



Prioritizing
safety in
protection
& control

BR930 Signalling Relays

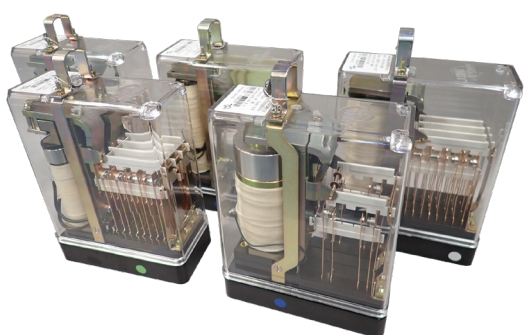


BR930

signalling relays

Mors Smitt has a wide range of relay products with the BR930 signalling relays manufactured in Burton-on-Trent, UK. These relays are manufactured since the 1960's and have full Network Rail acceptance certification (formerly British Rail)

Formerly known as Tyer, Zone Controls, Field and Grant, STS Rail and now Mors Smitt UK, our relays have been successfully supplied throughout the world. There are over 200 relay designs currently being manufactured meeting the requirements of many railway operators including customer specific designs when needed.



Serving Safety

We highly value our customers and put service first. We are committed to quality excellence to create reliable products and services, serving the stringent reliability, availability, maintain-ability, safety, health and environmental demands from our customers. This commitment will result in lower life-cycle-cost.

Mors Smitt is a trusted partner in your supply chain. World wide availability of products is assured by a network of professional, trained and dedicated subsidiaries, distributors and agents offering local service and support.

Mors Smitt is a total supplier for onboard and trackside safety-critical solutions. Combining electro-mechanical ultra-high dependable relays with safety-critical electronics

All products are manufactured to the strictest standards.



Mors Smitt is part of Wabtec Corporation. A global provider of value-added, technology-based products and services for railway, transit, freight and other industrial markets, with facilities world wide.



Key features

- Non-weld silver and silver impregnated carbon contact tips
- Automated operator inspection
- Automated end of line testing
- End of line test reports available on request
- Certificate of Conformity supplied with each order
- Recertification and repair services available
- Bespoke design services



Of modular plug-in design, the relays are secured in their mating plug boards by a wire retaining clip. Interlocking of the relay and plugboard is achieved by a pin code registration system which ensures that only those relays having the same pin code as the plugboard can be interchanged.

The contact arrangement for each relay is as specified in the relevant BR standard and up to 16 pairs of contacts can be accommodated in the same housing, with front contacts being normally open and back contacts normally closed. Contact pairs typically consist of a domed silver tip, mating with a flat, silver/ carbon tip and all contacts are rated in accordance with the appropriate BR specification.

A full repair, refurbishment and recertification service is available from Mors Smitt UK together with fast track manufacturing for urgent requirements.

Data sheets are available for every relay listed and with over 200 designs in production we offer a comprehensive and diverse range.



Production capability

One of 2 manufacturers supplying the UK market

- Supply approx. 50% of UK demand (25,000 relays per year)
- Products fully approved by UK Network Rail

Full design capability

- Over 50 years BR930 relay design experience
- Application specific and special purpose relays
- Multi-disciplined design and engineering skills set
- Short design to manufacture lead times
- Full CAD design capability
- Electronic circuit and module design
- PCB design
- Design for manufacture and test
- Prototyping facilities

Flexible and responsive manufacturing

- Latest technology based production line and test equipment
- Supply against low and high volume orders alike
- Adaptable to customer delivery requirements
- 6 to 8 week lead times
- Two week fast track delivery service for emergencies

Full repair and re-calibration capability

- Dedicated service department
- Repair, test and re-certification
- Short turnaround times

Service exchange

- Economic solution for replacement relays
- 12 months warranty
- Short lead times

Alstom relays

- Sole licensee for manufacture or repair of 'Z' type relays





Benefits

Significant investment

- Purpose designed and built ISO14644 Class 8 cleanroom based production line
- LEAN manufacturing principles
- Latest technology equipment and processes

Consistent high quality

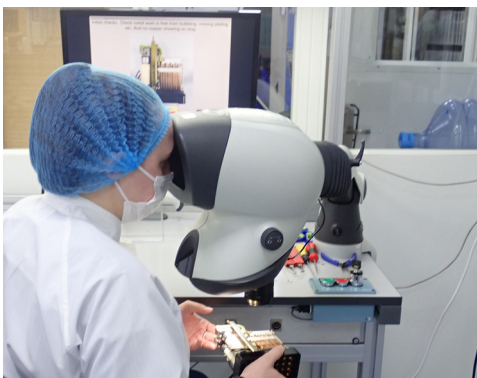
- Highly skilled workforce
- No fault forward culture
- Computer controlled workstations including setting and inspection
- Computerised automatic end of line test station
- Test results for every relay recorded and stored
- Full barcoded traceability

Flexible capacity

- Low or high volume batch runs
- Capacity readily adaptable to meet customer demand
- Rapid response to changes in delivery schedules or product mix for example
- Fast track delivery service

Production plant and process summary

- Computer controlled coil winding machines
- Automated coil printing
- Contact and spring blade riveting
- Contact setting
- Computer controlled assembly stations
- Staged inspection
- Computerised end of line tester
- Barcoded traceability
- Prototyping



Inbuilt quality

All relays are bar coded at the start of the assembly line ensuring

- Full traceability to assembly and setting personnel
- Automated relay specific setting parameters
- Automated relay specific inspection prompts
- Automated relay specific end of line testing

Examples of the operator prompts and end of line tests:

Automated setting

Pre programmed standards removing operator errors and giving robust pass / fail.

| Dropoff Test | | | | | |
|--|--------|------|----------|------|-------------|
| Manual Mode - Rotate Supply Pot To Perform Test. Press 'Start' to Continue | | | | | |
| | D | C | B | A | Coil Supply |
| 2 | | | | | 33.08 |
| 4 | | | | | |
| 6 | 1.70 | 1.70 | 1.70 | 1.70 | |
| 8 | | | | | |
| | Result | Min | Measured | Max | |
| Ray On | Pass | | | | |
| Induct Dropoff Voltage | Pass | 30 | 33.10 | 44 | D6.0 |
| Induct Dropoff Voltage | Pass | 30 | 33.10 | 44 | D6.0 |
| Induct Voltage | Pass | | 33.10 | 44 | |
| Induct Voltage Synchronisation | Pass | 0 | 0.00 | 8.00 | |

Computer prompted inspection

- Positive confirmation of inspection checks
- Visual reminders of pass & fail standards

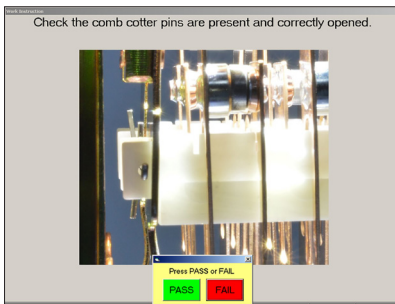
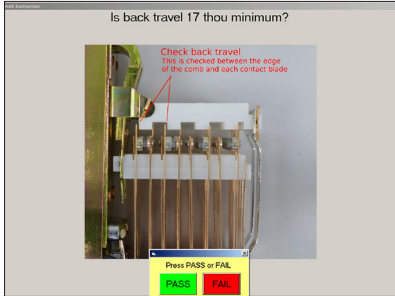
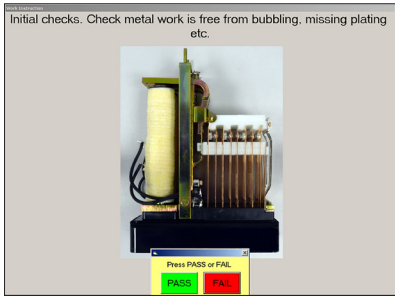
Automated end of line testing

- Computer controlled testing of all electrical relay parameters to BR930 standards
- Pin code and contact arrangement checks
- Test results recorded and stored
- Barcoded traceability

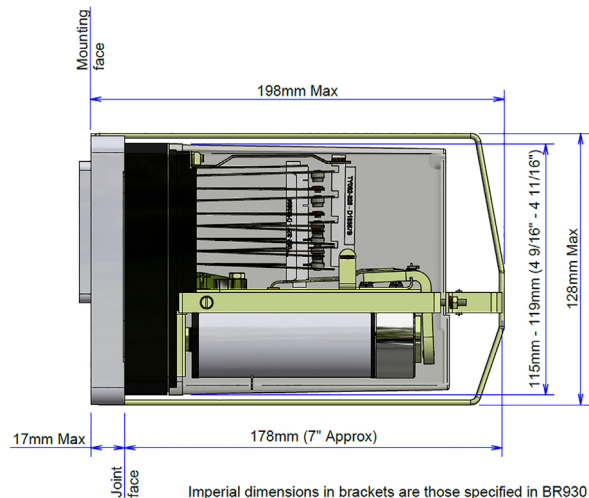
| Lower Guard | | | | | | |
|-------------|-------------------------|--------|-----------|-----------|-------|-------|
| Tn | Test | Result | Item | Meas | Total | Unit |
| 2:490 | Pin Code | Pass | A,C,E,F,H | A,C,E,F,H | 0.05 | 1.00 |
| 2:1002 | Message #1 | Done | | | 0.05 | 0.05 |
| 2:110 | Screw Nut LH | Done | | | 16.91 | 11.95 |
| 2:1058 | Message #3 | Done | | | 16.91 | 0.00 |
| 2:111 | Screw Nut RH | Done | | | 20.05 | 3.14 |
| 2:1034 | Message #4 | Done | | | 20.05 | 0.00 |
| 2:201 | Pin Code | Pass | | | 20.14 | 0.08 |
| 2:115 | Lock Guard | Done | | | 20.15 | 0.02 |
| 2:1056 | Message #5 | Done | | | 20.15 | 0.00 |
| 2:20 | Input for Guard Lowered | Done | | | 0.00 | 0.00 |

Despatch

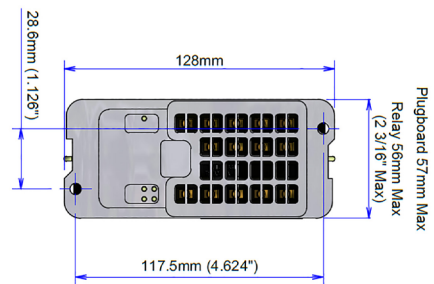
- Full serial number traceability to individual packing box



Dimensions



Imperial dimensions in brackets are those specified in BR930
Illustration shows TY083/GRP07 - QNA1 - 8F 4B 50V to BR931A A.C. immune D.C. neutral line relay.



Mors Smitt
A Whelan Company

Relay Test Report

Organisation : Mors Smitt UK
Relay Type : Twin AC Immune DC Biased Line Relay
Serial Number : 4086096
Base Bar Code : TY157-04217702104
Testing Station : MATOR2

Test Result : Pass

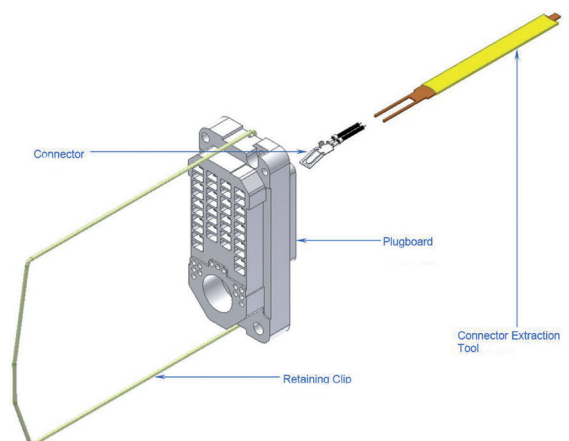
| Test | Test Criteria | Result | Normal | Min | Max | Measurement |
|---------|---------------------------------------|--------|--------|--------|--------|-------------|
| 4.800 | Test Pin Code | Pass | ACDOK | - | - | ACDOK |
| 4.801 | Test Pickup Coil | Pass | - | - | - | See Below |
| 4.801 | Test Dropoff Coil | Pass | - | - | - | See Below |
| 4.801 | Test Pickup Coil | Pass | - | - | - | See Below |
| 4.801 | Test Dropoff Coil | Pass | - | - | - | See Below |
| 4.802 | Test Pickup Coil | Pass | - | - | - | See Below |
| 4.802 | Test Dropoff Coil | Pass | - | - | - | See Below |
| 4.802 | Test Pickup Coil | Pass | - | - | - | See Below |
| 4.802 | Test Dropoff Coil | Pass | - | - | - | See Below |
| 4.800 | Test Coil Resistance | - | - | - | - | - |
| 4.800-1 | NR04 | - | - | 298.50 | 211.50 | 226.89 |
| 4.800-2 | NR04 | Pass | - | 298.50 | 211.50 | 226.13 |
| 4.800 | Test Contact Resistance | - | - | - | - | See Below |
| 4.801 | Test Contact Resistance | Pass | - | - | - | - |
| 4.802 | Test Contact Resistance | Pass | - | - | - | - |
| 4.800 | Test AC Sensitivity | Pass | - | - | - | - |
| 4.801 | Test Release Voltage (Block Contacts) | Pass | - | - | - | - |
| 4.805 | Test IAL (p.u.f.v) | Pass | - | - | - | - |

| Test Results | Operate Pick Up Value | Result | Release Drop Away Value | Result | Contact Resistance Ω | Spring Pressure MP | Result |
|--------------|-----------------------|--------------|-------------------------|--------------|----------------------|--------------------|--------|
| AC0 | 13.00 | Pass | - | Not Required | 0.03 | - | Pass |
| AD0 | 13.00 | Pass | - | Not Required | 0.03 | - | Pass |
| AM0 | - | Not Required | 7.50 | Pass | 0.05 | - | Pass |
| AP0 | - | Not Required | 7.50 | Pass | 0.04 | - | Pass |
| D00 | 13.00 | Pass | - | Not Required | 0.04 | - | Pass |
| BD0 | 13.00 | Pass | - | Not Required | 0.03 | - | Pass |
| BE0 | 13.00 | Pass | - | Not Required | 0.04 | - | Pass |
| BD5 | 13.00 | Pass | - | Not Required | 0.04 | - | Pass |
| CE0 | 14.80 | Pass | - | Not Required | 0.04 | - | Pass |
| CD0 | 14.80 | Pass | - | Not Required | 0.03 | - | Pass |
| CE5 | 14.80 | Pass | - | Not Required | 0.04 | - | Pass |
| CD5 | 14.80 | Pass | - | Not Required | 0.03 | - | Pass |
| D10 | 14.80 | Pass | - | Not Required | 0.04 | - | Pass |
| D05 | 14.80 | Pass | - | Not Required | 0.03 | - | Pass |
| D55 | - | Not Required | 7.50 | Pass | 0.04 | - | Pass |
| D70 | - | Not Required | 7.50 | Pass | 0.04 | - | Pass |

Air Gap : -

Plugboards

- Available as both standard UK Network Rail and to suit GEC electrical connectors (upon request.)
- Available in Network Rail approved white.
- Available undrilled or drilled to suit relay pin code
- Relay retaining clip / connectors available separately



Summary

- High quality, reliable approved products
- Flexible modern production facility and equipment
- Proven design capability for bespoke products
- Comprehensive aftersales support and service



Relays table

| Catalogue number | Q-reference | GEC/Alstom Z Reference | BR cat code | Pin code (BS8586) | Code Pins (BS8586) | Contact configuration | Rating | BR specification | Description | Reference |
|------------------|-------------|------------------------|-------------|-------------------|--------------------|-----------------------|--------|------------------|---|-----------|
| TY082/GRP01 | QN1 | ZS5512 | 0085/000350 | 001 | ABCDE | 12F 4B | 24 VDC | 930 | DC neutral line relay | N |
| TY082/GRP02 | QND2 | ZS5512 | 0085/000500 | 001 | ABCDE | 12F 4B | 24 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP03 | QN1 | ZS3512 | 0085/000360 | 001 | ABCDE | 8F 4B | 24 VDC | 930 | DC neutral line relay | N |
| TY082/GRP04 | QND2 | ZS3512 | 0085/000510 | 001 | ABCDE | 8F 4B | 24 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP05 | QN1 | ZS4512 | 0085/000370 | 002 | ABCFD | 8F 8B | 24 VDC | 930 | DC neutral line relay | N |
| TY082/GRP06 | QND2 | ZS4512 | 0085/000520 | 002 | ABCFD | 8F 8B | 24 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP07 | QN1 | - | 0085/000380 | 002 | ABCFD | 6F 6B | 24 VDC | 930 | DC neutral line relay | N |
| TY082/GRP08 | QND2 | - | 0085/000530 | 002 | ABCFD | 6F 6B | 24 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP09 | QN1 | - | 0085/000390 | 002 | ABCFD | 4F 4B | 24 VDC | 930 | DC neutral line relay | N |
| TY082/GRP10 | QND2 | - | 0085/000540 | 002 | ABCFD | 4F 4B | 24 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP11 | QN1 | ZS5612 | 0085/000410 | 003 | ABCEF | 12F 4B | 50 VDC | 930 | DC neutral line relay | N |
| TY082/GRP12 | QND2 | ZS5612 | 0085/000560 | 003 | ABCEF | 12F 4B | 50 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP13 | QN1 | ZS3612 | 0085/000420 | 003 | ABCEF | 8F 4B | 50 VDC | 930 | DC neutral line relay | N |
| TY082/GRP14 | QND2 | ZS3612 | 0085/000570 | 003 | ABCEF | 8F 4B | 50 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP15 | QN1 | ZS4612 | 0085/000430 | 004 | ABDEF | 8F 8B | 50 VDC | 930 | DC neutral line relay | N |
| TY082/GRP16 | QND2 | ZS4612 | 0085/000580 | 004 | ABDEF | 8F 8B | 50 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP17 | QN1 | - | 0085/000440 | 004 | ABDEF | 6F 6B | 50 VDC | 930 | DC neutral line relay | N |
| TY082/GRP18 | QND2 | - | 0085/000590 | 004 | ABDEF | 6F 6B | 50 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP19 | QN1 | - | 0085/000450 | 004 | ABDEF | 4F 4B | 50 VDC | 930 | DC neutral line relay | N |
| TY082/GRP20 | QND2 | - | 0085/000600 | 004 | ABDEF | 4F 4B | 50 VDC | 930 | DC neutral line double wound relay | ND |
| TY082/GRP24 | QN1 | - | - | T002 | ABCET | 12F 4B | 24 VDC | 930 | DC high sensitivity neutral line relay | N |
| TY082/GRP26 | QN1 | - | - | X042 | ACFJX | 12F 4B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP27 | QN1 | - | - | 279 | ABHKL | 8F 4B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP28 | QN1 | - | - | X042 | ACFJX | 8F 4B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP29 | QN1 | - | 0088/030512 | 112 | ADFHK | 8F 8B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP30 | QN1 | - | - | X003 | ABCFX | 8F 8B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP31 | QN1 | - | - | X003 | ABCFX | 6F 6B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP32 | QN1 | - | - | X026 | ABHJX | 4F 4B | 12 VDC | 930 | DC neutral line relay | N |
| TY082/GRP34 | QNH | ZS4513 | - | 034 | ADFGH | 8F 8B | 24 VDC | 930 | DC neutral line relay with high release voltage | NH |
| TY082/GRP35 | QNH | ZS5513 | 0085/000231 | 033 | ADEGH | 12F 4B | 24 VDC | 930 | DC neutral line relay with high release voltage | NH |
| TY082/GRP36 | QNH | ZS4613 | - | 207 | CDGHJ | 12F 4B | 50 VDC | 930 | DC neutral line relay with high release voltage | NH |
| TY082/GRP37 | QNH | ZS5613 | 0088/000123 | 208 | CEFGJ | 8F 8B | 50 VDC | 930 | DC neutral line relay with high release voltage | NH |
| TY083/GRP01 | QNA1 | ZS5522 | 0085/000650 | 021 | ABDFH | 12F 4B | 24 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP02 | QNA1 | ZS3522 | 0085/000660 | 021 | ABDFH | 8F 4B | 24 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP03 | QNA1 | ZS4522 | 0085/000670 | 022 | ABDGH | 8F 8B | 24 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP04 | QNA1 | - | 0085/000680 | 022 | ABDGH | 6F 6B | 24 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP05 | QNA1 | - | 0085/000690 | 022 | ABEFH | 4F 4B | 24 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP06 | QNA1 | ZS5622 | 0085/000710 | 0023 | ABEFH | 12F 4B | 50 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP07 | QNA1 | ZS3622 | 0085/000720 | 0023 | ABEFH | 8F 4B | 50 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP08 | QNA1 | ZS4622 | 0085/000730 | 0024 | ABEGH | 8F 8B | 50 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP09 | QNA1 | - | 0085/000740 | 0024 | ABEGH | 6F 6B | 50 VDC | 931A | AC immune DC neutral line relay | NA |
| TY083/GRP10 | QNA1 | - | 0085/000750 | 024 | ABEGH | 4F 4B | 50 VDC | 931A | AC immune DC neutral line relay | NA |
| TY084/GRP01 | QBA1 | ZB3521 | 0085/000800 | 0025 | ABFGH | 12F 4B | 24 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP02 | QBA1 | ZB3521 | 0085/000810 | 0025 | ABFGH | 8F 4B | 24 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP03 | QBA1 | ZB4521 | 0085/000820 | 0026 | ACDEH | 8F 8B | 24 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP04 | QBA1 | - | 0085/000830 | 0026 | ACDEH | 6F 6B | 24 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP05 | QBA1 | - | 0085/000840 | 0026 | ACDEH | 4F 4B | 24 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP06 | QBA1 | ZB5622 | 0085/000860 | 0027 | ACDFH | 12F 4B | 50 VDC | 932A | AC immune DC biased line relay | BA |



| Catalogue number | Q-reference | GEC/Alstom Z Reference | BR cat code | Pin code (BS8586) | Code Pins (BS8586) | Contact configuration | Rating | BR specification | Description | Reference |
|------------------|-------------|------------------------|-------------|-------------------|--------------------|-----------------------|-------------------|------------------|---|-----------|
| TY084/GRP07 | QBA1 | ZB3622 | 0085/000870 | 027 | ACDFH | 8F 4B | 50 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP08 | QBA1 | ZB4622 | 0085/000880 | 028 | ACDGH | 8F 8B | 50 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP09 | QBA1 | - | 0085/000890 | 028 | ACDGH | 6F 6B | 50 VDC | 932A | AC immune DC biased line relay | BA |
| TY084/GRP10 | QBA1 | - | 0085/000900 | 028 | ACDGH | 4F 4B | 50 VDC | 932A | AC immune DC biased line relay | BA |
| TY085/GRP01 | QSPA1 | ZS3531 | 0085/000950 | 041 | ABDEJ | 8F 4B | 24 VDC | 933A | AC immune DC slow pick-up neutral line relay | SPA |
| TY085/GRP02 | QSPA1 | ZS3631 | 0085/000960 | 043 | ABDGJ | 8F 4B | 50 VDC | 933A | AC immune DC slow pick-up neutral line relay | SPA |
| TY085/GRP06 | QSPA1 | ZS3651 | - | 373 | ACDEM | 8F 4B | 50 VDC | ZS3651 | AC immune DC slow pick-up neutral line relay | ZA3651 |
| TY086/GRP01 | QSPA1 | ZS3542 | 0085/002020 | 061 | ADEFJ | 8F 4B | 24 VDC | 934A | AC immune DC slow release neutral line relay | SRA |
| TY086/GRP02 | QL1 | ZS3542 | 0085/001020 | 063 | ADEHJ | 8F 4B | 50 VDC | 934A | AC immune DC slow release neutral line relay | SRA |
| TY087/GRP01 | QL1 | ZI7511 | 0085/001070 | 009 | ABDEG | 11F 4B | 24 VDC | 935A | DC magnetically latched neutral line relay | L |
| TY087/GRP02 | QL1 | ZI7611 | 0085/001080 | 011 | ABEFG | 11F 4B | 50 VDC | 935A | DC magnetically latched neutral line relay | L |
| TY087/GRP03 | QL1 | - | 0085/000861 | 007 | ABCEG | 8F 6B | 24 VDC | 935A | DC magnetically latched neutral line relay | L |
| TY087/GRP04 | QL1 | - | 0085/001015 | 008 | ABCFG | 8F 6B | 50 VDC | 935A | DC magnetically latched neutral line relay | L |
| TY132/GRP01 | QUCX1 | ZQ1111 | 0085/1400 | 070 | AFGHJ | 2F 2B | 1.4 AAC | 942 | AC lamp proving relay | UCX |
| TY132/GRP02 | QECX1 | ZQ4011 | 0085/001350 | 071 | ABCDK | 4F | 400 mAAC | 941A | AC lamp proving relay | ECX |
| TY132/GRP03 | QECX21 | - | - | 286 | ACDKL | 4F | 400 mAAC | 948 | AC lamp proving relay | ECX21 |
| TY132/GRP04 | QECX | - | - | 376 | ACDHM | 4F | 250 mAAC | ZQ4081 | AC lamp proving relay | ECX |
| TY132/GRP06 | QUCX3 | - | - | S059 | ADGHS | 2F 2B | 550 mAAC | 942 | AC lamp proving relay | UCX3 |
| TY132/GRP11 | QNX1 | - | - | X104 | BCHKX | 4F 2B | 300 mAAC | 942 | AC lamp proving relay | NX1 |
| TY132/GRP15 | QECX | - | - | 309 | ADFJL | 4F 2B | 400 mAAC | ZQ4021 | AC lamp proving relay | ECX |
| TY132/GRP16 | QECX | - | 0085/000864 | 071 | ABCDK | 4F 2B | 400 mAAC | 941A | AC lamp proving relay | ECX |
| TY133/GRP01 | QEC1 | ZQ1211 | 0085/001300 | 0081 | ABDJK | 4F | 2.2 ADC | 940A | DC single wound lamp proving relay | EC |
| TY133/GRP02 | QEC1 | - | 0085/001290 | 0081 | ABDJK | 4F 2B | 2.2 ADC | 940A | DC single wound lamp proving relay | EC |
| TY133/GRP03 | QECF1 | ZQ1411 | 0085/001450 | 0091 | ABHJK | 4F | 1.5 ADC | 945A | DC lamp proving relay | ECF |
| TY133/GRP08 | QEC | - | - | 355 | ABEJM | 4F 2B | 400 mADC | ZQ4051 | DC lamp proving relay | EC |
| TY150/GRP01 | QT2 | ZA0011 | 0085/000200 | 101 | ACFGK | 2F | 500 mADC | 938A | DC neutral track relay | T |
| TY150/GRP05 | QT | - | - | T017 | ABCKT | 2F 2B | 250 mADC | 938A | DC neutral track relay | T |
| TY152/GRP01 | QT2 | ZA0021 | 0085/000300 | 111 | ADFGK | 2F | P.U. 17 VDC | 968 | DC neutral track relay | T |
| TY153/GRP01 | QTA2 | ZA0051 | 0085/000250 | 105 | ACGJK | 2F | 400 mADC | 939A | AC immune DC neutral track relay | TA |
| TY153/GRP02 | QTA2 | ZA0151 | 0085/000280 | 110 | ADEJK | 2F | 400 mADC | 966 F2 | AC immune DC neutral track relay | TA |
| TY153/GRP03 | QTA2 | - | - | 110 | ADEJK | 2F 1B | 400 mADC | 966 F2 | AC immune DC neutral track relay | TA |
| TY153/GRP04 | QTA2 | - | 0085/000230 | 104 | ACGHK | 2F | 10 VDC | 966 F9 | AC immune DC neutral track relay | TA |
| TY153/GRP05 | QTA2 | - | - | 110 | ADEJK | 2F 2B | 400 mADC | 966 F2 | AC immune DC neutral track relay | TA |
| TY153/GRP06 | QT | ZA0031 | - | 305 | ADEJL | 2F | 150 mADC | 938A | DC neutral track relay | T |
| TY153/GRP07 | QECX19 | - | - | S058 | ADFKS | 4F | 135 mAAC | 941A | AC lamp proving relay | ECX19 |
| TY153/GRP08 | QUCX5 | - | - | S096 | BCFGS | 4F 2B | 800 mAAC & 50 VDC | 942 | AC lamp proving relay with DC latching | UCX5 |
| TY153/GRP09 | QECX16 | - | - | S039 | ACEKS | 2F | 720 mAAC | 941A | AC lamp proving relay | ECX16 |
| TY153/GRP12 | QECX | - | - | T011 | ABCHT | 2F | 200 mAAC | 941A | AC lamp proving relay | ECX |
| TY153/GRP13 | QECX11 | - | 0085/001569 | 569 | AEFKN | 4F 2B | 1.0 AAC | 841A | AC lamp proving relay | ECX11 |
| TY153/GRP16 | QECX | - | - | X533 | AGKXY | 4F | 650 mAAC | 941A | AC lamp proving relay | ECX |
| TY153/GRP18 | QN3 | - | - | 077 | ABDEK | 4F 2B | 375 mADC | | DC lamp proving relay | N3 |
| TY153/GRP19 | QECX20 | - | - | S113 | BDFJS | 4F 2B | 58 mAAC | 914A | AC lamp proving relay | ECX20 |
| TY153/GRP21 | QTA2 | - | 0088/000122 | 105 | ACGJK | 2F 2B | 400 mADC | 939A | AC immune DC neutral track relay | TA |
| TY154/GRP02 | QBCA1 | ZU3521 | 0085/001505 | 170 | BCEJK | 2HF 4B | 24 VDC | 943A | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |
| TY154/GRP03 | QBCA1 | ZU3621 | 0085/001515 | 172 | BCFHK | 2HF 4B | 50 VDC | 943A | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |
| TY154/GRP05 | QBCA1 | - | - | 159 | BEFHJ | 2HF 4F 4B | 24 VDC | 943A | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |



| Catalogue number | Q-reference | GEC/Alstom Z Reference | BR cat code | Pin code (BS8586) | Code Pins (BS8586) | Contact configuration | Rating | BR specification | Description | Reference |
|------------------|-------------|------------------------|-------------|-------------------|--------------------|-----------------------|--------|------------------|---|-----------|
| TY154/GRP06 | QBCA1 | - | - | 160 | BEGHJ | 2HF 4F 4B | 50 VDC | 943A | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |
| TY154/GRP09 | QBCA1 | - | - | S007 | ABCKS | 2HF 4F 4B | 12 VDC | 943A | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |
| TY154/GRP11 | QBCA1 | ZU2621 | 0088/044047 | 163 | BCDFK | 2HF 4F 4B | 50 VDC | ZU2621 | AC immune DC biased contactor relay with silver cadmium oxide heavy duty contacts | BCA |
| TY155/GRP01 | QCJ1 | - | 0085/001550 | 6046 | ABDFGH | 1F 3B | 24 VDC | 949 | DC non-safety 7.5 second time delay relay with pure silver contacts | CJ |
| TY155/GRP02 | QCJ1 | - | 0085/001560 | 6047 | ABDFGJ | 1F 3B | 50 VDC | 949 | DC non-safety 7.5 second time delay relay with pure silver contacts | CJ |
| TY155/GRP03 | QCJ1 | - | 0085/002512 | 6047 | ABDFGJ | 1F 3B | 50 VDC | 949 | DC non-safety 12 second time delay relay with pure silver contacts | CJ |
| TY155/GRP04 | QCJ1 | - | - | 385 | ACELM | 1F 3B | 50 VDC | 949 | DC non-safety 10 second time delay relay with pure silver contacts | CJ |
| TY155/GRP05 | QCJ1 | - | - | X196 | EFGHX | 1F 3B | 50 VDC | 949 | DC non-safety 10 second time delay relay with pure silver contacts | CJ |
| TY155/GRP06 | QCJ1 | - | - | S057 | ADFJS | 1F 3B | 50 VDC | 949 | DC non-safety 14 second time delay relay with pure silver contacts | CJ |
| TY155/GRP07 | QCJ1 | - | 0085/001963 | 6047 | ABDFGJ | 1F 3B | 50 VDC | 949 | DC non-safety 10 second time delay relay with pure silver contacts | CJ |
| TY155/GRP08 | QCJ1 | - | 0085/001964 | 6047 | ABDFGJ | 1F 3B | 50 VDC | 949 | DC non-safety 14 second time delay relay with pure silver contacts | CJ |
| TY156/GRP01 | QNN1 | ZH5612 | 0085/001630 | 212 | CDEFK | 6F 2B | 50 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP02 | QNN1 | ZH4612 | 0085/001640 | 211 | CFGHJ | 4F 4B | 50 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP03 | QNN1 | - | 0085/001650 | 211 | CFGHJ | 2F 2B | 50 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP04 | QNN1 | ZH5512 | 0085/001590 | 092 | ACDEK | 6F 2B | 24 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP05 | QNN1 | ZH4512 | 0085/001600 | 057 | ACEHJ | 4F 4B | 24 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP06 | QNN1 | - | 0085/001610 | 057 | ACEHJ | 2F 2B | 24 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP07 | QNND1 | ZL5612 | 0085/001740 | 056 | ACEGJ | 6F 1B | 50 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP08 | QNND1 | ZL4612 | 0085/001750 | 060 | ACGHJ | 4F 3B | 50 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP09 | QNND1 | - | 0085/001760 | 060 | ACGHJ | 2F 1B | 50 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP10 | QNND1 | ZL5512 | 0085/001700 | 055 | ACEFJ | 6F 1B | 50 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP11 | QNND1 | ZL4512 | 0085/001710 | 054 | ACDHJ | 4F 3B | 24 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP12 | QNND1 | - | 0085/001720 | 054 | ACDHJ | 2F 1B | 24 VDC | 960 | Twin DC neutral line double wound relay | NND |
| TY156/GRP13 | QNN1 | - | 0085/001590 | 092 | ACDEK | 6F 2B | 24 VDC | 960 | Twin high sensitivity DC neutral line relay | NN |
| TY156/GRP14 | QNN1 | - | - | T003 | ABDET | 6F 2B | 24 VDC | 960 | Twin high sensitivity DC neutral line relay | NN |
| TY156/GRP15 | QNN1 | - | - | X119 | BDHKX | 6F 2B | 12 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP16 | QNN1 | - | - | X133 | BFGKX | 4F 4B | 12 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP17 | QNN1 | - | - | X133 | BFGKX | 2F 2B | 12 VDC | 960 | Twin DC neutral line relay | NN |
| TY156/GRP18 | QNN1 | - | - | T019 | AHJKT | 6F 2B | 24 VDC | 960 | Twin DC neutral line relay with low operate voltage | NN |
| TY156/GRP19 | QNN1 | - | - | T023 | ABCMT | 4F 4B | 24 VDC | 960 | Twin DC neutral line relay with low operate voltage | NN |
| TY156/GRP20 | QNNH | ZH4513 | - | 050 | ABGHJ | 4F 4B | 24 VDC | 960 | Twin DC neutral line relay with high release voltage | NNH |
| TY156/GRP21 | QNNH | ZH5513 | - | 051 | ACDEJ | 6F 2B | 24 VDC | 960 | Twin DC neutral line relay with high release voltage | NNH |
| TY156/GRP22 | QNNH | ZH4613 | - | 052 | ACDFJ | 4F 4B | 50 VDC | 960 | Twin DC neutral line relay with high release voltage | NNH |
| TY156/GRP23 | QNNH | ZH5613 | - | 053 | ACDGJ | 6F 2B | 50 VDC | 960 | Twin DC neutral line relay with high release voltage | NNH |
| TY157/GRP01 | QBBA1 | ZN5621 | 0085/001850 | 049 | ABFHJ | 6F 2B | 50 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP02 | QBBA1 | ZN4621 | 0085/001860 | 017 | ABCEH | 4F 4B | 50 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP03 | QBBA1 | - | 0085/001870 | 017 | ABCEH | 2F 2B | 50 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP04 | QBBA1 | ZN5521 | 0085/001810 | 098 | ACEGK | 6F 2B | 24 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |



| Catalogue number | Q-reference | GEC/Alstom Z Reference | BR cat code | Pin code (BS8586) | Code Pins (BS8586) | Contact configuration | Rating | BR specification | Description | Reference |
|------------------|-------------|------------------------|-------------|-------------------|--------------------|-----------------------|-----------|------------------|---|-----------|
| TY157/GRP05 | QBBA1 | ZN4521 | 0085/001820 | 097 | ACEFK | 4F 4B | 24 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP06 | QBBA1 | - | 0085/001830 | 097 | ACEFK | 2F 2B | 24 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP07 | QBBA1 | - | - | 049 | ABFHJ | 6F 2B | 50 VDC | 961 | Twin high sensitivity AC immune DC biased line relay | BBA |
| TY157/GRP08 | QBBA1 | - | - | X121 | BEFGX | 6F 2B | 12 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP09 | QBBA1 | - | - | S013 | ABDKS | 4F 4B | 12 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP10 | QBBA1 | - | - | S013 | ABDKS | 2F 2B | 12 VDC | 961 | Twin AC immune DC biased neutral line relay | BBA |
| TY157/GRP11 | QBBA1 | - | - | T024 | ABLMT | 6F 2B | 24 VDC | 961 | Twin AC immune DC biased line relay with low operate voltage | BBA |
| TY159/GRP01 | QNNS1 | - | 0085/001920 | 214 | CDEHK | 6F 2B | 24 VDC | 963 | Twin DC slow-acting neutral line relay | NNS |
| TY159/GRP02 | QNNS1 | - | 0085/001930 | 213 | CDEGK | 4F 4B | 24 VDC | 963 | Twin DC slow-acting neutral line relay | NNS |
| TY159/GRP03 | QNNS1 | - | 0085/001950 | 216 | CDFGK | 6F 2B | 50 VDC | 963 | Twin DC slow-acting neutral line relay | NNS |
| TY159/GRP04 | QNNS1 | - | 0085/001960 | 015 | ADEFG | 4F 4B | 50 VDC | 963 | Twin DC slow-acting neutral line relay | NNS |
| TY159/GRP13 | QNNSA | - | 0085/001961 | 573 | AEGJN | 6F 2B | 50 VDC | 963 | Twin AC immune DC slow-acting neutral line relay | NNSA |
| TY159/GRP14 | QNNSA | - | 0085/001962 | 572 | AEGHN | 4F 4B | 50 VDC | 963 | Twin AC immune DC slow-acting neutral line relay | NNSA |
| TY160/GRP01 | QNNA1 | - | 0085/001665 | 209 | CEFHJ | 6F 2B | 50 VDC | 996 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP02 | QNNA1 | - | 0085/001660 | 210 | CEGHJ | 4F 4B | 50 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP03 | QNNA1 | - | - | 210 | CEGHJ | 2F 2B | 50 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP04 | QNNA1 | - | - | 962 | CFKLM | 6F 2B | 24 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP05 | QNNA1 | - | - | 963 | CGHJM | 4F 4B | 24 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP06 | QNNA1 | - | - | 963 | CGHJM | 2F 2B | 24 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY160/GRP07 | QNNA1 | - | - | T013 | AFGHT | 4F 4B | 110 VDC | 966 F6 | Twin AC immune DC neutral line relay | NNA |
| TY163/GRP01 | QRJ1 | - | 0085/002500 | 232 | DEFGH | 1F 1B | 22-30 VDC | 946 | DC neutral slow to release 3 second time delay relay | RJ |
| TY163/GRP02 | QRJ1 | - | 0085/002502 | 233 | DEFGJ | 1F 1B | 22-30 VDC | 946 | DC neutral slow to release 5 second time delay relay | RJ |
| TY163/GRP03 | QRJ1 | - | 0085/002504 | 234 | DEFHJ | 1F 1B | 22-30 VDC | 946 | DC neutral slow to release 6 second time delay relay | RJ |
| TY163/GRP04 | QRJ1 | - | 0085/002506 | 235 | DEGHJ | 1F 1B | 22-30 VDC | 946 | DC neutral slow to release 7.5 second time delay relay | RJ |
| TY163/GRP05 | QRJ1 | - | 0085/002508 | 236 | DFGHJ | 1F 1B | 22-30 VDC | 946 | DC neutral slow to release 10 second time delay relay | RJ |
| TY163/GRP06 | QRJ1 | - | 0085/002509 | 237 | DEFGK | 3F 1B | 50 VDC | 946 | DC neutral slow to release 10 second time delay relay | RJ |
| TY178/GRP01 | QNE | - | 0085/000620 | 1057 | DEFGL | 8F 8B | 24 VDC | 996 F3 | DC neutral line relay with silver cadmium medium duty back contacts | NE |
| TY178/GRP02 | QNDE | - | 0085/000630 | 1057 | DEFGL | 8F 8B | 24 VDC | 966 F3 | DC neutral line double wound relay with silver cadmium oxide medium duty back contacts | NDE |
| TY192/GRP01 | QNHX1 | - | 0085/002040 | 029 | ACEFH | 8F 4B | 110 VAC | 966 F7 | AC neutral line relay | NHX |
| TY195/GRP01 | QND | - | - | 307 | ADFGH | 8F 4B | 30 VDC | 930 | DC neutral line double wound relay | ND |
| TY206/GRP01 | QEECF1 | - | 0085/001730 | 030 | ACEGH | 2F | 1.4 ADC | 966 F10 | Twin DC lamp proving relay | EECF |
| TY206/GRP02 | QEECF2 | - | 0086/023451 | 062 | ADEGJ | 3F | 1.0 ADC | 966 F10 | Twin DC lamp proving relay | EECF2 |
| TY266/GRP01 | QT2R | - | 0085/001970 | 133 | BCDFH | 6F 3B | 12 VDC | ZS2411 | DC neutral reed follower relay | T2R |
| TY370/GRP21 | QR5 | - | - | C149 | CDFKX | - | 50 VDC | - | Resistor/capacitor circuit Other resistor/capacitor circuits available* | R |
| TY370/GRP24 | - | ZT6607 | - | - | - | - | 50 VDC | - | Resistor/capacitor delay circuit. | ZT6607 |
| TY370/GRP25 | - | ZT6609 | - | - | - | - | 50 VDC | - | Resistor/capacitor delay circuit. | ZT6609 |
| TY370/GRP41 | QR1 | - | - | 020 | ABDEH | - | - | - | Rectifier/resistance unit 6 ohms. Other QR1, QR2, QR12, QR13 and QR14 circuits are available* | R |
| TY370/GRP45 | QR1 | - | 0088/047217 | 020 | ABDEH | - | - | - | Rectifier/resistance unit 14 ohms. Other QR1, QR2, QR12, QR13 and QR14 circuits are available* | R |
| TY377/GRP04 | QCU2 | - | - | X082 | AGHKX | 2F 1B | - | - | 4 Aspect filament switching relay. 3, 2 and 1 aspect versions are available* | CU |



| Catalogue number | Q-reference | GEC/Alstom Z Reference | BR cat code | Pin code (BS8586) | Code Pins (BS8586) | Contact configuration | Rating | BR specification | Description | Reference |
|------------------|-------------|------------------------|-------------|-------------------|--------------------|-----------------------|----------|------------------|--|-----------|
| TY379/GRP01 | QBT3 | - | - | X531 | AGHXY | 2F 2B | 0.65 VDC | 938 | DC biased track relay | BT3 |
| ZJ1511 | PS | ZJ1511 | 0085/001140 | 014 | ACEFG | AF 4B | 24 VDC | 936A | DC polarised magnetic stick line relay | PS |
| ZJ1611 | PS | ZJ1611 | 0085/001170 | 016 | ABCDH | AF 4B | 50 VDC | 936A | DC polarised magnetic stick line relay | PS |
| ZJ4511 | PS | ZJ4511 | 0085/001130 | 014 | ACEFG | 8F 8B | 24 VDC | 936A | DC polarised magnetic stick line relay | PS |
| ZJ4611 | PS | ZJ4611 | 0085/001160 | 016 | ABCDH | 8F 8B | 50 VDC | 936A | DC polarised magnetic stick line relay | PS |
| ZJ5511 | PS | ZJ5511 | 0085/001150 | 013 | ACDFG | 12F 4B | 24 VDC | 936A | DC polarised magnetic stick line relay | PS |
| ZJ5611 | PS | ZJ5611 | 088/044179 | 015 | ADEFG | 12F 4B | 50 VDC | 936A | DC polarised magnetic stick line relay | PS |

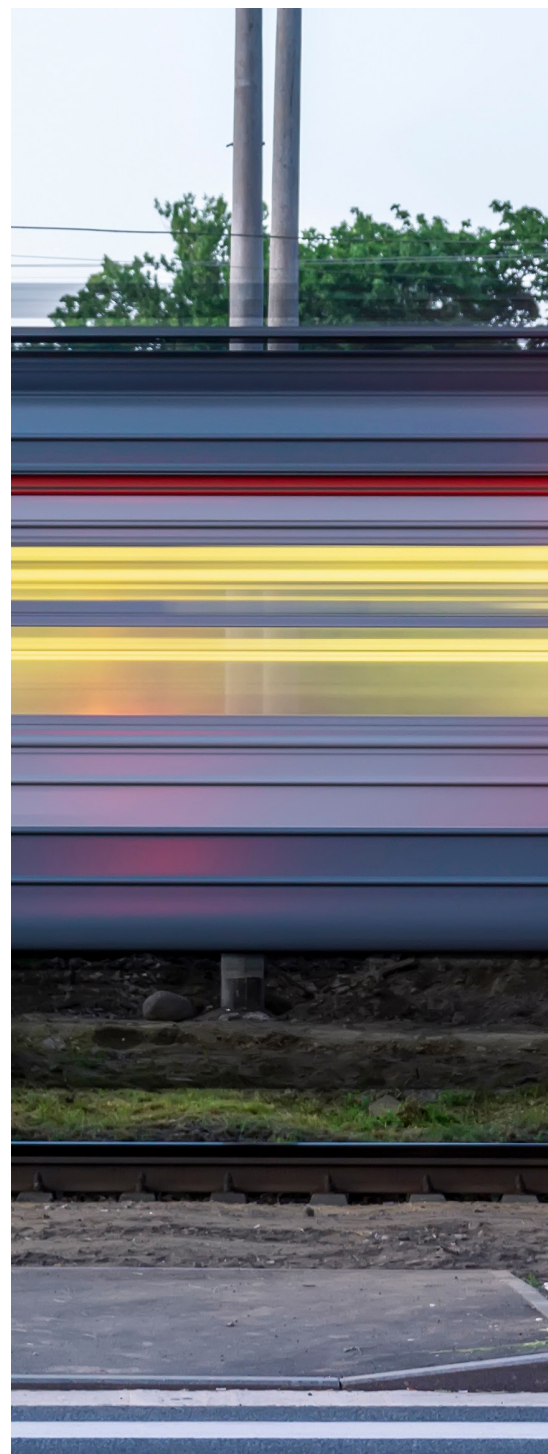
*Contact Mors Smitt UK with your requirements.





Typical applications

| Type number | BR specification | Application |
|-------------|------------------|--|
| TY082 | 930 | Line end interlocking |
| TY083 | 931 | Line end interlocking when AC voltages are present |
| TY084 | 932 | Line end interlocking when AC voltages are present. Polarity dependent |
| TY085 | 933 | Track circuit repeater |
| TY086 | 934 | Signal control |
| TY087 | 935 | Interlocking |
| TY132 | 942 | Series proving of lamps in junction indicator (5 lamps 110v 25w) |
| TY132 | 941 & 948 | Proving of AC signal lamps |
| TY133 | 940 | Proving of DC signal lamps |
| TY133 | 945 | Proving of level crossing flashing signals |
| TY150 | 938 | 4Ω track relay 2F contacts |
| TY152 | 968 | 250Ω track relay for electronic track circuits |
| TY153 | 939 | 20Ω track relay where AC voltages are present |
| TY153 | 966 F2 | 9Ω track relay for use in AC electrified areas |
| TY153 | 966 F9 | 70 Ohm track relay when AC voltages are present |
| TY154 | 943 | For point machine operation |
| TY155 | 949 | Used in conjunction with TY154 to provide a time delay on point machine operation. This is a non-safety relay. |
| TY156 | 960 | Line and interlocking |
| TY157 | 961 | Line and interlocking when AC voltages are present |
| TY160 | 966 F6 | Line and interlocking |
| TY163 | 946 | Time delays on automatic half barrier level crossing |
| TY163 | 946 | Time delays for starting signal release |
| TY178 | 966 F3 | An alternative to TY82 with larger current carrying capacity on back contacts |
| TY192 | 966 F7 | Solid state interlocking (SSI) interface relay |
| TY206 | 966 F8/F10 | Lamp proving for flashing signals |



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