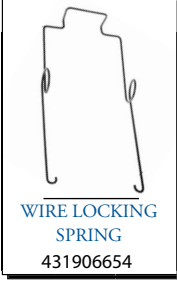



* Mounting possibility on 35 mm rail EN 50022 by adding suffix D to the part number (see socket datasheet)

Note: Keying of relay to socket can be specified by adding the keying letters in the part number. See all details in the related socket datasheet.

TBAU 400 relay

Spare parts

Spare parts - order part numbers

| | | | |
|--|--|--|--|
| <p>(1)</p>  <p>LOCKING BRACKET 905846</p> | <p>(1)</p>  <p>SCREW FOR BRACKET C927210</p> | <p>(1)</p>  <p>METAL STRAP (2) P928060</p> | <p>(1)</p>  <p>METAL STRAP (4) P928061</p> |
| <p>(1)</p>  <p>WIRE LOCKING SPRING 431906654</p> | <p>(1)</p>  <p>ROUND PLASTIC PLUGS 414928005</p> | <p>(2)</p>  <p>HEX. PLASTIC KEYS 414905678</p> | <p>(3)</p>  <p>LOCK PINS ASSY 2 SCREWS 906364 212903020</p> |

(1) Parts only for socket
 (2) Parts for relay and socket
 (3) Parts only for relay



TBAU 400 relay

Instructions

Installation

Install socket and connect wiring correctly according identification to terminals. Plug relay into socket. Reverse installation into socket not possible due to mechanical blocking by snap-lock.

Don't reverse polarity of coil connection. Relays can be mounted (tightly) next to each other and in any attitude.

Warning! Never use silicon near by relays

Operation

Before operating always apply voltage to coil to check correct operation.

Long term storage may corrode the silver on the relay pins. Just by plugging the relay into the socket, the female bifurcated receivers will automatically clean the corrosion on the pins and guarantee a good connection.

Do not use the relay in places with flammable gas as the arc generated from switching could ignite gasses.

Maintenance

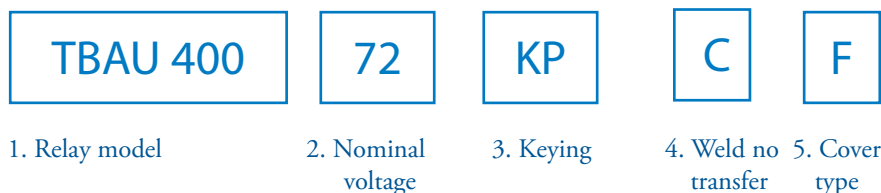
Correct operation of relay can easily be checked as transparent cover gives good visibility on the moving contacts. When the relay doesn't seem to operate correct, please check presence of coil voltage. Use a multimeter. If LED is used, coil presence should be indicated. If coil voltage is present, but the relay doesn't work, a short circuit of suppression diode is possible (The coil connection was reversed). If relay doesn't work after inspection, please replace relay unit by a similar model. Send defective relay back to manufacturer. Normal wear and tear excluded.



TBAU 400 relay

Ordering scheme

Configuration:



This example represents a **TBAU 400 72 KP C F**.

Description: TBAU 400 relay, U_{nom} : 72 VDC, keying KP, weld no transfer, relay cover for wire locking spring.

1. Relay model

TBAU 400

2 & 3. Nominal voltage and keying

| | |
|---------------|---------|
| 12 GR | 12 VDC |
| 24 GP | 24 VDC |
| 36 HP | 36 VDC |
| 48 JP | 48 VDC |
| 72 KP | 72 VDC |
| 96 MP | 96 VDC |
| 110 LP | 110 VDC |

4. Weld no transfer

| | |
|----------|---------------------------------------|
| - | Weld no transfer available (standard) |
| C | Weld no transfer |

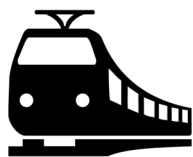
5. Relay cover type

| | |
|----------|-------------------------------------|
| - | Relay cover with lock pins |
| F | Relay cover for wire locking spring |





DS-TBAU 400-V2.1 July 2016



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