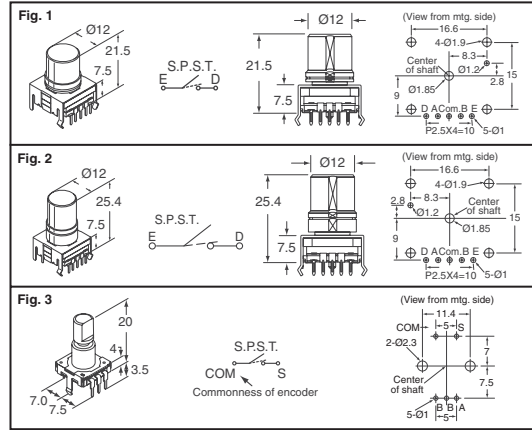


Panasonic® 11mm and 16mm Square Encoders

EVE-P/EVE-Q: Recommended Applications: • Centralized control of automotive audio equipment, navigation systems and air conditioners. **Features:** • Smooth, high rotational torque • Long life achieved by the high click torque • Runout protection: Runout: 0.1mm max. **Specifications:** **Mechanical:** • Rotation Angle: 360° (endless) • Rotation Torque: 40 mN-m maximum • Detents: EVE-P: 16; EVE-Q: 32 **Electrical:** • Output Signals: Phase A and B • Resolution: EVE-P 8 pulses/360°; EVE-Q 16 pulses/360° • Rating: 1mA, 10VDC (at each bit) • Contact Resistance: 1Ω maximum • Bouncing: 5 ms maximum • Insulation Resistance: 50MΩ minimum (at 250VDC) • Dielectric Withstanding Voltage: 300VAC for 1 minute **Switch Part:** • Type: SPST Push-on • Rating: 20mA, 16VDC • Contact Resistance: 100mΩ maximum • Operating Force: 6N • Travel: 0.5mm **Endurance:** • Rotation Life: 1,000,000 cycles minimum • Operating Life: 1,000,000 times minimum **Operating Temperature:** -40°C - 85°C (45-85% RH)

EVE-V: Recommended Applications: • Car audio, navigation systems and air conditioners. **Features:** • Low Profile: 4mm • Wave soldering type • Integrated push-ON switch **Specifications:** **Mechanical:** • Rotation Angle: 360° (endless) • Shaft Pull/ Push Strength: 100 N-m minimum • Rotation Torque: 3 mN-m to 20 mN-m • Detents: 32 **Electrical:** • Output Signals: Phase A and B • Resolution: 16 pulses/360° • Rating: 1mA, 10VDC (at each bit) • Contact Resistance: 1Ω maximum • Insulation Resistance: 50MΩ minimum (at 250VDC) • Dielectric Withstanding Voltage: 300VAC for 1 minute • Bouncing: 5 ms maximum **Switch Part:** • Type: SPST Push-on • Rating: 20mA, 16VDC • Contact Resistance: 100mΩ maximum • Operating Force: 1.5mm travel type: 4N • Travel: 1.5mm **Endurance:** • Rotation Life (encoder): 30,000 cycles minimum • Operating Life (switch): 50,000 times minimum **Operating Temperature:** -40°C - 85°C



| Fig. | Description | Digi-Key Part No. | Price Each | | | Panasonic Part No. |
|------|---|-------------------|------------|------|------|--------------------|
| | | | 1 | 10 | 100 | |
| 1 | 8 PPR, SPST, 16 Detents, 21.5mm Height | P12420-ND | 10.55 | 8.80 | 7.39 | EVE-PDBRG508B |
| | 16 PPR, SPST, 32 Detents, 21.5mm Height | P12422-ND | 9.86 | 8.23 | 6.91 | EVE-QDBRG516B |
| 2 | 8 PPR, SPST, 16 Detents, 25.4mm Height | P12421-ND | 10.55 | 8.80 | 7.39 | EVE-PDBRL408B |
| | 16 PPR, SPST, 32 Detents, 25.4mm Height | P12423-ND | 9.86 | 8.23 | 6.91 | EVE-QDBRL416B |
| 3 | 16 PPR, SPST, 32 Detents, 20mm Height | P12418-ND | 3.21 | 2.68 | 2.25 | EVE-VCGJL016B |

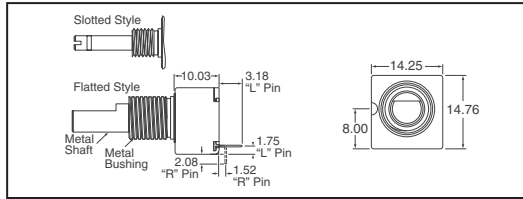
• RoHS Compliant



14mm Rotary Optical Encoder



Electrical Characteristics: • Output: 2-bit quadrature code • Supply Voltage (V_{CC}): 5.0VDC ±0.25VDC • Supply Current (I_{CC}): 26mA maximum • Output Voltage: Low (V_{CE(sat)}), per Channel: 800mV maximum @ I_(SINK)=25mA; High (V_{O(HI)}), per Channel: 4.0VDC minimum @ V_{CC}=4.75VDC • Output Current (I_(SINK)): per Channel: 25mA minimum • Rise/Fall Time: 200ns • Power Dissipation: 167mW maximum • Pulse Width (per Channel): 180°e • Phase Angle (Channel A Leads Channel B, Clockwise Rotation): 90°e ±45°e • Insulation Resistance @ 500VDC: 1,000MΩ minimum • RPM (Operating): Non-Detent, 300 maximum • Switch Power Rating: 12VDC/20mA (600Ω maximum load) • Switch Contact Resistance: 200Ω maximum • Mounting hardware included



| Bushings Dim. D x L (mm) | Shaft Dim. D x L (mm) | Shaft Style | Terminal Style | W/Switch Yes/No | Cycles Per Revolution | Digi-Key Part No. | Price Each | | |
|--------------------------|-----------------------|-------------|----------------|-----------------|-----------------------|----------------------|------------|-------|-------|
| | | | | | | | 1 | 25 | 50 |
| 9.52 x 9.52 | 6.35 x 22.23 | Slotted | Axial | Yes | 8 | EM14A0D-B28-L008S-ND | 19.10 | 14.62 | 13.85 |
| 9.52 x 9.52 | 6.35 x 19.05 | Flatted | Axial | No | 8 | EM14A0D-C24-L008N-ND | 17.90 | 13.70 | 12.98 |
| 9.52 x 9.52 | 6.35 x 19.05 | Flatted | Axial | No | 32 | EM14A0D-C24-L032N-ND | 17.90 | 13.70 | 12.98 |
| 9.52 x 9.52 | 6.35 x 19.05 | Flatted | Axial | Yes | 64 | EM14A0D-C24-L064S-ND | 19.10 | 14.62 | 13.85 |
| 6.35 x 6.35 | 3.18 x 19.05 | Slotted | Axial | Yes | 64 | EM14C0D-E24-L064S-ND | 19.10 | 14.62 | 13.85 |
| 6.35 x 6.35 | 3.18 x 22.23 | Slotted | Axial | No | 16 | EM14C0D-E28-L016N-ND | 17.90 | 13.70 | 12.98 |
| 6.35 x 6.35 | 3.18 x 22.23 | Slotted | Axial | No | 64 | EM14C0D-E28-L064N-ND | 17.90 | 13.70 | 12.98 |
| 6.35 x 6.35 | 3.18 x 22.23 | Slotted | Axial | Yes | 64 | EM14C0D-E28-L064S-ND | 19.10 | 14.62 | 13.85 |

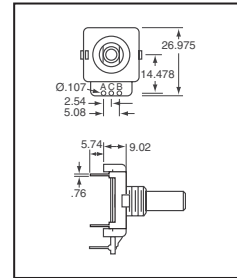
Digital Contacting Encoders



Electrical Characteristics: • Output: 2-bit gray code, Channel A leads Channel B by 90° electrically turning clockwise (CW) • Closed Circuit Resistance: 5Ω maximum • Open Circuit Resistance: 100kΩ minimum • Contact Rating: 10milliamp @ 10VDC or 0.1 watt maximum • Insulation Resistance (500VDC): 1,000MΩ minimum • Dielectric Withstanding Voltage: 1,000VAC minimum • Electrical Travel: Continuous • Contact Bounce (15 RPM): 5 milliseconds maximum • RPM (Operating): 120 maximum **Environmental Characteristics:** • Operating Temperature Range: -40°C - 85°C **Mechanical Characteristics:** • Mechanical Angle: Continuous • Mounting hardware sold separately

| Anti-Rotation Lug Position | Cycles Per Revolution | Digi-Key Part No. | Price Each | | |
|----------------------------|-----------------------|----------------------|------------|------|------|
| | | | 1 | 25 | 50 |
| None | 24 | ECW1D-B24-BC0024L-ND | 3.46 | 2.70 | 2.20 |
| 9:00 | 24 | ECW1J-B24-BC0024L-ND | 3.46 | 2.70 | 2.20 |

| Description | Digi-Key Part No. | Pricing | | | |
|------------------------------|-------------------|---------|------|-------|--------|
| | | 1 | 10 | 100 | 1,000 |
| Lockwasher for ECW Encoder | H-37-2-ND | .16 | 1.24 | 7.47 | 59.85 |
| Mounting Nut for ECW Encoder | H-38-11-ND | .53 | 4.13 | 24.90 | 199.50 |



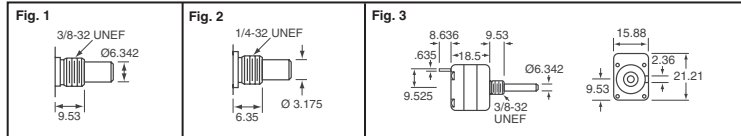
Rotary Optical Encoders



Electrical Characteristics: • Output: 2-bit gray code, Channel A leads Channel B by 90° electrically turning clockwise • Supply Voltage: 5.0VDC ±0.25VDC • Supply Current: 26mA maximum • Output Voltage: 0.8V maximum for low output and 4V minimum for high output • Output Current (Low Output): 25mA minimum • Insulation Resistance (500VDC): 1,000MΩ • Rise/Fall Time: 200ns (typical) • Shaft RPM (Ball Bearing): 3,000rpm maximum • Power Consumption: 136mW maximum • Pulse Width (Electrical Degrees, Each Channel): 180° ±45° Typical • Pulse Width (Index Channel): 360° ±90° • Phase (Electrical Degrees, Channel A to Channel B): 90° ±45° Typical • Index Channel Centered on 1-1 State Combination of A and B Channels: 0° ±45°

Environmental Characteristics: • Operating Temperature Range (Standard): -40°C - 75°C

Mechanical Characteristics: • Mechanical Rotation: Continuous • Mounting hardware included



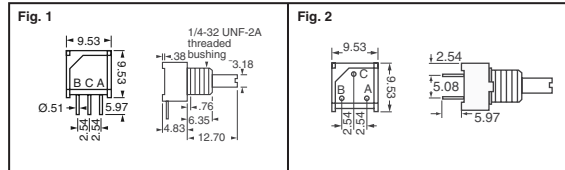
| Fig. | Cycles Per Revolution | Digi-Key Part No. | Price Each | | |
|------|-----------------------|----------------------------------|------------|-------|-------|
| | | | 1 | 25 | 50 |
| 1 | 64 | ENA1J-B28-L00064L-ND NEW! | 51.37 | 40.00 | 32.67 |
| | 100 | ENA1J-B28-L00100L-ND | 51.37 | 40.00 | 32.67 |
| 2 | 128 | ENC1J-D28-L00128L-ND | 51.37 | 40.00 | 32.67 |
| 3 | 256 | ENS1J-B28-L00256L-ND | 82.74 | 64.43 | 52.62 |

9mm Square/Sealed Encoder



Electrical Characteristics: • Output: 2-bit gray code, Channel A leads Channel B by electrically turning clockwise (CW): 6 pulses per resolution • Closed Circuit Resistance: 5Ω maximum • Open Circuit Resistance: 100kΩ minimum • Contact Rating: TTL compatible loads • Insulation Resistance (500VDC): 1,000MΩ minimum • Dielectric Withstanding Voltage: (Sea Level) 900VAC minimum; (Electrical Travel) Continuous • Contact Bounce (15 RPM): 5 milliseconds maximum • RPM (Operating): 120 maximum **Environmental Characteristics:** • Operating Temperature Range: -40°C - 125°C • Rotational Life: 100,000 cycles **Mechanical Characteristics:** • Mechanical Angle: 360° Continuous • Mounting hardware included

| Fig. | Description | Digi-Key Part No. | Price Each | | | |
|------|--------------------------------|-------------------|------------|------|------|------|
| | | | 1 | 10 | 50 | 100 |
| 1 | 9mm Square Right Angle Encoder | 3315C-001-006L-ND | 2.17 | 1.98 | 1.70 | 1.38 |
| 2 | 9mm Square Vertical Encoder | 3315V-001-006L-ND | 2.77 | 2.45 | 2.06 | 1.76 |



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