

# BLDC Motor + Encoder

모터뱅크

모델명 : BL4281E1K



## 제품설명

BL4281E1K 는  
BLDC Motor 이며 홀센서가 내장된 3 상  
8 극 42mm 크기로 엔코더가 추가되  
어 탈조를 방지하는 크로즈루프제  
어가 가능한 모터입니다.

BL4281E1K 상세구성

- 1) 3상 8극 42mm BLDC 모터 델타권선 모터에 엔코더추가형.
- 2) 크기는 42각 정격출력 77W 4000RPM의 고성능 모터.
- 3) 다양한 감속기구성과 브레이크추가가 지원되는 Nema 17규격.

SPEC:

### 네마 17(42mm) 고풍력 BLDC 모터

Nema 17(42mm) BLDC Motor 24V 4,000rpm 1.85Kgf.cm 77.5W

| ROTATION: CW SEE FROM LEAD END |               | ■ 결선도                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
|--------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------|--------|------------------|--------|--------|--------|--------|--------|--------|--------------------------|-----------|-----|--------|------------------|-----------------|--------|---------|--------|---------------|--------------|---------|--------|-----------------|---------------|---------|--------|--------------|-----------|--|--|--|-------------|--------------|--|--|--|--------------|--------|--|--|--|-------------------|------------|--|--|--|-----------------|------------|--|--|--|------------------|---|--|--|--|
| MANUFACTURER MODEL             | BL4281        | <table border="1" style="width: 100%; border-collapse: collapse;"> <caption>ELECTRICAL CONNECTION TABLE</caption> <tr> <td>+5V</td> <td>RED 빨강</td> <td rowspan="4">UL1007<br/>26 AWG</td> </tr> <tr> <td>HALL U</td> <td>YEL 노랑</td> </tr> <tr> <td>HALL V</td> <td>GRE 회색</td> </tr> <tr> <td>HALL W</td> <td>BLU 파랑</td> </tr> <tr> <td>PHASE TO PHASERESISTANCE</td> <td>0.55 OHMS</td> <td>GND</td> <td>BLK 검정</td> <td rowspan="4">UL1007<br/>20 AWG</td> </tr> <tr> <td>NOMINAL VOLTAGE</td> <td>24 VDC</td> <td>PHASE U</td> <td>YEL 노랑</td> </tr> <tr> <td>NO LOAD SPEED</td> <td>5800±10% RPM</td> <td>PHASE V</td> <td>GRE 회색</td> </tr> <tr> <td>NO LOAD CURRENT</td> <td>0.6 Amps Max.</td> <td>PHASE W</td> <td>BLU 파랑</td> </tr> <tr> <td>RATED TORQUE</td> <td>0.185 N-m</td> <td colspan="3"></td> </tr> <tr> <td>RATED SPEED</td> <td>4000±10% RPM</td> <td colspan="3"></td> </tr> <tr> <td>OUTPUT POWER</td> <td>77.5 W</td> <td colspan="3"></td> </tr> <tr> <td>BACK EMF CONSTANT</td> <td>4.1 V/kRPM</td> <td colspan="3"></td> </tr> <tr> <td>TORQUE CONSTANT</td> <td>0.04 N-m/A</td> <td colspan="3"></td> </tr> <tr> <td>INSULATION CLASS</td> <td>B</td> <td colspan="3"></td> </tr> </table> |        | +5V              | RED 빨강 | UL1007<br>26 AWG | HALL U | YEL 노랑 | HALL V | GRE 회색 | HALL W | BLU 파랑 | PHASE TO PHASERESISTANCE | 0.55 OHMS | GND | BLK 검정 | UL1007<br>20 AWG | NOMINAL VOLTAGE | 24 VDC | PHASE U | YEL 노랑 | NO LOAD SPEED | 5800±10% RPM | PHASE V | GRE 회색 | NO LOAD CURRENT | 0.6 Amps Max. | PHASE W | BLU 파랑 | RATED TORQUE | 0.185 N-m |  |  |  | RATED SPEED | 4000±10% RPM |  |  |  | OUTPUT POWER | 77.5 W |  |  |  | BACK EMF CONSTANT | 4.1 V/kRPM |  |  |  | TORQUE CONSTANT | 0.04 N-m/A |  |  |  | INSULATION CLASS | B |  |  |  |
| +5V                            | RED 빨강        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        | UL1007<br>26 AWG |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| HALL U                         | YEL 노랑        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| HALL V                         | GRE 회색        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| HALL W                         | BLU 파랑        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| PHASE TO PHASERESISTANCE       | 0.55 OHMS     | GND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | BLK 검정 | UL1007<br>20 AWG |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| NOMINAL VOLTAGE                | 24 VDC        | PHASE U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | YEL 노랑 |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| NO LOAD SPEED                  | 5800±10% RPM  | PHASE V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GRE 회색 |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| NO LOAD CURRENT                | 0.6 Amps Max. | PHASE W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | BLU 파랑 |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| RATED TORQUE                   | 0.185 N-m     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| RATED SPEED                    | 4000±10% RPM  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| OUTPUT POWER                   | 77.5 W        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| BACK EMF CONSTANT              | 4.1 V/kRPM    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| TORQUE CONSTANT                | 0.04 N-m/A    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |
| INSULATION CLASS               | B             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                  |        |                  |        |        |        |        |        |        |                          |           |     |        |                  |                 |        |         |        |               |              |         |        |                 |               |         |        |              |           |  |  |  |             |              |  |  |  |              |        |  |  |  |                   |            |  |  |  |                 |            |  |  |  |                  |   |  |  |  |

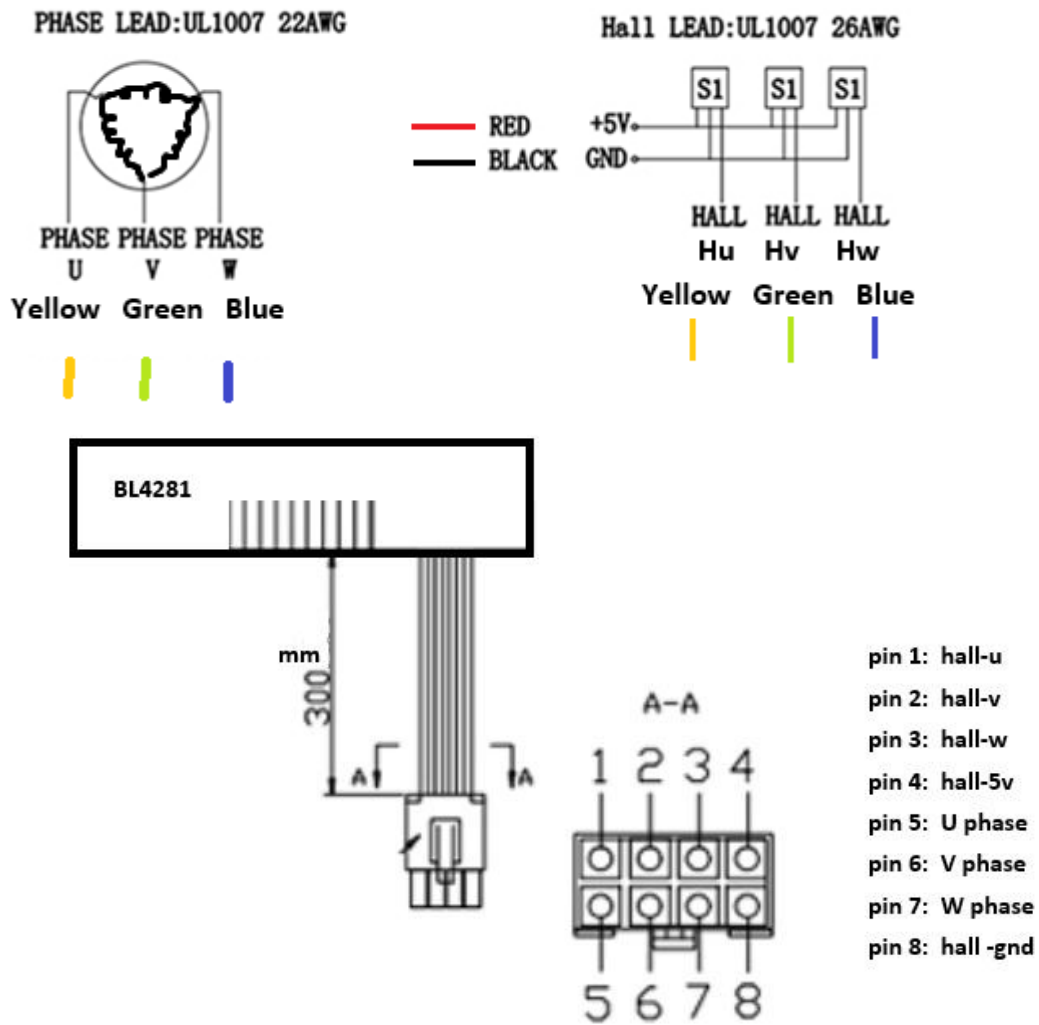
Connection diagram:

Hall sensor cable

Wiring cable

Note: hall sensor power supply voltage +5 to +20VDC

단자구성:



선구분 :

UVW ( AWG 22:를 신호선보다 더 두껍습니다)

U : Yellow color

V : Green color

W : Blue color

를신호선( AWG 26 )

+5V : Red color

GND : Black color

Hall u : Yellow color

Hall v : Green color

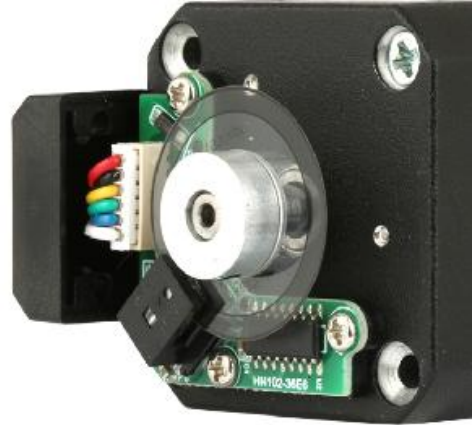
Hall w : Blue color

엔코더구성:

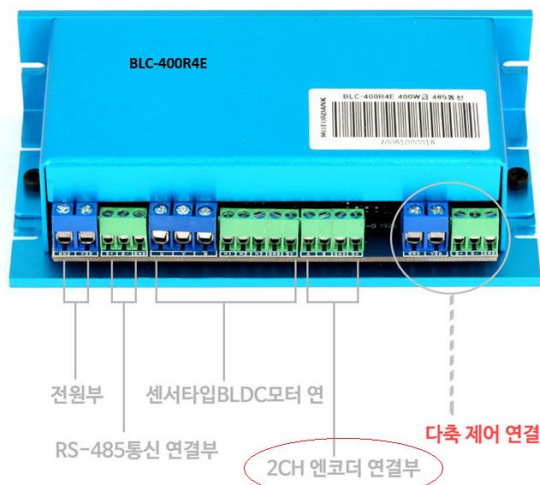
| 엔코더결선<br>분해능 1000P/R | 레드  | 블랙  | 옐로우 | 그린  | 블루  | 화이트 |
|----------------------|-----|-----|-----|-----|-----|-----|
|                      | +5V | GND | EA+ | EA- | EB+ | EB- |

Encoder Wiring Diagram:

|     |                        |        |
|-----|------------------------|--------|
| Vcc | Encoder Voltage(+5V)   | RED    |
| GND | Encoder Grand(0V)      | BLACK  |
| EA+ | Encoder A+ phase input | YELLOW |
| EA- | Encoder A- phase input | GREEN  |
| EB+ | Encoder B+ phase input | BLUE   |
| EB- | Encoder B- phase input | WHITE  |



인크리멘탈 증감비교형 1000CPR 엔코더



BLC-400R4E 와 연동시켜 클로즈루프제어 구성

모터세부스펙:

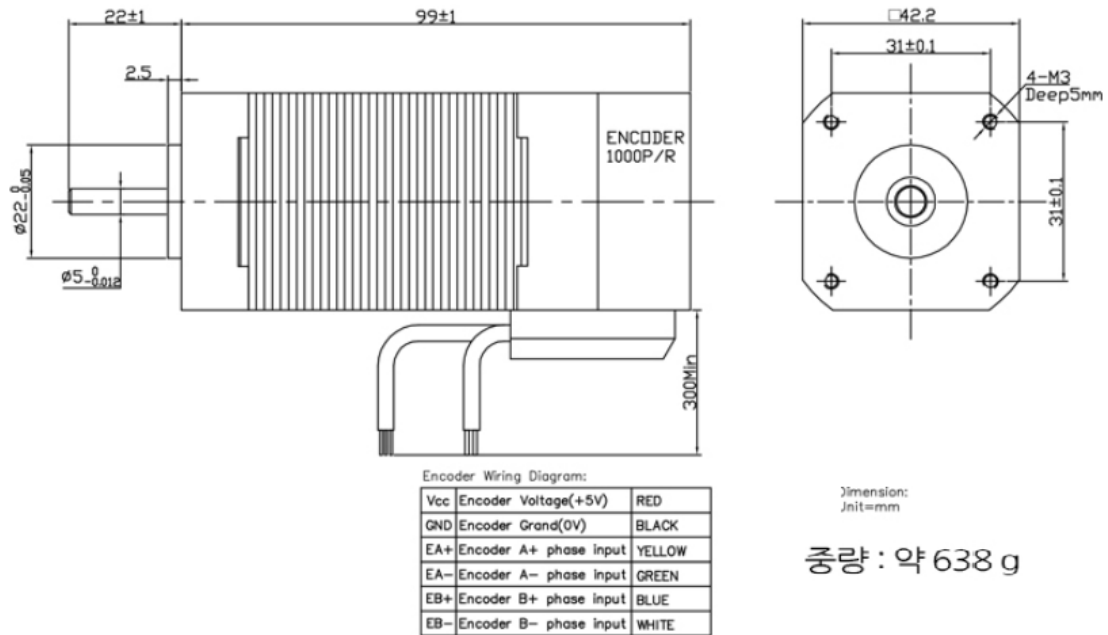
| General Specification: |                             |
|------------------------|-----------------------------|
| Item                   | Specification               |
| Winding type           | Delta                       |
| Hall effect angle      | 120 degree electrical angle |
| Shaft run out          | 0.025mm                     |
| Radial play            | 0.02mm@450g                 |
| End play               | 0.08mm@450g                 |
| Max.radial force       | 28N @20mm form the flange   |
| Max.axial force        | 10N                         |
| Insulation class       | Class B                     |
| Dielectric strength    | 500VDC for one minute       |
| Insulation resistance  | 100M $\Omega$ Min.,500VDC   |

제품의 각시리즈별(BL4241/BL4261/BL4281/BL42100) 스펙비교



|                           |                                                                         |        |        |        |         |
|---------------------------|-------------------------------------------------------------------------|--------|--------|--------|---------|
| Electrical Specification: |                                                                         |        |        |        |         |
|                           |                                                                         | Model  |        |        |         |
| Specification             | Unit                                                                    | BL4241 | BL4261 | BL4281 | BL42100 |
| Number Of Phase           | Phase                                                                   | 3      |        |        |         |
| Number Of Poles           | Poles                                                                   | 8      |        |        |         |
| Rated Voltage             | VDC                                                                     | 24     |        |        |         |
| Rated Speed               | Rpm                                                                     | 4000   |        |        |         |
| Rated Torque              | N.m                                                                     | 0.0625 | 0.125  | 0.185  | 0.25    |
| Rated Current             | Amps                                                                    | 1.8    | 3.3    | 4.8    | 6.3     |
| Rated Power               | W                                                                       | 26     | 52.5   | 77.5   | 105     |
| Peak Torque               | N.m                                                                     | 0.19   | 0.38   | 0.56   | 0.75    |
| Peak Current              | Amps                                                                    | 5.4    | 10.6   | 15.5   | 20      |
| Back E.M.F                | V/Krpm                                                                  | 4.1    | 4.2    | 4.3    | 4.3     |
| Torque Constant           | N.m/A                                                                   | 0.039  | 0.04   | 0.041  | 0.041   |
| Rotor Inertia             | g.cm <sup>2</sup>                                                       | 24     | 48     | 72     | 96      |
| Body Length               | mm                                                                      | 41     | 61     | 81     | 100     |
| Weight                    | Kg                                                                      | 0.3    | 0.45   | 0.65   | 0.8     |
| Sensor                    | Honeywell                                                               |        |        |        |         |
| Insulation Class          | B                                                                       |        |        |        |         |
| Degree of Protection      | IP30                                                                    |        |        |        |         |
| Storage Temperature       | -25 – +70°C                                                             |        |        |        |         |
| Operating Temperature     | -15 – +50°C                                                             |        |        |        |         |
| Working Humidity          | ≤85% RH                                                                 |        |        |        |         |
| Working Environment       | No direct sunlight, non-corrosive gas, flammable gas, oil mist, no dust |        |        |        |         |
| Altitude                  | ≤1000m                                                                  |        |        |        |         |

## 제품치수(Dimension Drawing) :



## 결선도:

모터드라이버 : BLC-400R4E 과 BL4281E1K

