# 1. LISTADO DE DATOS DE LA OBRA

## 1.1. Versión del programa y número de licencia

Versión: 2023

Número de licencia: 180145

## 1.2. Datos generales de la estructura

Proyecto: PLACA TANQUE

Clave: PLACA TANQUE

## 1.3. Normas consideradas

Concreto: NSR-10

A. formados en frio: AISI S100-2016 (LRFD)

Aceros laminados y armados: ANSI/AISC 360-16 (LRFD)

**Categoría de uso:** General

## 1.4. Acciones consideradas

### 1.4.1. Gravitatorias

| Planta | C.V. (kN/m²) | Cargas muertas (kN/m²) |
|---|---|---|
| Losa 1 | 1.0 | 1.5 |
| Cimentación | 1.0 | 1.5 |

### 1.4.2. Viento

Sin acción de viento

### 1.4.3. Sismo

Sin acción de sismo

### 1.4.4. Hipótesis de carga

| | | | |
|---|---|---|---|
| Automáticas | Peso propio<br>Cargas muertas<br>Carga viva | | |
| Adicionales | Referencia | Descripción | Naturaleza |
| | F | Fluido | Peso propio |

### 1.4.5. Listado de cargas

Cargas especiales introducidas (en kN, kN/m y kN/m²)

| Grupo | Condición | Tipo | Valor | Coordenadas |
|---|---|---|---|---|
| Cimentación | F | Superficial | 47.00 | (5.40,5.40) (-0.00,5.40) (-0.00,0.00) (5.40,0.00) |

## 1.5. Estados límite

| | |
|---|---|
| E.L.U. de rotura. Hormigón<br>E.L.U. de rotura. Hormigón en cimentaciones<br>Tensiones sobre el terreno | NSR-10 |
| Desplazamientos | Derivas |

## 1.6. Situaciones de proyecto

Para las distintas situaciones de proyecto, las combinaciones de acciones se definirán de acuerdo con los siguientes criterios:

- Donde:

$G_k$ Acción permanente
$P_k$ Acción de pretensado
$Q_k$ Acción variable
$\gamma_G$ Coeficiente parcial de seguridad de las acciones permanentes
$\gamma_P$ Coeficiente parcial de seguridad de la acción de pretensado
$\gamma_{Q,1}$ Coeficiente parcial de seguridad de la acción variable principal
$\gamma_{Q,i}$ Coeficiente parcial de seguridad de las acciones variables de acompañamiento

### 1.6.1. Coeficientes parciales de seguridad (γ) y coeficientes de combinación (ψ)

Para cada situación de proyecto y estado límite los coeficientes a utilizar serán:

**E.L.U. de rotura. Hormigón: NSR-10**

**E.L.U. de rotura. Hormigón en cimentaciones: NSR-10**

**Desplazamientos**

| (C.9-1) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G)<br>Carga viva (Q) | 1.400 | 1.400 |

| (C.9-2 Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 1.600 |

| (C.9-2 S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 1.600 |

| (C.9-3 Lr, L) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 0.500 |

| (C.9-3 S, L) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 0.500 |

| (C.9-3 Lr, W) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | | |

| (C.9-3 S, W) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | | |

| (C.9-4 Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 0.500 |

| (C.9-4 S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.200 | 1.200 |
| Carga viva (Q) | 0.000 | 0.500 |

| (C.9-6) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 0.900 | 0.900 |
| Carga viva (Q) | | |

**Tensiones sobre el terreno**

| B.2.3-1, B.2.3-2 | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 1.000 |

| B.2.3-3 (Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | | |

| B.2.3-3 (S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | | |

| B.2.3-4 (Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 0.750 |

| B.2.3-4 (S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 0.750 |

| B.2.3-5, B.2.3-9 | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 0.600 | 1.000 |
| Carga viva (Q) | | |

| B.2.3-7 (Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |

| B.2.3-7 (Lr) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 0.750 |

| B.2.3-7 (S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 0.750 |

| B.2.3-8 (S) | | |
|---|---|---|
| | Coeficientes parciales de seguridad (γ) | |
| | Favorable | Desfavorable |
| Carga permanente (G) | 1.000 | 1.000 |
| Carga viva (Q) | 0.000 | 0.750 |

### 1.6.2. Combinaciones

- **Nombres de las hipótesis**

PP Peso propio
CM Cargas muertas
F Fluido
Qa Carga viva

- **E.L.U. de rotura. Hormigón**
- **E.L.U. de rotura. Hormigón en cimentaciones**
- **Desplazamientos**

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.400 | 1.400 | 1.400 | |
| 2 | 1.200 | 1.200 | 1.200 | |
| 3 | 1.200 | 1.200 | 1.200 | 1.600 |
| 4 | 0.900 | 0.900 | 0.900 | |

- **Tensiones sobre el terreno**

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | |
| 2 | 1.000 | 1.000 | 1.000 | 1.000 |
| 3 | 0.600 | 0.600 | 0.600 | |
| 4 | 1.000 | 1.000 | 0.600 | |
| 5 | 0.600 | 0.600 | 1.000 | |

## 1.7. Datos geométricos de grupos y plantas

| Grupo | Nombre del grupo | Planta | Nombre planta | Altura | Cota |
|---|---|---|---|---|---|
| 1 | Losa 1 | 1 | Losa 1 | 1.00 | 1.00 |
| 0 | Cimentación | | | | 0.00 |

## 1.8. Losas y elementos de cimentación

### 1.8.1. Losas de cimentación

| Losas de cimentación | Peralte (cm) | Módulo de reacción del suelo (kN/m³) | Tensión admisible | |
|---|---|---|---|---|
| | | | Situaciones persistentes (MPa) | Situaciones accidentales (MPa) |
| Todas | 30 | 58000.00 | 0.290 | 0.580 |

## 1.9. Materiales utilizados

### 1.9.1. Concretos

| Elemento | Concreto | $f'_c$ (MPa) | Árido | | $E_c$ (MPa) |
|---|---|---|---|---|---|
| | | | Naturaleza | Tamaño máximo (mm) | |
| Todos | f'c=210 | 21 | Origen metamórfico | 15 | 21551 |

### 1.9.2. Aceros por elemento y posición

#### *1.9.2.1. Aceros en barras*

| Elemento | Acero | $f_{yk}$ (MPa) | $\gamma_s$ |
|---|---|---|---|
| Todos | Grade 60 | 412 | 1.00 |

#### *1.9.2.2. Aceros en perfiles*

| Tipo de acero para perfiles | Acero | Límite elástico (MPa) | Módulo de elasticidad (GPa) |
|---|---|---|---|
| Acero formado en frío | ASTM A 36 36 ksi | 250 | 203 |
| Acero laminado | ASTM A 36 36 ksi | 250 | 200 |

# 2. COMBINACIONES USADAS EN EL CÁLCULO

- **Nombres de las hipótesis**

PP Peso propio
CM Cargas muertas
F Fluido
Qa Carga viva

- **Categoría de uso**

1. General

- **E.L.U. de rotura. Hormigón**

  NSR-10

- **E.L.U. de rotura. Hormigón en cimentaciones**

  NSR-10

- **E.L.U. de rotura. Pilares mixtos de hormigón y acero**

  NSR-10

- **E.L.U. de rotura. Acero conformado**

  AISI/NASPEC-2016 (LRFD)

  ASCE 7

- **E.L.U. de rotura. Acero laminado**

  AISC 360-16 (LRFD)

  ASCE 7

- **Desplazamientos**

  Derivas

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.400 | 1.400 | 1.400 | |
| 2 | 1.200 | 1.200 | 1.200 | |
| 3 | 1.200 | 1.200 | 1.200 | 1.600 |
| 4 | 0.900 | 0.900 | 0.900 | |

- **E.L.U. de rotura. Madera**

  ANSI/AWC NDS-2015 (ASD)

  **1. Coeficientes para situaciones persistentes o transitorias**

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | |
| 2 | 1.000 | 1.000 | 1.000 | 1.000 |
| 3 | 0.600 | 0.600 | 0.600 | |

  **2. Coeficientes para situaciones accidentales de incendio**

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 0.900 | 0.900 | 0.900 | |
| 2 | 1.200 | 1.200 | 0.900 | |
| 3 | 0.900 | 0.900 | 1.200 | |
| 4 | 1.200 | 1.200 | 1.200 | |
| 5 | 0.900 | 0.900 | 0.900 | 0.500 |
| 6 | 1.200 | 1.200 | 0.900 | 0.500 |
| 7 | 0.900 | 0.900 | 1.200 | 0.500 |
| 8 | 1.200 | 1.200 | 1.200 | 0.500 |

- **E.L.U. de rotura. Aluminio**

  EC

  Nieve: Altitud inferior o igual a 1000 m

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | |
| 2 | 1.350 | 1.350 | 1.000 | |
| 3 | 1.000 | 1.000 | 1.350 | |
| 4 | 1.350 | 1.350 | 1.350 | |
| 5 | 1.000 | 1.000 | 1.000 | 1.500 |
| 6 | 1.350 | 1.350 | 1.000 | 1.500 |
| 7 | 1.000 | 1.000 | 1.350 | 1.500 |
| 8 | 1.350 | 1.350 | 1.350 | 1.500 |

■ **Tensiones sobre el terreno**

NSR-10

| Comb. | PP | CM | F | Qa |
|---|---|---|---|---|
| 1 | 1.000 | 1.000 | 1.000 | |
| 2 | 1.000 | 1.000 | 1.000 | 1.000 |
| 3 | 0.600 | 0.600 | 0.600 | |
| 4 | 1.000 | 1.000 | 0.600 | |
| 5 | 0.600 | 0.600 | 1.000 | |

## 3. DISEÑO DE LOSA

### 3.1. Listado de losas rectangulares

Peralte en metros

Momentos en kN·m/m

Cuantías en cm²/m

Diámetro de barra en mm

Separación en cm

Losa 1

(No hay losas rectangulares)

### 3.2. Desplazamientos en nudos de losas macizas y reticulares

Desp en mm. Giros en radianes x 1000

Cimentación

| Coord. X | Coord. Y | | Desp. Z | Giro X | Giro Y |
|---|---|---|---|---|---|
| 0.001 | 0.200 | Máx. | -0.8961 | 0.0053 | -0.0037 |
| | | Mín. | -1.3940 | 0.0034 | -0.0058 |
| | | Dif. | 0.4979 | 0.0019 | 0.0021 |
| 0.001 | 0.450 | Máx. | -0.8954 | 0.0043 | -0.0037 |
| | | Mín. | -1.3928 | 0.0028 | -0.0058 |
| | | Dif. | 0.4974 | 0.0015 | 0.0021 |
| 0.001 | 0.700 | Máx. | -0.8948 | 0.0034 | -0.0038 |
| | | Mín. | -1.3919 | 0.0022 | -0.0058 |
| | | Dif. | 0.4971 | 0.0012 | 0.0021 |
| 0.001 | 0.950 | Máx. | -0.8943 | 0.0026 | -0.0038 |
| | | Mín. | -1.3911 | 0.0017 | -0.0059 |
| | | Dif. | 0.4968 | 0.0009 | 0.0021 |

## ÍNDICE

| Coord. X | Coord. Y | | Cort. X | Cort. Y | Mom. X | Mom. Y | Mom. XY |
|---|---|---|---|---|---|---|---|
| 5.399 | 3.200 | Máx. | 0.0075 | 0.0439 | -0.0859 | -0.0291 | -0.0000 |
| | | Mín. | 0.0048 | 0.0282 | -0.1336 | -0.0453 | -0.0000 |
| | | Dif. | 0.0027 | 0.0157 | 0.0477 | 0.0162 | 0.0000 |
| 5.399 | 3.450 | Máx. | 0.0078 | 0.0641 | -0.0859 | -0.0375 | -0.0000 |
| | | Mín. | 0.0050 | 0.0412 | -0.1336 | -0.0583 | -0.0000 |
| | | Dif. | 0.0028 | 0.0229 | 0.0477 | 0.0208 | 0.0000 |
| 5.399 | 3.700 | Máx. | 0.0084 | 0.0819 | -0.0859 | -0.0488 | -0.0000 |
| | | Mín. | 0.0054 | 0.0527 | -0.1336 | -0.0759 | -0.0000 |
| | | Dif. | 0.0030 | 0.0293 | 0.0477 | 0.0271 | 0.0000 |
| 5.399 | 3.950 | Máx. | 0.0092 | 0.0961 | -0.0859 | -0.0626 | -0.0000 |
| | | Mín. | 0.0059 | 0.0618 | -0.1337 | -0.0974 | -0.0000 |
| | | Dif. | 0.0033 | 0.0343 | 0.0477 | 0.0348 | 0.0000 |
| 5.399 | 4.200 | Máx. | 0.0103 | 0.1049 | -0.0859 | -0.0782 | -0.0000 |
| | | Mín. | 0.0067 | 0.0674 | -0.1337 | -0.1217 | -0.0000 |
| | | Dif. | 0.0037 | 0.0375 | 0.0477 | 0.0435 | 0.0000 |
| 5.399 | 4.450 | Máx. | 0.0119 | 0.1062 | -0.0860 | -0.0947 | -0.0000 |
| | | Mín. | 0.0077 | 0.0683 | -0.1337 | -0.1473 | -0.0000 |
| | | Dif. | 0.0043 | 0.0379 | 0.0478 | 0.0526 | 0.0000 |
| 5.399 | 4.700 | Máx. | 0.0141 | 0.0974 | -0.0860 | -0.1106 | -0.0000 |
| | | Mín. | 0.0090 | 0.0626 | -0.1338 | -0.1721 | -0.0000 |
| | | Dif. | 0.0050 | 0.0348 | 0.0478 | 0.0615 | 0.0000 |
| 5.399 | 4.950 | Máx. | 0.0168 | 0.0753 | -0.0861 | -0.1242 | -0.0000 |
| | | Mín. | 0.0108 | 0.0484 | -0.1339 | -0.1932 | -0.0000 |
| | | Dif. | 0.0060 | 0.0269 | 0.0478 | 0.0690 | 0.0000 |
| 5.399 | 5.200 | Máx. | 0.0203 | 0.0404 | -0.0862 | -0.1085 | -0.0000 |
| | | Mín. | 0.0130 | 0.0260 | -0.1340 | -0.1688 | -0.0000 |
| | | Dif. | 0.0072 | 0.0144 | 0.0479 | 0.0603 | 0.0000 |

## 3.4. Armados de losas

Cimentación

Número Plantas Iguales: 1

Malla 1: Losa maciza

Alineaciones longitudinales

Armado Base Inferior: 1#5c/20

Armado Base Superior: 1#5c/20

Peralte: 30

Alineación 3: (y= 0.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 4: (y= 0.45) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 5: (y= 0.70) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 6: (y= 0.95) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 7: (y= 1.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 8: (y= 1.45) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20
Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 9: (y= 1.70) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 10: (y= 1.95) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 11: (y= 2.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 12: (y= 2.45) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 13: (y= 2.70) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 14: (y= 2.95) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 15: (y= 3.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 16: (y= 3.45) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 17: (y= 3.70) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 18: (y= 3.95) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 19: (y= 4.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 20: (y= 4.45) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 21: (y= 4.70) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 22: (y= 4.95) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

Alineación 23: (y= 5.20) Inferior 24+ (x= 0.02)-(x= 5.38) +24 1#5c/20

Superior 35+ (x= 0.02)-(x= 5.38) +35 1#5c/20

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Alineaciones transversales

Armado Base Inferior: 1#5c/20

Armado Base Superior: 1#5c/20

Peralte: 30

Alineación 3: (x= 0.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20

Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 4: (x= 0.45) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20

Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 5: (x= 0.70) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20

Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 6: (x= 0.95) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20

Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 7: (x= 1.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 8: (x= 1.45) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 9: (x= 1.70) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 10: (x= 1.95) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 11: (x= 2.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 12: (x= 2.45) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 13: (x= 2.70) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 14: (x= 2.95) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 15: (x= 3.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 16: (x= 3.45) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 17: (x= 3.70) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 18: (x= 3.95) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 19: (x= 4.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 20: (x= 4.45) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 21: (x= 4.70) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 22: (x= 4.95) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

Alineación 23: (x= 5.20) Inferior 24+ (y= 0.02)-(y= 5.38) +24 1#5c/20
Superior 35+ (y= 0.02)-(y= 5.38) +35 1#5c/20

# 4. CONCLUSIONES

## 4.1. Conclusiones

En los capitulos anteriores se muestra el análisis estructural realizado por medio del modelamiento de elementos finitos y las solicitaciones resultantes más desfavorables. Igualmente se muestra el dimensionamiento estructural de los elementos basado en las solicitaciones determinadas. El dimensionamiento se realizó por medio de hojas de cálculo propias teniendo en cuentas las disposiciones del reglamento NSR-10 para diseño de secciones por resistencia última y se verificó la distribución del refuerzo de flexión del título C.

- Las cargas para las que se han diseñado todas las estructuras son las correspondientes a su tipología estructural recogidas en el Reglamento Colombiano de Construcción Sismo Resistente NSR-10.

- La definición de la capacidad estructural del concreto reforzado y del acero estructural se ha llevado a cabo mediante las indicaciones de la NSR-10.

- La conclusión es que las estructuras calculadas desarrollan una capacidad resistente (minorada con los coeficientes de reducción de resistencia) mayor que las solicitaciones derivadas de cada uno de las Combinaciones de Carga (mayorados con los correspondientes Factores de Cargas) definidos en la NSR-10 para cada una de las comprobaciones estructurales llevadas a cabo.

**Fdo.: Juan David Cabrera Cardona**
Ingeniero Civil Especialista en Estructuras
Matrícula No. 70202-262543 TLM

YASKAWA

# iQpump Micro AC Drive

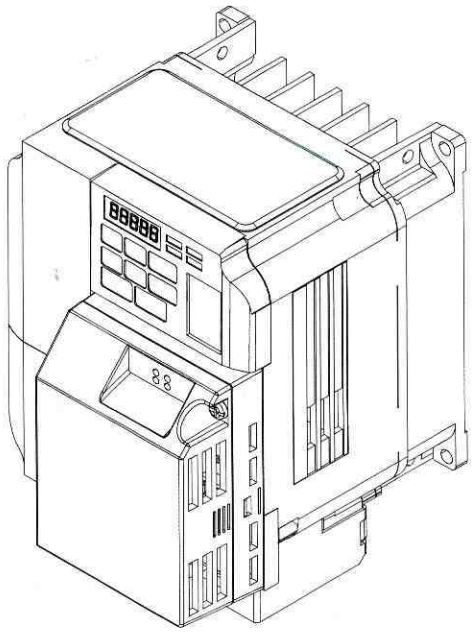
## Compact Intelligent Pump Controller

# Quick Start Procedure

Type: CIMR-PW□□□□

Models: 200 V Class, Single-Phase Input: 1 to 5 HP ND
200 V Class, Three-Phase Input: 1.5 to 25 HP ND
400 V Class, Three-Phase Input: 1 to 25 HP ND

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.



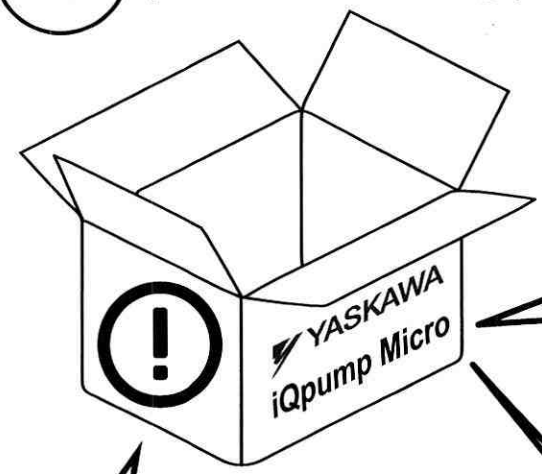

MANUAL NO. TOEP YAIQPM 01A

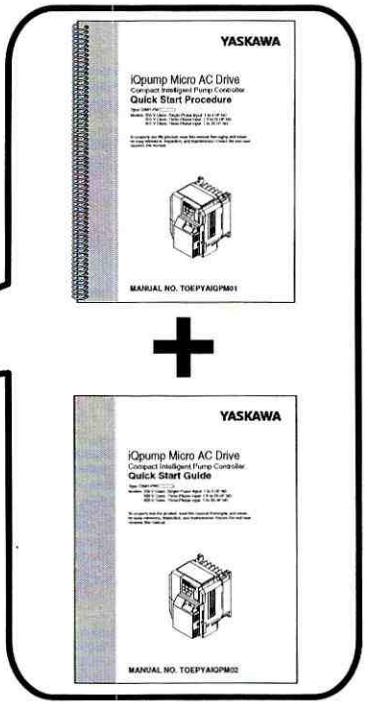
## Contents

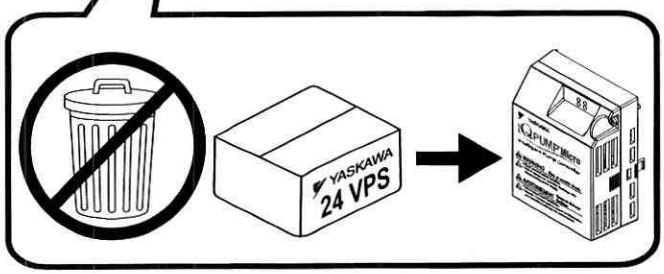
STEP 1

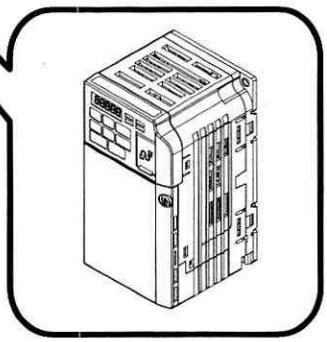
## ☐ Unpack the iQpump Micro

**1** **Remove all contents prior to discarding packaging !**



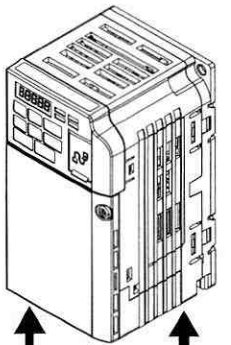



**NOTICE: Connect LINE, MOTOR, and CONTROL circuit wiring <u>BEFORE</u> installing 24V power supply.**

**2**

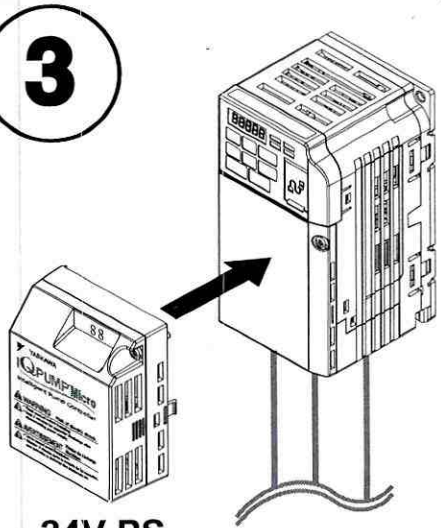


LINE

MOTOR

CONTROL

**3**



24V PS

STEP 2

# ☐ Identify the Model for Installation

**Safety Symbols in this Document**

**WARNING!**
Read and understand users manual before using this equipment. Failure to follow users instructions may result in serious injury or death.

**WARNING!**
Hazardous Voltage. Contact may cause electric shock or burn. Turn-off and lock-out system and facility power before servicing.

**WARNING!**
Stay Clear- Equipment starts automatically. Clear all personnel from equipment, install shields or guards, locate and verify emergency SHUT-OFF is functional. Failure to comply may result in serious injury to personnel.

**WARNING!**
Improper Operation Sequence. DO NOT RUN THE MOTOR. Failure to comply may result in serious injury to personnel.

**WARNING!**
Do not operate equipment with covers or guards removed. Install or replace cover and/or guards before operation. Failure to comply may result in serious injury to personnel.

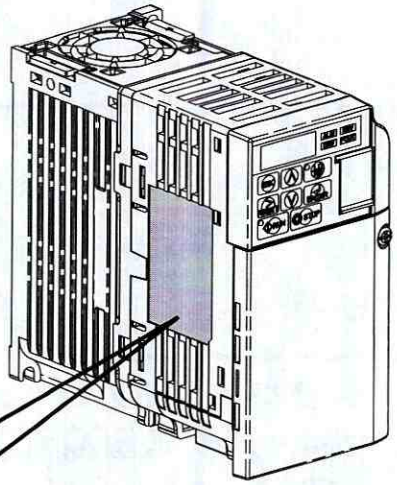
This Quick Start Procedure serves as general guide to help install, configure and perform test run operation. Refer to the iQpump Micro User Manual No. TOEP YAIQPM 03 for complete instructions to configure this product for each specific installation site.

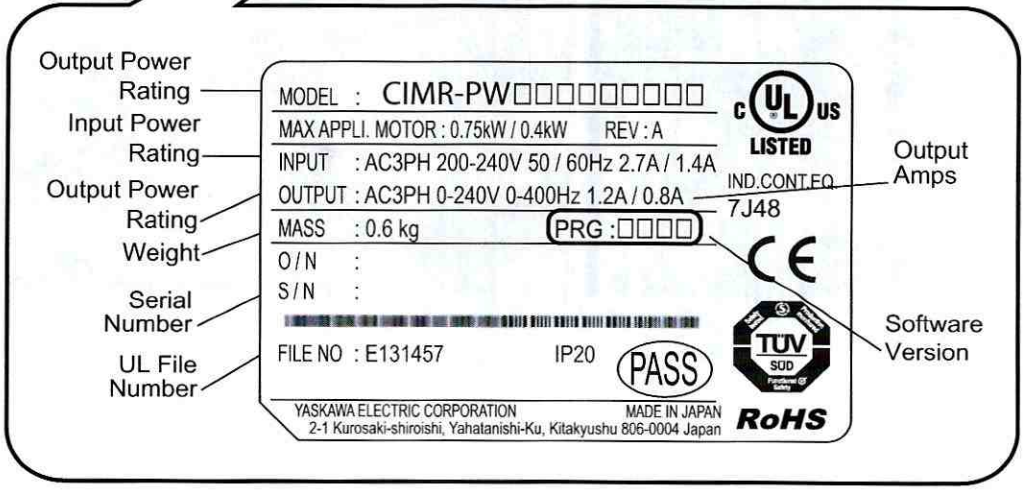
## 2.1 Verify the correct model and ratings.

Follow this procedure for each iQpumpMicro and motor combination.

a. Locate the nameplate and your order information.
b. Verify the Model No: (E) matches the line item(s) on your order, to confirm receipt of the correct model.
c. Locate the nameplate of motor that will be connected.
d. Confirm the motor nameplate Amperage, Voltage, and Frequency (Hz) are within the Output specifications (B) shown on the iQpump Micro nameplate.

## 2.2 Verify main power source is adequate by reviewing the Input specifications (A) shown on the iQpump Micro nameplate.





STEP 3

# ☐ Perform Mechanical Installation

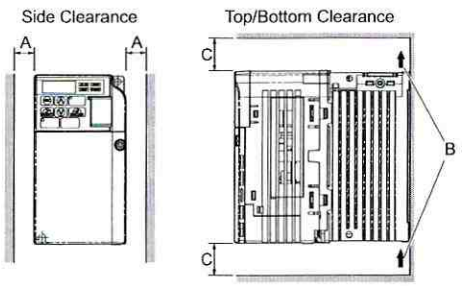
## 3.1 Verify installation environment.

Mechanical installation and mounting footprint vary by model. Refer to the iQpump Micro User Manual No. TOEP YAIQPM 03, Chapter 2: Mechanical Installation for details. Ensure the installation conditions are suitable to prolong and optimize performance life.

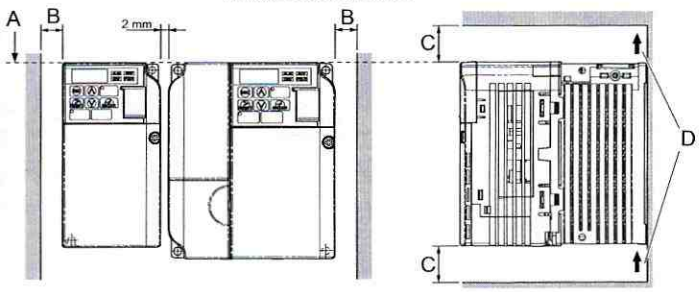
| Environment | Conditions |
|---|---|
| Installation Area | Indoors |
| Ambient Temperature | -10 to + 40 °C (+14 to +104 °F) NEMA 1, UL Type 1 Enclosure |
| Humidity | 95% RH or less and free of condensation |
| Storage Temperature | -20 °C to +60 °C (-4 °F to +104 °F) |
| Surrounding Area | Install the drive in an area free from:<br>• oil mist and dust<br>• metal shavings, oil, water, or other foreign materials<br>• radioactive materials<br>• combustible materials (e.g., wood)<br>• harmful gases and liquids<br>• excessive vibration<br>• chlorides<br>• direct sunlight. |
| Altitude | Up to 1000 meters without derating. Up to 3000 meters with output current and voltage derating |
| Orientation | Install the unit vertically to maintain maximum cooling effects. |

## 3.2 Maintain installation clearances.

Single Drive Installation




Multiple Drive Installation




Ensure the back panel is placed against a closed flat surface for proper cooling.

**NOTICE:** Abnormal Operation. Avoid placing peripheral devices, transformers, or other electronics near the bypass as the noise created can lead to abnormal operation. Take proper steps to shield the bypass from electrical interference if such devices must be used in close proximity to the Bypass.

**NOTICE:** Equipment Damage. Prevent foreign matter such as metal shavings and wire clippings from falling into the bypass during installation. Failure to comply could result in damage to the bypass. Place a temporary cover over the top of the drive during installation. Remove the temporary cover before bypass start-up, as the cover will reduce ventilation and cause the bypass to overheat.

| Install Type | Minimum Spacing | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Single drive | 30 mm (1.18 in) | • Airflow direction | 100 mm (3.93 in) | - |
| Multiple drive installation | Align the tops of the units | 30 mm (1.18 in) | 100 mm (3.93 in) | Airflow direction |

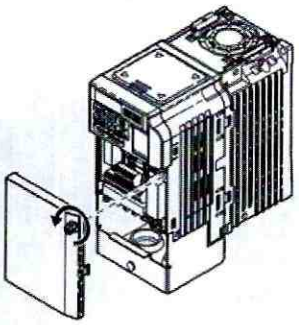
STEP 4

# ☐ Motor, Line Power and Start/Stop Circuit

## 4.1 Remove the front cover

**NOTICE:** Improper removal of the the drive's protective covers and conduit bracket (NEMA 1, UL Type 1) can cause damage to the drive. Adhere to iQpump User Manual, Section 3, Protective Covers to avoid drive damage.

**NEMA 1, UL Type 1 Enclosure**



## 4.2 Connect main input power and motor wiring to the drive.

Refer to **Figure 1** for single-phase input power drive models.
Refer to **Figure 2** for three-phase input power drive models.

Follow accepted wiring practices and applicable electric codes. Ensure all equipment is properly grounded.

**WARNING!** Fire Hazard. Do not connect terminals B1, B2 (-), +1, +2 terminals to earth ground. Only connect ground wiring to designated ground terminals.

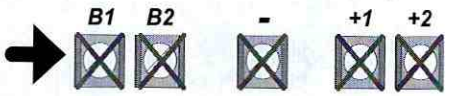
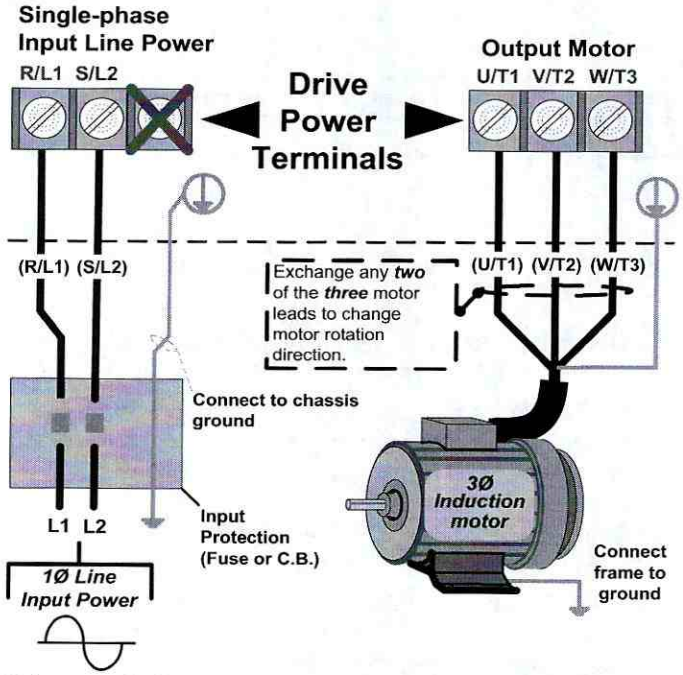
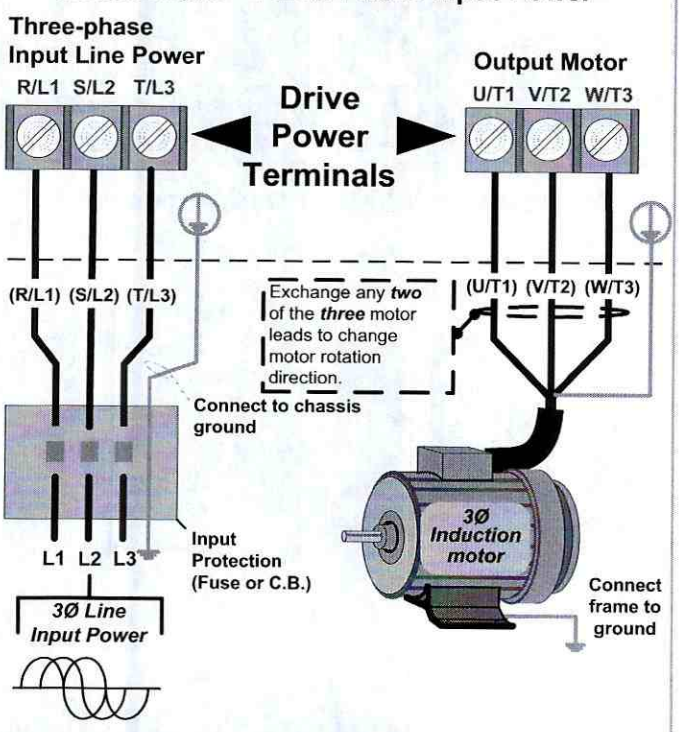



**Figure 1: Line and Motor Electrical Connections - Single-Phase Input Power**




**Sizing note:** Verify the drive is properly sized for single phase input power. The drive input line voltage must be equal to or greater than motor rated voltage for best performance.

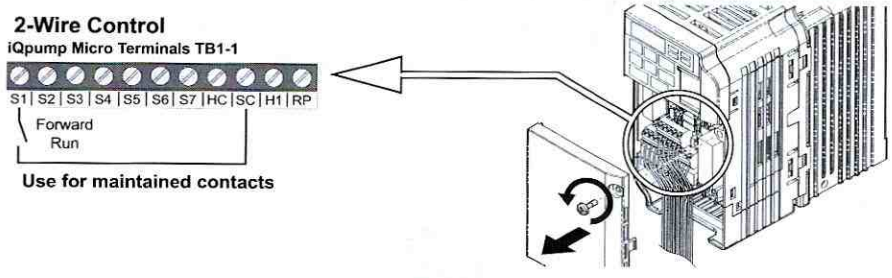
**Figure 2: Line and Motor Electrical Connections - Three-Phase Input Power**




## 4.3 Select start / stop control method, (parameter b1-02).

Remove the drive terminal cover to access the control terminals. The drive will START and STOP from the keypad from the factory. If this is the preferred start/stop method then continue to the feedback signal connection section. Refer to the wiring diagram below to START/STOP the drive using an external switch or contact

**2-Wire Start/Stop Wiring Diagram**

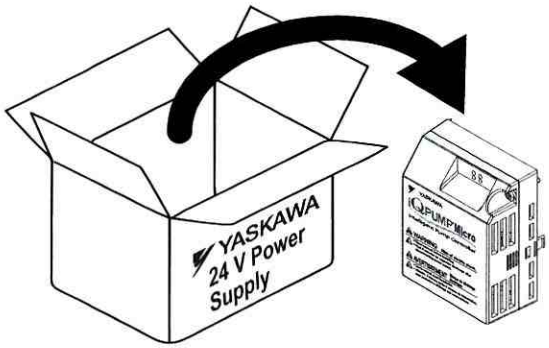


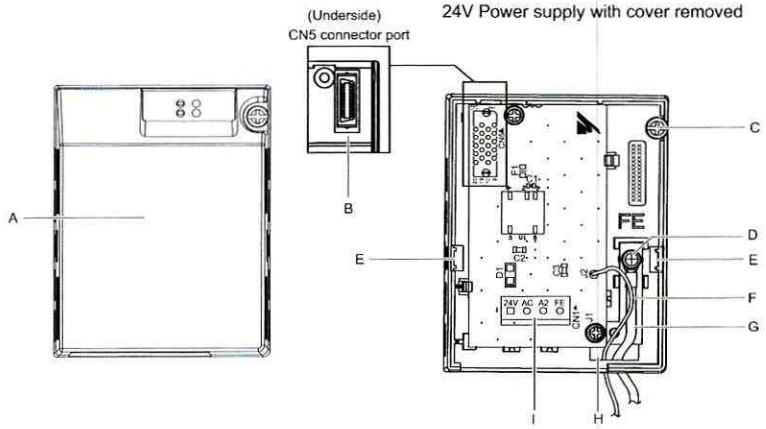
STEP 5

# ☐ Install the 24 V Transducer Power Supply

## 5.1 24V Power Supply Components

### Unpack the 24 V Power Supply




**A – 24V Power Supply cover**
**B – CN5 Connector to drive**
**C – Screw hole (attaches 24V Power Supply cover)**
**D – Functional Earth cable connection (FE)**
**E – Mounting tabs**
**F – J2/A2 (white) conductor wire**
**G – Ground wire <1>**
**H – Through-slot for J2/A2 wire and ground wire**
**I – CN1 Terminal Block-Customer Connections**

**Figure 1.1 24V Power Supply Components**

**<1> One of the four ground wires packaged with the 24V Power Supply must be connected during installation.**

### IP20/NEMA 1, UL Type 1 Dimensions with 24V Power Supply

The installed 24 V power supply option adds 27 mm (1.06 in.) to the total depth of the drive. Height and width dimensions are unaffected.

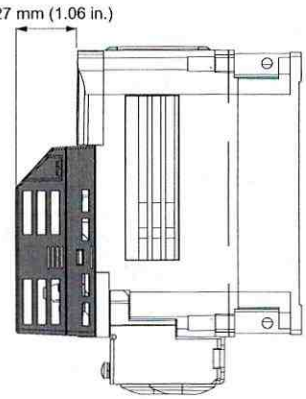



**Figure 1.2 24 V Power Supply Dimensions**

STEP 5

# ☐ Install the 24 V Transducer Power Supply (continued)

## 5.2 Prior to Installing the 24V Power Supply

Prior to installing the 24V Power Supply, wire the drive, make necessary connections to the drive terminals, and verify that the drive functions normally without the 24V Power Supply installed. Refer to the product manual packaged with the drive for information on wiring and connecting the drive.

The installation procedure differs slightly depending on enclosure type. The enclosure type is identified within the drive model number.

**5.3** Locate the drive model number using ***Figure 1.3***.

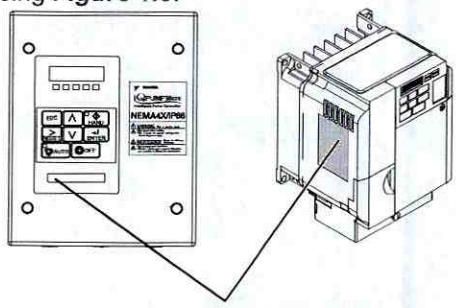



**Figure 1.3 Model Number Location**

**5.4** Identify the drive enclosure type. Use ***Figure 1.4*** to find the digit within the model number that identifies the enclosure type.

**Note:** Installing the 24V Power Supply on an IP20/NEMA 1, UL Type 1 enclosure drive voids NEMA 1, UL Type 1 protection while maintaining IP20 conformity.

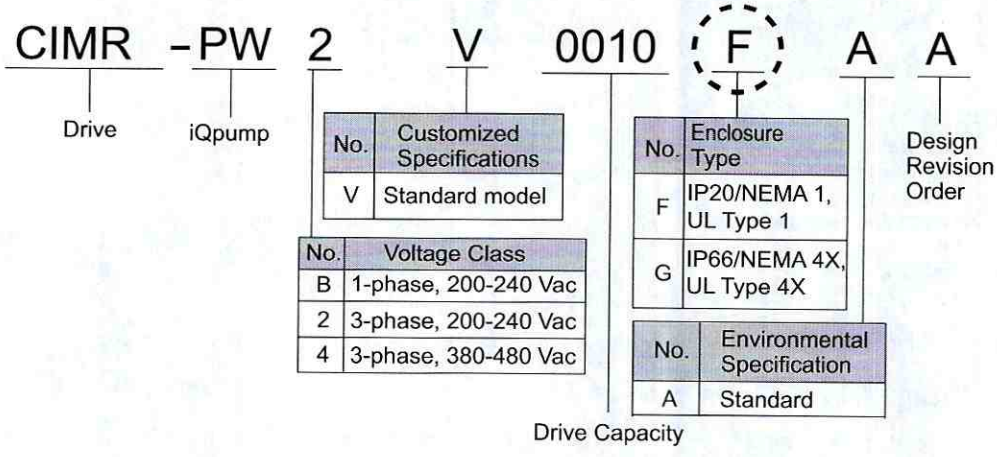



**Figure 1.4 Drive Enclosure Type Identification**

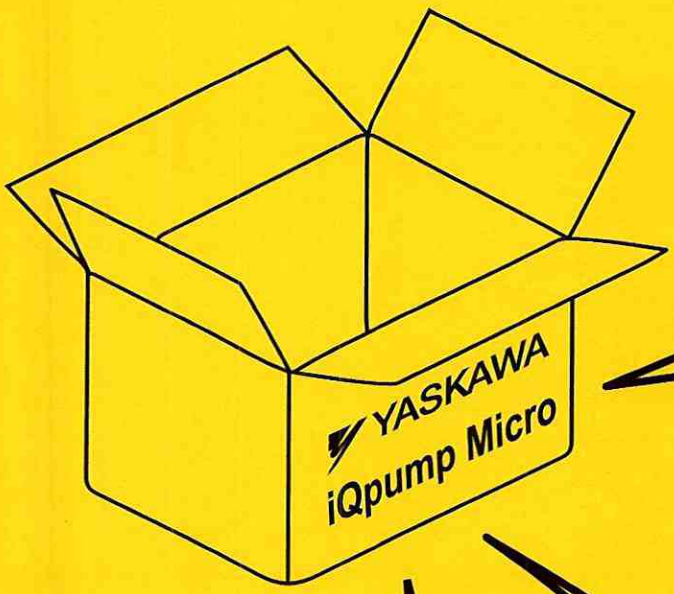
**5.5** Select proper installation tools according to enclosure type and model.

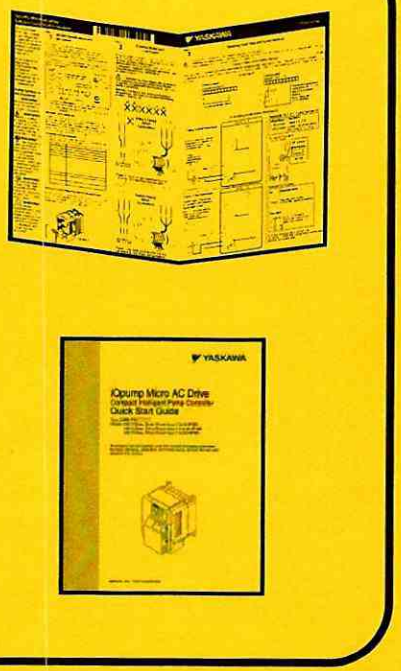
**Note:** Tools required to prepare the 24V Power Supply cables for wiring are not listed in this manual.

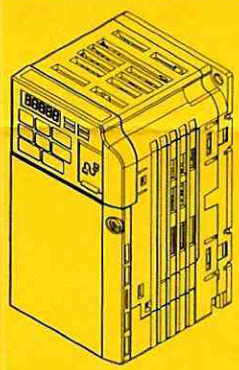
**Table 1.1 Tool and Material Requirements (Customer Supplied)**

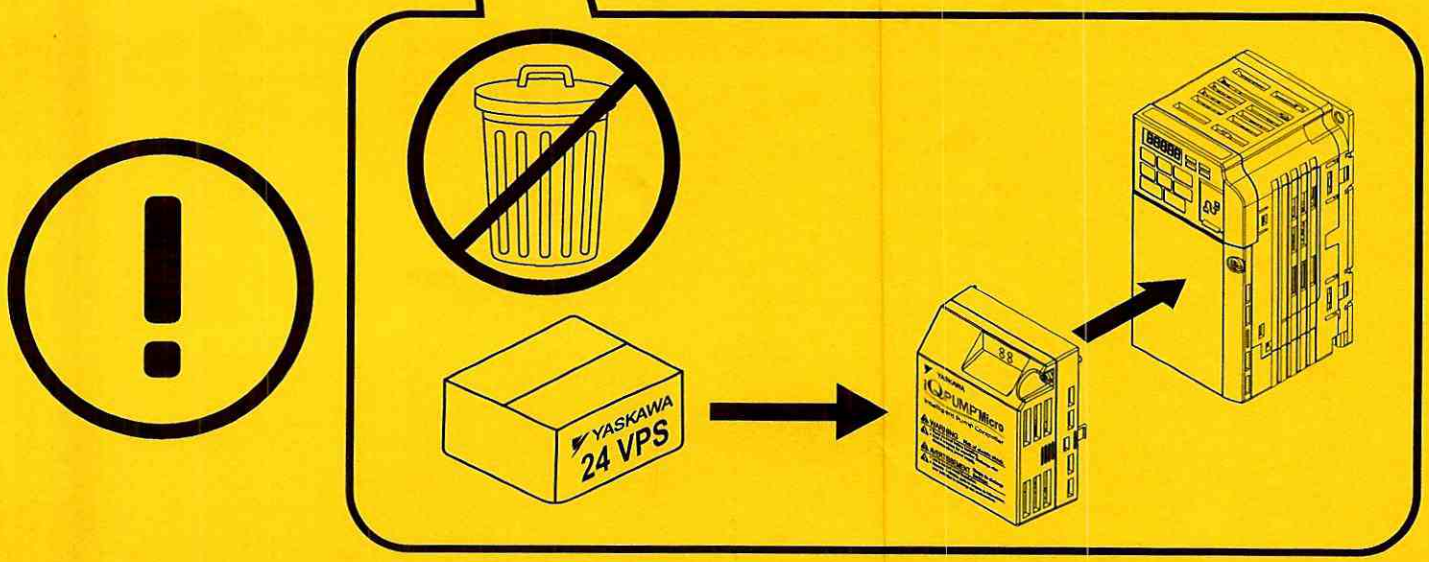
| Model Number Enclosure Type Digit | Drive Enclosure Type | Drive Capacity | Tools | | Materials |
|---|---|---|---|---|---|
| | | | Screwdriver | Socket Wrench | Wire Tie with Adhesive Mount |
| F | IP20/NEMA 1, UL Type 1 | All | Phillips screwdriver M3 metric #1, #2 U.S. standard size Note: Screw sizes vary by drive capacity. Select a screwdriver appropriate for the drive capacity. | Not applicable | All models |
| G | IP66/NEMA 4X, UL Type 4X | 2V0030 to 2V0069 4V0018 to 4V0038 | | 10 mm socket wrench | Not applicable |
| | | Other capacities | | 8 mm socket wrench | |

**NOTICE: Remove all contents prior to discarding packaging.**



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Document Number: TOEPYAIQPM05A 11/2014 

STEP 5

## ☐ Install the 24 V Transducer Power Supply (continued)

# 5.6 Installation Procedure

**5.7** Shut off power to the drive. Wait at least five minutes after confirming the DC bus voltage is safe.

On **IP20/NEMA 1, UL Type 1** models, loosen the screw that fastens the front cover in place and remove the front cover. This drive front cover will be replaced by the 24V Power Supply cover. Cover removal varies depending on drive size.

On **IP66/NEMA 4X, UL Type 4X** models, loosen the 4 bolts that attach the enclosure front cover in place, gently move the front cover away from the enclosure, press firmly on the digital operator cable connector release tab to disconnect the cable from port CN1 on the drive, then remove the front cover. Refer to ***Table 1.3*** for installation bolt size.

**Table 1.2 Remove the Drive or Enclosure Front Cover**

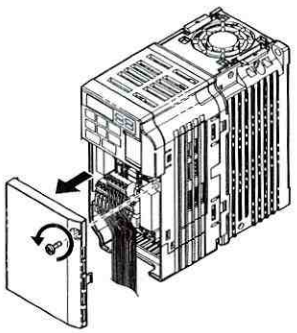
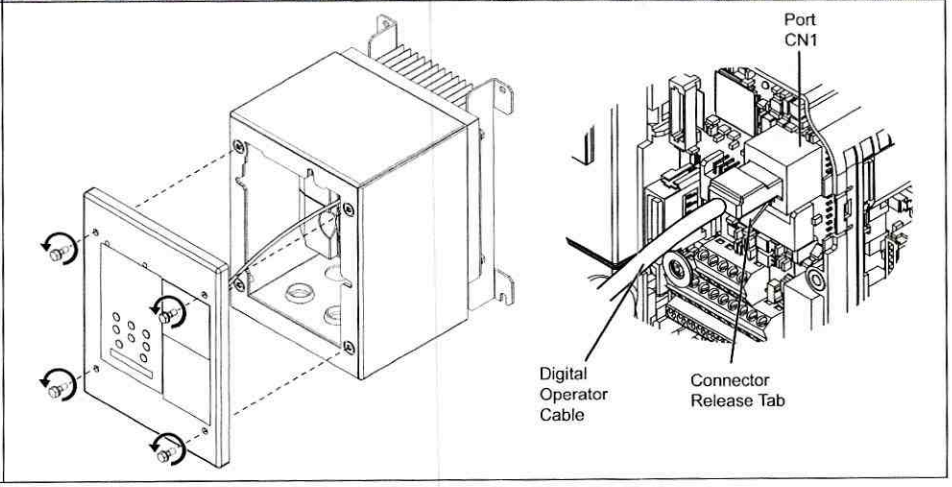
| IP20/NEMA 1, UL Type 1 | IP66/NEMA 4X, UL Type 4X |
|---|---|
|  |  |

**Table 1.3 IP66/NEMA 4X, UL Type 4X Enclosure Front Cover Installation Bolt Size**

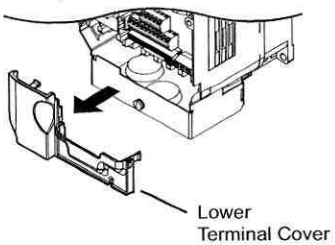
| Voltage Class | Drive Model | Installation Bolt Size |
|---|---|---|
| Single-Phase 200 V Class | BV0001G to BV0012G | M5 |
| Three-Phase 200 V Class | 2V0001G to 2V0020G | M5 |
| | 2V0030G to 2V0069G | M6 |
| Three-Phase 400 V Class | 4V0001G to 4V0011G | M5 |
| | 4V0018G to 4V0038G | M6 |

**5.8** On **IP20/NEMA 1, UL Type 1** enclosure models, loosen the screw on the front of the bottom cover and remove it from the drive. All models except 2V0006F require removing a plastic lower terminal cover prior to removing the bottom cover.

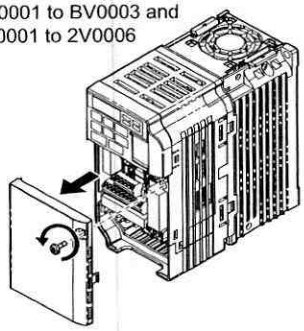
On **IP66/NEMA 4X, UL Type 4X**enclosure models, remove the lower terminal cover (if provided) from the drive.

The lower terminal cover is not present on certain models.

Models **With** Lower Terminal Cover




Models **Without** Lower Terminal Cover: BV0001 to BV0003 and 2V0001 to 2V0006



STEP 5

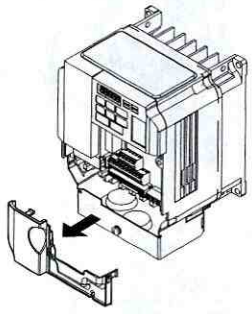
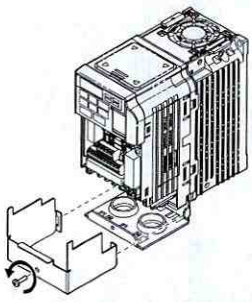
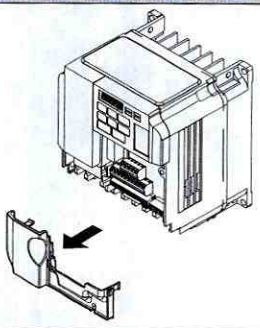
## ☐ Install the 24 V Transducer Power Supply (continued)

**Note:** The lower terminal cover is required for secure mounting of the 24V Power Supply on the models shown in ***Table 1.4***. Contact your Yaskawa representative for ordering if you have a model listed in ***Table 1.4*** and the lower terminal cover is not present on your drive.

**Table 1.4 Lower Terminal Cover Part Number by Model**

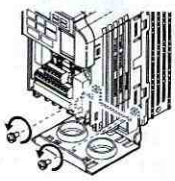
| Drive Model | Terminal Cover Part Number |
|---|---|
| BV0006☐ and BV0010☐<br>2V0010☐ and 2V0012☐<br>4V0002☐ to 4V0009☐ | CVST31300 |
| BV0012☐<br>2V0020☐<br>4V0011☐ | CVST31301 |
| Other models | Not required |

**Table 1.5 Remove the Bottom Cover and Lower Terminal Cover**

| IP20/NEMA 1, UL Type 1 | | IP66/NEMA 4X, UL Type 4X |
|---|---|---|
| **Lower Terminal Cover on All Models Except Models: BV0001 to BV0003 2V0001 to 2V0006** | **Bottom Cover on All Models** | **Terminal Cover on Models BV0006G to BV0010G 2V0010G to 2V0020G 4V0002G to 4V0011G** |
|  |  |  |

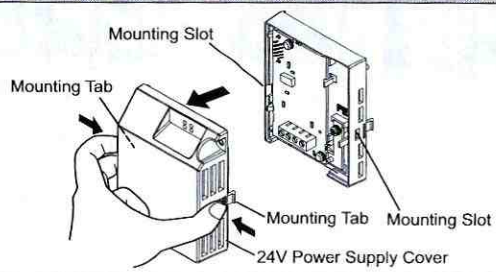
**5.9** On IP20/NEMA 1, UL Type 1 enclosure models, loosen the screws attaching the NEMA 1, UL Type 1 conduit bracket to the drive to allow the bracket to swing out to provide easier access to the ground screw. Do not remove the screws.

**Table 1.6 Loosen Conduit Bracket Screws**

| IP20/NEMA 1, UL Type 1 | IP66/NEMA 4X, UL Type 4X |
|---|---|
|  | Not applicable. |

**5.10** Remove the 24V Power Supply cover.

**Table 1.7 Remove 24V Power Supply Cover**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|
|  |

STEP 5

## ☐ Install the 24 V Transducer Power Supply (continued)

**5.11** Select one of the four ground wires packaged with the 24V Power Supply unit and attach the ground wire to the drive.

Select the correct ground wire shown in ***Figure 1.5*** by first removing the drive ground terminal screw as shown in ***Table 1.8***. Yaskawa recommends using a long Phillips screwdriver with a magnetic tip to aid in keeping the screw captive during removal and installation.

Test fit the screw (size M3.5 to M6) into each of the four ground wire drive-side ring lugs prior to installation. Ground wire selection varies by drive model.

With the appropriate screw removed, attach the drive-side of the ground wire to the drive ground terminal and tighten all loosened screws.

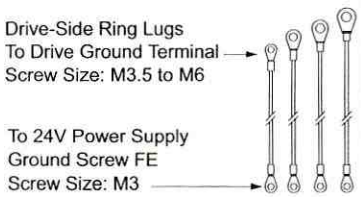
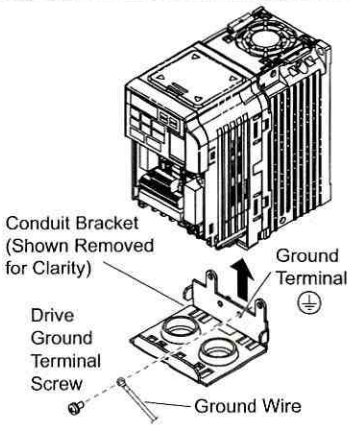
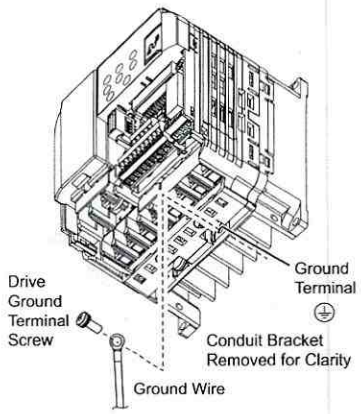
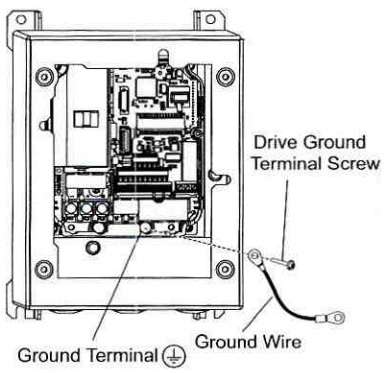


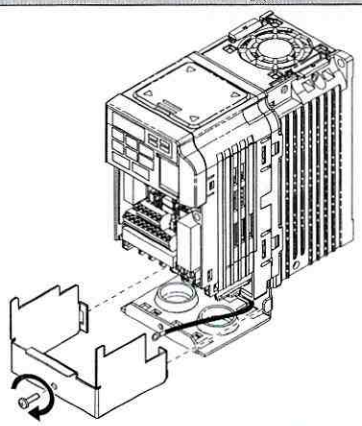

**Figure 1.5 Ground Wire Selections**

**Table 1.8 Drive Ground Terminal and Screw Location**

| IP20/NEMA 1, UL Type 1 | | IP66/NEMA 4X, UL Type 4X |
|---|---|---|
| **Models BV0001 to BV0003 2V0001 to 2V0006** | **All Other Models** | |
|   |   |   |

**5.12** Reattach the bottom terminal cover.

**Table 1.9 Reattach Bottom Terminal Cover**

| IP20/NEMA 1, UL Type 1 | IP66/NEMA 4X, UL Type 4X |
|---|---|
|  | Not applicable. |

STEP 5

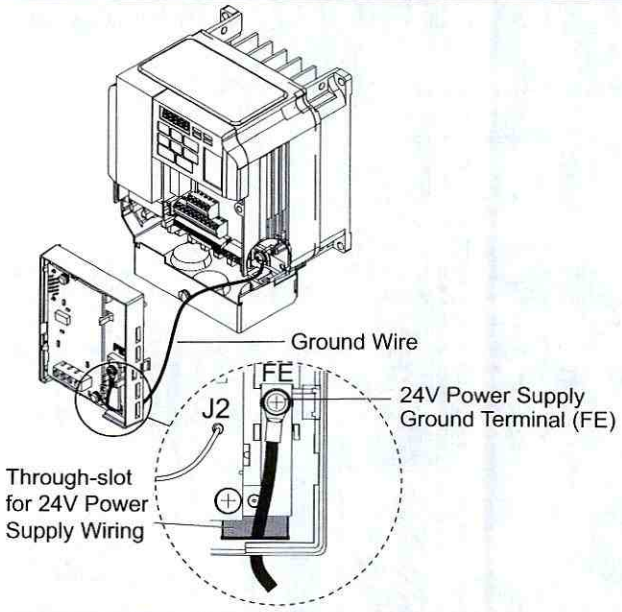
## ☐ Install the 24 V Transducer Power Supply (continued)

**5.13** Connect the ground wire to the 24V Power Supply at ground terminal FE.

Route the free end of the ground wire to the front of the 24V Power Supply via the through-slot as shown in ***Table 1.10*** and connect the ground wire. Tighten the screw to 0.5 ~ 0.6 Nm or (4.4 ~ 5.3 in lbs) using an M3 Phillips screwdriver.

**Table 1.10 Connect Ground Wire to 24V Power Supply**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|

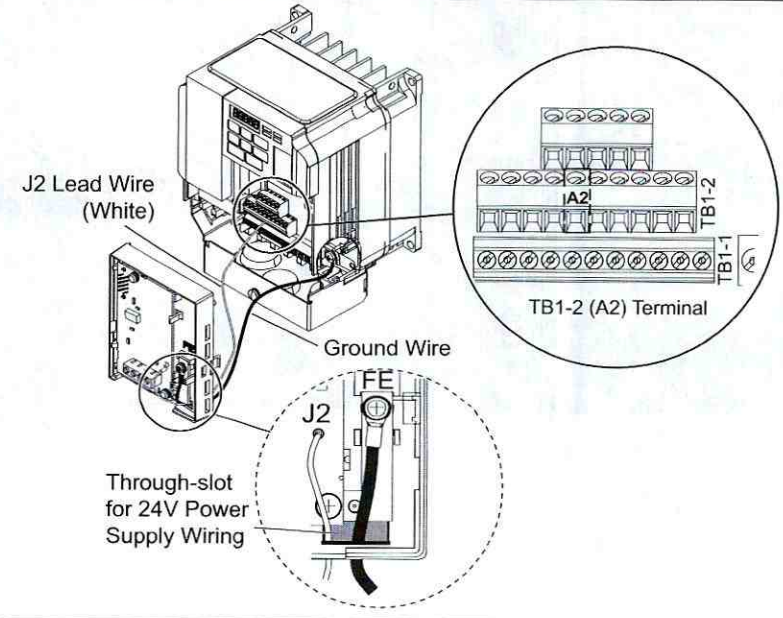



**5.14** Connect the white J2 lead wire to terminal A2 on drive terminal block TB1-2.

Route the free end of the J2 wire to the A2 terminal on the drive via the through-slot on the 24V Power supply as shown in ***Table 1.11***.

**Table 1.11 Connect J2 Lead Wire to Drive**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|

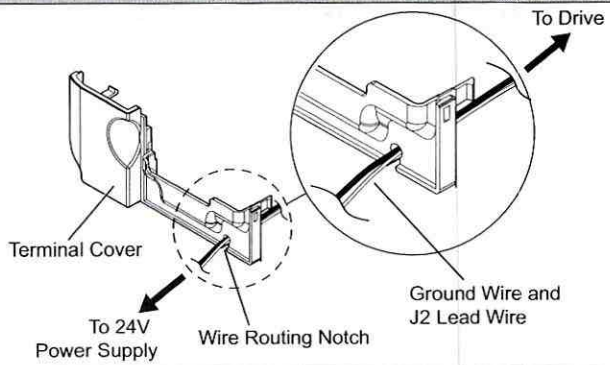


STEP 5

## ☐ Install the 24 V Transducer Power Supply (continued)

**5.15** On models BV0006☐ to BV0018☐, 2V0010☐ to 2V0020☐, and 4V0002☐ to 4V0011☐, insert the ground wire and J2 lead wire into the terminal cover wire notch.

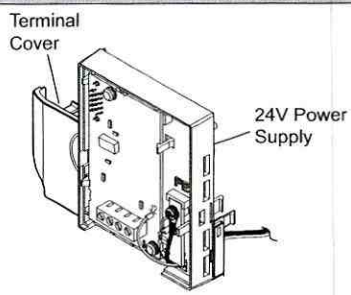
**Table 1.12 Insert Wires Into Routing Notch**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|
|  |



After inserting the ground wire and J2 lead wire into the notch, attach the terminal cover to the 24V Power Supply.

**Table 1.13 Connect Terminal Cover to 24V Power Supply**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|
|  |

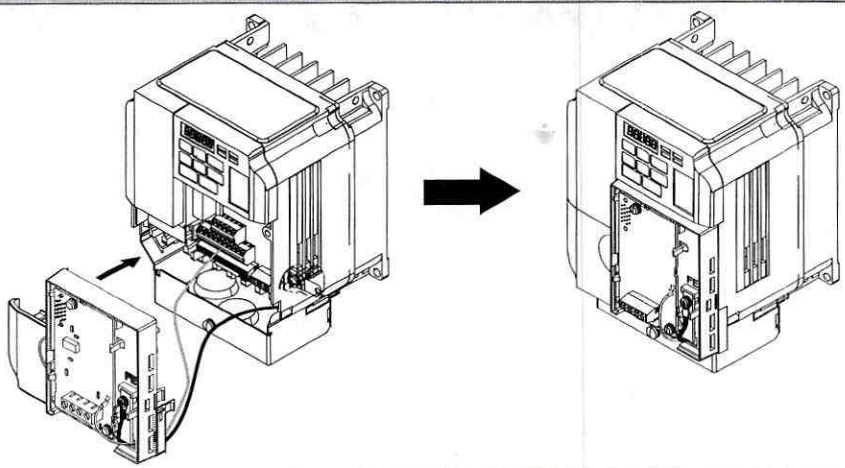


**5.16** Attach the 24V Power Supply or 24V Power Supply/Terminal Cover combination to the drive.

Properly seat the tabs on the left and right sides of the 24V Power Supply unit into the drive case mounting slots and snap into place.

**NOTICE:** *Damage to Equipment. Take proper precautions when attaching the 24V Power Supply to the drive so that no cables are pinched between the 24V Power Supply and the drive. Failure to comply may result in damage to circuitry and equipment.*

**Table 1.14 Attach 24V Power Supply to Drive**

| IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X |
|---|
|  |

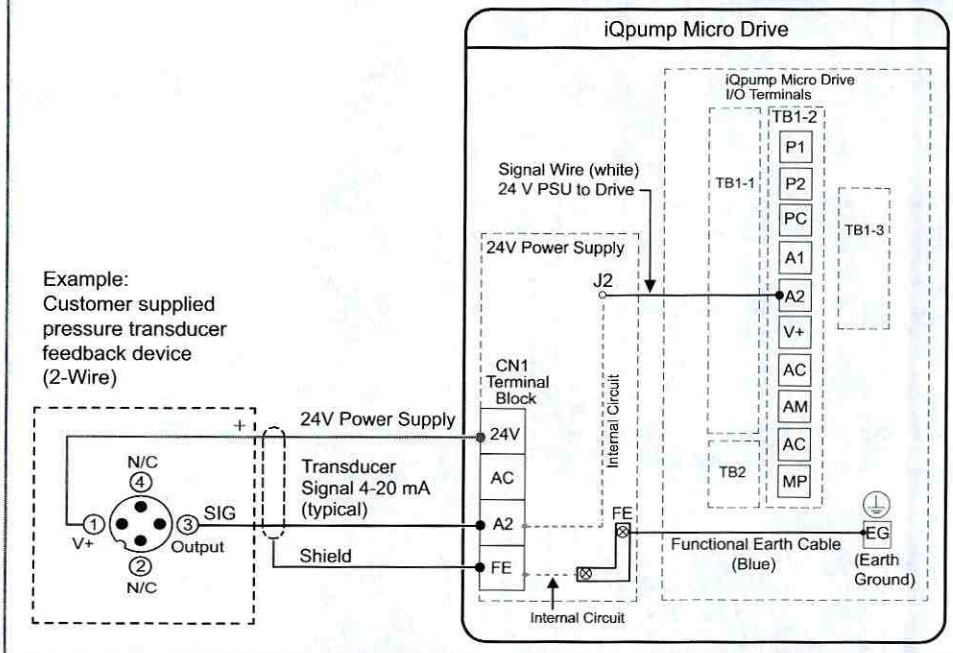
STEP 5

# ☐ Install the 24 V Transducer Power Supply (continued)

## 5.17 Connect wiring from customer-supplied transducer to 24V Power Supply.

Refer to Figure 1.6 Transducer (2-Wire) connection or Figure 1.7 Transducer (3-Wire) connection based on the application.

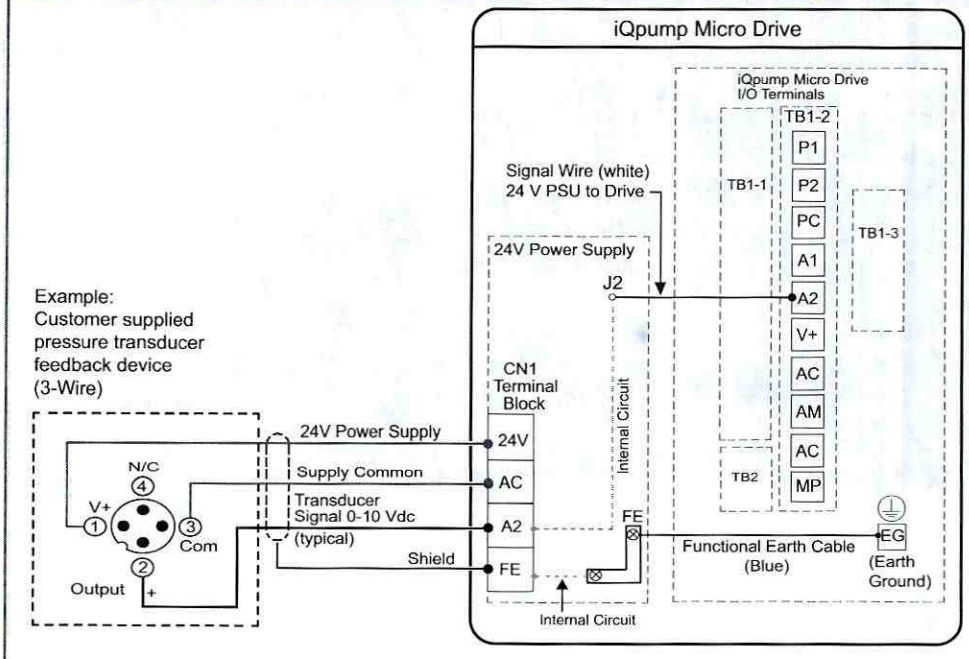
### Figure 1.6 (2-Wire) 4 to 20 mA Transducer




Note: Transducer wire colors and numbering may vary depending on feedback device used, consult feedback device manual.

### Figure 1.7 (3-Wire) 0 to 10 V Transducer

Note: Set DIP switch S1 located on drive to V position for use with 0 to 10V transducer.

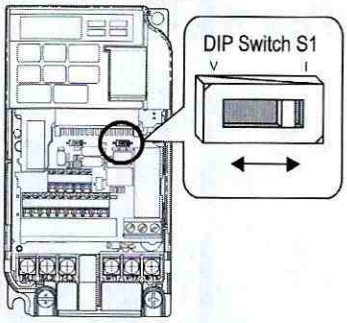



### Setting DIP Switch S1 for Terminal A2 Signal Type Selection

**Terminal A2:** DIP Switch S1 Signal Type Selection

| Setting Value | Description |
|---|---|
| V (left position) | Voltage input (0 to 10 V) |
| I (right position) | Current input (default setting) (4 to 20 mA or 0 to 20 mA) |

DIP Switch S1 Location




Parameter H3-09 Details

| No. | Parameter Name |
|---|---|
| H3-09 | Frequency ref. (current) terminal **A2** signal level selection |

| Description |
|---|
| Selects the signal level for terminal A2.<br>0: 0 to +10 V, unipolar input (with lower limit)<br>1: 0 to +10 V, bipolar input (no lower limit)<br>2: 4 to 20 mA<br>3: 0 to 20 mA |

**Note:** Refer to the iQpump Micro User Manual, (No. TOEPYAIQPM03) to program the iQpump Micro drive for network communication if required.

STEP 5

## ☐ Install the 24 V Transducer Power Supply (continued)

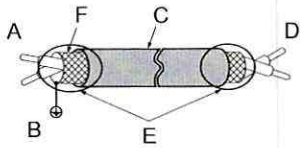
### 5.18 (continued)

Select appropriate transducer wire type and size from ***Table 1.15***. For simpler and more reliable wiring, you may choose to crimp ferrules to the wire ends. Refer to ***Figure 1.9*** and ***Table 1.16*** for ferrule terminal types and sizes.

**Table 1.15 24V Power Supply Wire Size and Torque Specifications**

| Terminal | Screw Size | Tightening Torque N•m (in-lbs) | Bare Wire Terminal | | Ferrule-Type Terminal | | |
|---|---|---|---|---|---|---|---|
| | | | Applic. wire size mm² (AWG) | Recomm. mm² (AWG) | Applic. wire size mm² (AWG) | Recomm. mm² (AWG) | Wire Type |
| 24V, AC, A2, FE | M3 | 0.5 to 0.6 (4.4 to 5.3) | Stranded: 0.25 to 1.5 (24 to 16) Single: 0.25 to 1.5 (24 to 16) | 0.75 (18) | 0.25 to 1.0 (24 to 17) | 0.5 (20) | Shielded line, etc. |

### 5.19 Prepare the ends of the transducer wires as shown in ***Figure 1.8***.




**A – Drive side**
**B – Connect shield to FE ground terminal of drive.**
**C – Insulation**
**D – Transducer side**
**E – Shield sheath (Insulate with tape)**
**F – Shield**

**Figure 1.8 Preparing the Ends of Shielded Cables**

**NOTICE:** *Insulate shields with tape or shrink tubing to prevent contact with other signal lines and equipment. Improper wiring practices could result in drive or equipment malfunction due to short circuit.*

**NOTICE:** *Connect the shield of shielded cable to the appropriate ground terminal. Improper equipment grounding could result in drive or equipment malfunction or nuisance trips.*

### 5.20 If desired, select the correct ferrule-type wire termination.

Crimp a ferrule to signal wiring to improve wiring simplicity and reliability. Use CRIMPFOX 6, a crimping tool manufactured by PHOENIX CONTACT.

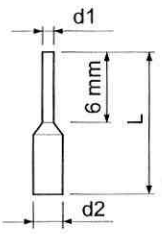



**Figure 1.9 Ferrule Dimensions**

**Table 1.16 Ferrule Terminal Types and Sizes**

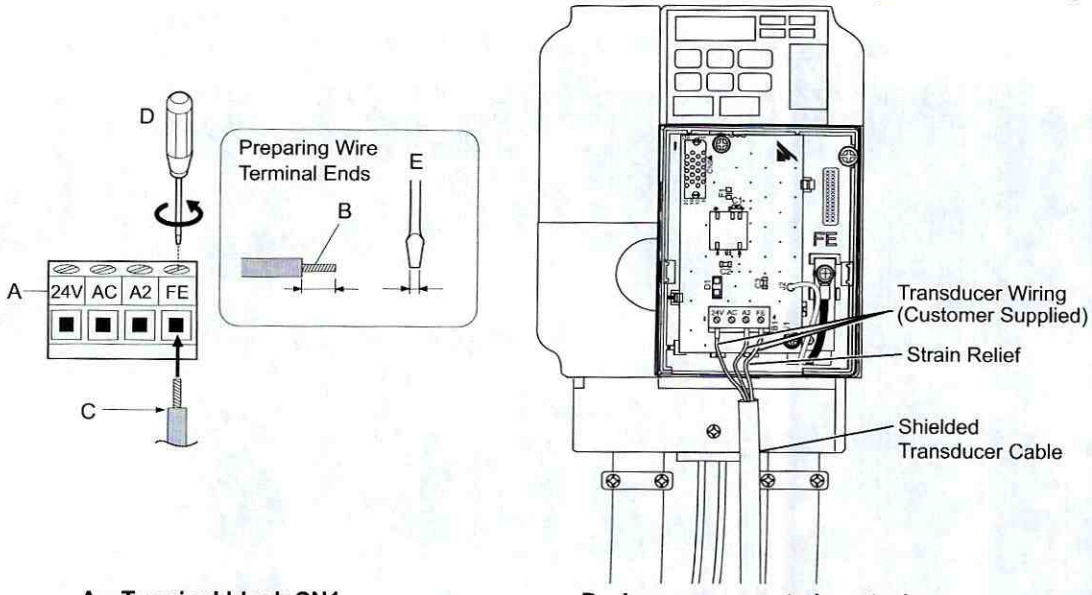
| Size mm² (AWG) | Type | L (mm) | d1 (mm) | d2 (mm) | Manufacturer |
|---|---|---|---|---|---|
| 0.25 (24) | AI 0.25-6YE | 10.5 | 0.8 | 2.0 | PHOENIX CONTACT |
| 0.34 (22) | AI 0.34-6TQ | 10.5 | 0.8 | 2.0 | |
| 0.5 (20) | AI 0.5-6WH | 12 | 1.1 | 2.5 | |
| 0.75 (18) | AI 0.75-6GY | 12 | 1.3 | 2.8 | |
| 1.0 | AI 1-6RD | 12 | 1.5 | 3.0 | |

**Note:** Do not route shielded cable through bottom conduit bracket cable glands on IP20/NEMA 1, UL Type 1 enclosures.

STEP 5

## ☐ Install the 24 V Transducer Power Supply (continued)

**5.21** Connect transducer wiring to the 24V Power Supply terminals using ***Figure 1.10*** as a guide.



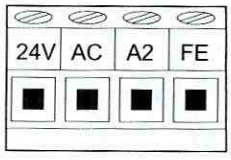

**A – Terminal block CN1**
**B – Avoid fraying wire strands when stripping insulation from wire. Strip length 5.5 mm.**
**C – Single wire or stranded wire**
**D – Loosen screw to insert wire.**
**E – Blade depth of 0.4 mm or less Blade width of 2.5 mm or less**

**Figure 1.10 24V Power Supply Wiring Guide**

**NOTICE:** *Separate transducer wiring from main circuit wiring (terminals R/L1, S/L2, T/L3, B1, B2, U/T1, V/T2, W/T3, ⊖, ⊕1, ⊕2) and other high-power lines. Improper wiring practices could result in drive malfunction due to electrical interference.*

**NOTICE:** *Damage to Equipment. Do not tighten screws beyond the specified tightening torque. Failure to comply may damage the terminal block.* ***Refer to 24V Power Supply Wire Size and Torque Specifications on page 13*** *for details.*

**Table 1.17 24V Power Supply Terminal Block CN1**

| CN1 Terminal Block | Terminal No. | Terminal Name (Function) | Function (Signal Level) Default Setting |
|---|---|---|---|
|   | 24V | Tranducer Power Supply | +20V to +24V Vdc 30 mA |
| | AC | Power Supply Common | 0 Vdc |
| | A2 | Analog input | 4-20 mA, 0-20 mA, 0-10 Vdc |
| | FE | Functional Earth Ground for Shielded Connection | ⏚ |