



Safety relay, 24 V DC, 14DI, 4DO relays, display, easyNet

Part no. ES4P-221-DRXD1
 Catalog No. 111019

EL-Nummer (Norway) 0004521514

Delivery program

| | | | |
|--|--|--------------------------------------|--|
| Product range | | | Control relays for safety applications |
| Basic function | | | easy800 with safety function blocks |
| Features | | | |
| Safety functions | | | Stopping in the event of an emergency Protective door OSSD input ESPE with muting function Two-hand control Highest speed monitoring Zero speed monitoring Safety timing relay Mode selection Enabling switch Feedback circuit |
| Display & keypad | | | ✓ |
| Mounting width | | mm | 107.5 |
| Technical safety parameters: | | | |
| Values according to EN ISO 13849-1 | | | |
| Performance level | | according to EN ISO 13849-1 | PL e |
| Category | | according to EN ISO 13849-1 | Kat. 4 |
| Safety integrity level claim limit | | in accordance with 62061 | SILCL 3 |
| Probability of failure per hour | | PFH _d x 10 ⁻¹⁰ | 4.26 |
| Safety integrity level | | In accordance with IEC 61508 | SIL 3 |
| Display | | | Display Keypad |
| Real time clock | | | # |
| Supply voltage | | U _s | 24 V DC |
| Networking | | | easyNet/easyLink |
| Safety/standard circuit diagram | | | ✓/✓ |
| Instructions | | | |
| Expandable: standard inputs/outputs and standard bus systems | | | |
| individual laser inscription with ES4-COMBINATION possible →#2011790 | | | |
| Inputs (safety) | | | 14 |
| Outputs (safety) | | | |
| 6 A relay | | | 4 |
| Test signal | | | 4 |

Technical data

| | | | |
|----------------|--|--|--|
| General | | | |
| Standards | | | EN ISO 13849-1 EN 50156-1, EN 50156-2 EN 50178 EN 50581_x EN 61000-6-2 EN 61000-6-3 IEC 61508 IEC 62061 |
| Approvals | | | |
| Approvals | | | EAC |

| | | |
|------------------------|----|--|
| Dimensions (W x H x D) | mm | 107.5 (6 TE) x 90 x 72 |
| Weight | kg | 0.38 |
| Mounting | | Top-hat rail IEC/EN 60715, 35 mm or screw fixing using fixing brackets ZB4-101-GF1 (accessories) |

Times

| | | |
|--------------------------------------|----|-----|
| Inputs | | |
| Max. duration of external test pulse | ms | 1 |
| Semi-conductor output | | |
| Off test pulse | ms | < 1 |
| Off-delay | ms | < 1 |

Terminal capacities

| | | |
|------------------------|-----------------|-----------------------|
| Solid | mm ² | 0.2/4 (AWG 22 - 12) |
| Flexible with ferrule | mm ² | 0.2/2.5 (AWG 22 - 12) |
| Standard screwdriver | mm | 0.8 x 3.5 |
| Max. tightening torque | Nm | 0.6 |

Climatic environmental conditions

| | | |
|-------------------------------|-----|--|
| Operating ambient temperature | °C | -25 to + 55 cold as per IEC 60068-2-1 heat as per IEC 60068-2-2 Damp heat – constant to IEC 60068-2-78 – cyclical to IEC 60068-2-30 |
| Condensation | | Take appropriate measures to prevent condensation |
| LCD display (clearly legible) | °C | 0 - 55 |
| Ambient temperature | | |
| Storage | θ | °C -40 - +55 |
| relative humidity | % | 5 - 95 in accordance with IEC 60068-2-30, IEC 60068-2-78 Non-condensing |
| Air pressure (operation) | hPa | 795 - 1080 |

Ambient conditions, mechanical

| | | | |
|-----------------------------|--------------|----|---|
| Degree of protection | | | IP20 (IEC/EN 60529, EN50178, VBG 4) |
| Constant amplitude 0.15 mm | | Hz | |
| constant amplitude | | Hz | 10 - 57 (0.15 mm) |
| constant acceleration | | Hz | 57 - 150 (2g) |
| Vibrations | 3,5 mm / 1 g | Hz | In accordance with IEC 60068-2-6 |
| Mechanical shock resistance | | g | 18 shocks Sinusoidal 15 g/11 ms according to IEC 60068-2-27 |
| Drop to | Drop height | mm | 50 (IEC/EN 60068-2-31) |
| Free fall, packaged | | m | 0,3 (IEC/EN 61131-2) |

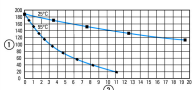
Electromagnetic compatibility (EMC)

| | | | |
|---|--|-----|---|
| Electromagnetic compatibility | | | As per ICE 62061, increased EMC requirements for safety-relevant functions |
| Overvoltage category/pollution degree | | | III/2 |
| Electrostatic discharge (ESD) | | | |
| applied standard | | | nach IEC/EN 61000-4-2 |
| Air discharge | | kV | 15 |
| Contact discharge | | kV | 8 |
| Electromagnetic fields (RFI) | | V/m | 30 to IEC EN 61000-4-3 |
| Radio interference suppression | | | EN 55011 Class B, EN 55022 Class B |
| Burst | | kV | according to IEC/EN 61000-4-4 Supply cables: 4 Signal cables: 4 |
| power pulses (Surge) | | | 2 kV (supply cables, symmetrical) 4 kV (semi-conductor outputs, symmetrical) In accordance with IEC 62061 |
| Immunity to line-conducted interference | | V | 20, in accordance with IEC/EN 61000-4-6 |

Insulation resistance

| | | | |
|---|--|--|---|
| Clearance in air and creepage distances | | | EN 50178, UL 508, CSA C22.2, No. 142, EN 60664-1:2003 |
| Insulation resistance | | | EN 50178 |

Back-up of real-time clock

| | | | |
|---------------------------------|--|-------|---|
| Back-up of real-time clock | | |  |
| | | | ① Backup time (hours) with fully charged double layer capacitor ② Service life (years) |
| Accuracy of the real-time clock | | s/day | Normally ± 2 (± 0.5 h/year), may vary up to ± 5 s/day depending on the ambient temperature |

Accuracy

| | | | |
|-------------|--|-----|----|
| Resolution | | | |
| Range "S" | | ms | 50 |
| Range "M:S" | | s | 1 |
| Range "H:M" | | min | 1 |

Repetition accuracy

| | | | |
|-------------|--|-----|----|
| Resolution | | | |
| Range "S" | | ms | 50 |
| Range "M:S" | | s | 1 |
| Range "H:M" | | min | 1 |

Retentive memory

| | | | |
|-----------------------------|--|--|------------------------------|
| Read/write cycles (minimum) | | | 10000000000000 (10^{14}) |
|-----------------------------|--|--|------------------------------|

Power supply

| | | | |
|----------------------------|-------|----|--|
| Rated operational voltage | U_e | V | 24 DC (-15/+20%) |
| Permissible range | U_e | | 20.4 - 28.8 V DC |
| Residual ripple | | % | ≤ 0 |
| Input current | | | |
| Input current 115/230 V AC | | mA | < 250 |
| Voltage dips | | ms | ≤ 10 (IEC/EN 61131-2) |
| Heat dissipation | | W | < 6 |
| Potential isolation | | | From the inputs: yes: no from the outputs: yes to PC interface: no to easyLink: no to easyNet: yes |

Network easyNet

| | | | |
|--|--|--------|--|
| Stations | | Number | max. 8 |
| Data transfer rate/distance | | | 1000 kBit/s, 6 m 500 kBit/s, 25 m 250 kBit/s, 40 m 125 kBit/s, 125 m 50 kBit/s, 300 m 20 kBit/s, 700 m 10 kBit/s, 1000 m |
| Potential isolation | | | |
| Potential isolation between inputs and internal power supply | | | yes |
| Potential isolation | | | from power supply: yes From the inputs: yes from the outputs: yes to PC interface: yes to memory card: yes to easyLink: no to easyNet: yes |
| Bus termination | | | yes (first and last station) |
| Connection technique | | | RJ45, 8-pole |

Digital inputs 24 V DC

| | | | |
|----------------------|-------|------|--|
| Number | | | 14 |
| Status indication | | | LCD display |
| Potential isolation | | | from power supply: no between digital inputs: no from the outputs: yes to the interface: no to the memory card: no to easyLink: no to easyNet: yes |
| Rated signal voltage | U_e | V DC | 24 |
| On 0 signal | U_e | V DC | < 5 |
| On 1 signal | U_e | V DC | > 15,0 |

| | | | |
|---|--|--------------|--|
| Input current on 1 signal | | | |
| IS1 - IS14 | | mA | 5.7 (at 24 V DC) |
| Hardware delay time from 0 to 1 | | ms | |
| | | | Debounce ON: 24 Debounce OFF: 0.06 (IS1, IS2), 0.17 (IS3 to IS14) |
| Hardware delay time from 1 to 0 | | ms | |
| | | | Debounce ON: 24 Debounce OFF: 0.08 (IS1, IS2), 0.22 (IS3 to IS14) |
| Cable length (unscreened) | | m | 100 |
| Single cable length of test signal output to the device input (shielded) | | m | 1000 |
| Total of single cable lengths from one test signal output to the device inputs (shielded) | | m | 3000 |
| Maximum rotary frequency at device inputs IS1 and IS2, when using function block OM or ZM | | Hz | 1000 |
| Maximum switching frequency at input (does not apply to I1, I2, if function block SM or OM is used) | | Operations/h | 300 |

Test signal outputs

| | | | |
|---------------------|--|------|--------------|
| Number | | | 4 (T1 to T4) |
| Voltage | | V DC | 24 |
| Potential isolation | | | No |

Relay outputs

| | | | |
|---|------------|---------------|--|
| | | | 4 |
| Outputs in groups of | | | 1 |
| Safety level | | | 3 redundant relay outputs, 6 months test interval According to EN 50156 |
| Protection of an output relay | | | Fuse: 6 A gL/gG, Circuit-breaker with C characteristic: 4 A (only permissible with 24V DC), Short-circuit current $I_K < 250$ A |
| Potential isolation | | | from power supply: yes From the inputs: yes between digital inputs: yes to the interface: yes to easyNet: yes to easyLink: yes Safe isolation according to EN 50178: 300 V AC Basic isolation: 600 V AC |
| Lifespan, mechanical | Operations | $\times 10^6$ | 10 |
| Contacts | | | |
| Conventional thermal current | I_{th} | A | 6 |
| Rated impulse withstand voltage U_{imp} of contact coil | | kV | 6 |
| Rated operational voltage | U_e | V AC | 250 |
| Rated insulation voltage | U_i | V AC | 250 |
| safe isolation between coil and contact | | V AC | 300 in accordance with 50178 |
| Switching capacity | | | DC-13, 24 V DC, 0.1 Hz: 40000 operations (in accordance with IEC 60947-5-1) AC-15, 230 V AC, 3 A: 80000 operations (in accordance with IEC 60947-5-1) DC: B300 (in accordance with UL 508) AC: R300 (in accordance with UL 508) |
| Switching frequency | | | |
| Mechanical operations | | $\times 10^6$ | 10 |
| Switching frequency | | Hz | 15 |

Transistor outputs

| | | | |
|--------------------------|--|---|-------------|
| Residual ripple | | % | 5 |
| Output status indication | | | LCD-display |

Design verification as per IEC/EN 61439

| | | | |
|--|------------|----|-----|
| Technical data for design verification | | | |
| Rated operational current for specified heat dissipation | I_n | A | 0 |
| Heat dissipation per pole, current-dependent | P_{vid} | W | 0 |
| Equipment heat dissipation, current-dependent | P_{vid} | W | 0 |
| Static heat dissipation, non-current-dependent | P_{vs} | W | 6 |
| Heat dissipation capacity | P_{diss} | W | 0 |
| Operating ambient temperature min. | | °C | -25 |

| | | |
|--|----|--|
| Operating ambient temperature max. | °C | 55 |
| IEC/EN 61439 design verification | | |
| 10.2 Strength of materials and parts | | |
| 10.2.2 Corrosion resistance | | Meets the product standard's requirements. |
| 10.2.3.1 Verification of thermal stability of enclosures | | Meets the product standard's requirements. |
| 10.2.3.2 Verification of resistance of insulating materials to normal heat | | Meets the product standard's requirements. |
| 10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects | | Meets the product standard's requirements. |
| 10.2.4 Resistance to ultra-violet (UV) radiation | | Meets the product standard's requirements. |
| 10.2.5 Lifting | | Does not apply, since the entire switchgear needs to be evaluated. |
| 10.2.6 Mechanical impact | | Does not apply, since the entire switchgear needs to be evaluated. |
| 10.2.7 Inscriptions | | Meets the product standard's requirements. |
| 10.3 Degree of protection of ASSEMBLIES | | Does not apply, since the entire switchgear needs to be evaluated. |
| 10.4 Clearances and creepage distances | | Meets the product standard's requirements. |
| 10.5 Protection against electric shock | | Does not apply, since the entire switchgear needs to be evaluated. |
| 10.6 Incorporation of switching devices and components | | Does not apply, since the entire switchgear needs to be evaluated. |
| 10.7 Internal electrical circuits and connections | | Is the panel builder's responsibility. |
| 10.8 Connections for external conductors | | Is the panel builder's responsibility. |
| 10.9 Insulation properties | | |
| 10.9.2 Power-frequency electric strength | | Is the panel builder's responsibility. |
| 10.9.3 Impulse withstand voltage | | Is the panel builder's responsibility. |
| 10.9.4 Testing of enclosures made of insulating material | | Is the panel builder's responsibility. |
| 10.10 Temperature rise | | The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices. |
| 10.11 Short-circuit rating | | Is the panel builder's responsibility. The specifications for the switchgear must be observed. |
| 10.12 Electromagnetic compatibility | | Is the panel builder's responsibility. The specifications for the switchgear must be observed. |
| 10.13 Mechanical function | | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed. |

Technical data ETIM 7.0

| | | |
|--|---|-------------|
| PLC's (EG000024) / Logic module (EC001417) | | |
| Electric engineering, automation, process control engineering / Control / Programmable logic control (SPS) / Logic module (ecl@ss10.0.1-27-24-22-16 [AKE539014]) | | |
| Supply voltage AC 50 Hz | V | 0 - 0 |
| Supply voltage AC 60 Hz | V | 0 - 0 |
| Supply voltage DC | V | 20.4 - 28.8 |
| Voltage type of supply voltage | | DC |
| Switching current | A | 8 |
| Number of analogue inputs | | 0 |
| Number of analogue outputs | | 4 |
| Number of digital inputs | | 14 |
| Number of digital outputs | | 4 |
| With relay output | | Yes |
| Number of HW-interfaces industrial Ethernet | | 0 |
| Number of interfaces PROFINET | | 0 |
| Number of HW-interfaces RS-232 | | 1 |
| Number of HW-interfaces RS-422 | | 0 |
| Number of HW-interfaces RS-485 | | 0 |
| Number of HW-interfaces serial TTY | | 0 |
| Number of HW-interfaces USB | | 0 |
| Number of HW-interfaces parallel | | 0 |
| Number of HW-interfaces Wireless | | 0 |
| Number of HW-interfaces other | | 3 |
| With optical interface | | No |
| Supporting protocol for TCP/IP | | No |
| Supporting protocol for PROFIBUS | | No |

| | | |
|---|----|---------|
| Supporting protocol for CAN | | No |
| Supporting protocol for INTERBUS | | No |
| Supporting protocol for ASI | | No |
| Supporting protocol for KNX | | No |
| Supporting protocol for MODBUS | | No |
| Supporting protocol for Data-Highway | | No |
| Supporting protocol for DeviceNet | | No |
| Supporting protocol for SUCONET | | No |
| Supporting protocol for LON | | No |
| Supporting protocol for PROFINET IO | | No |
| Supporting protocol for PROFINET CBA | | No |
| Supporting protocol for SERCOS | | No |
| Supporting protocol for Foundation Fieldbus | | No |
| Supporting protocol for EtherNet/IP | | No |
| Supporting protocol for AS-Interface Safety at Work | | No |
| Supporting protocol for DeviceNet Safety | | No |
| Supporting protocol for INTERBUS-Safety | | No |
| Supporting protocol for PROFIsafe | | No |
| Supporting protocol for SafetyBUS p | | No |
| Supporting protocol for other bus systems | | Yes |
| Radio standard Bluetooth | | No |
| Radio standard WLAN 802.11 | | No |
| Radio standard GPRS | | No |
| Radio standard GSM | | No |
| Radio standard UMTS | | No |
| IO link master | | No |
| Redundancy | | Yes |
| With display | | Yes |
| Degree of protection (IP) | | IP20 |
| Basic device | | Yes |
| Expandable | | Yes |
| Expansion device | | No |
| With timer | | Yes |
| Rail mounting possible | | Yes |
| Wall mounting/direct mounting | | Yes |
| Front build in possible | | No |
| Rack-assembly possible | | No |
| Suitable for safety functions | | Yes |
| Category according to EN 954-1 | | 4 |
| SIL according to IEC 61508 | | 3 |
| Performance level acc. EN ISO 13849-1 | | Level e |
| Appendant operation agent (Ex ia) | | No |
| Appendant operation agent (Ex ib) | | No |
| Explosion safety category for gas | | None |
| Explosion safety category for dust | | None |
| Width | mm | 107.5 |
| Height | mm | 90 |
| Depth | mm | 72 |

Approvals

| | | |
|-------------------------|--|---|
| Product Standards | | IEC/EN see Technical Data; UL 508; CSA-C22.20.4-04; CSA-22.2 No. 142-MI1987; CE marking |
| UL File No. | | CSA report applies to both US and Canada |
| UL Category Control No. | | NRAQ |
| CSA File No. | | 012528 |
| CSA Class No. | | 2252-81; 2252-01 |

Characteristics

PU05907001Z safety manual

Dimensions

