Wheel Drives

WheelMax™ Series Integrated Wheel Drive Assemblies
Handles loads up to 454 kg (1000 lb) and speeds up to 5 km/hr (3 mph)

Allied Motion's **WheelMax integrated wheel drives** are engineered for use as traction drives for electrically powered vehicles. Each compact WheelMax combines a wheel with tire, an epicyclic gearbox, and a brushless DC motor with integrated drive electronics all in a compact, ready-to-mount assembly. Alternate motor types and custom mounting plates are also available; contact an Allied Motion Solution Center for more information.

Applications for this series of wheel drives include AGVs, pushers, tuggers, powered utility carts, robotic material handling vehicles, hospital patient handlers, and automated delivery/retrieval vehicles to name a few.

WheelMax series models are available in two weight classes: those for loads up to 227 kg (500 lb) and those for loads up to 454 kg (1000 lb). Standard models include a Polyurethane 95 Shore A tire. Other materials are available upon request.

Standard WheelMax models are equipped with a brushless DC motor that includes an integrated motor drive, holding brake and magnetic encoder. Enabling torque, velocity and/or position control of the wheel while minimizing wiring complexity.

Features & Benefits

- Two load carrying capacity classes of 227 kg (500 lb) or 454 kg (1000 lb) per wheel
- Up to 25 Nm continuous wheel torque and 350 Watts
- Models compatible with a 24 VDC and a 48 VDC source
- Optimized helical gear geometry minimizes noise and vibration
- A tapered roller bearing supports the wheel's load and an angular contact bearing supports axial loads
- Lifetime gear lubrication reduces maintenance
- Modular mounting bracket that can be customized to accommodate virtually any chassis design
- Brushless DC motor with integrated drive electronics
- Urethane tire for excellent traction, long life and low noise
- Exchange of wheel and tire can be accomplished with minimal effort
- IP50 protection level as standard

Options

- 227 kg (500 lb) weight class with a 200 mm 8" wheel diameter
- Models without holding brake
- Alternate PMDC or BLDC motor with or without integrated drive electronics
- Alternate wheel materials
- Alternate drive electronic I/O including current sourcing/sinking inputs and/or buffered encoder outputs
- Models with CANopen bus
- Models with Encoder Outputs

- Compact powered traction wheel for electric vehicles with travel speed up to 5 km/hr (3 mph)
- Continuous load capacity up to 454 kg (1000 lb) and 25 Nm (221 lb-in) continuous torque
- Available with 150 or 200 mm (6" or 8") diameter wheel

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SPECIFICATIONS

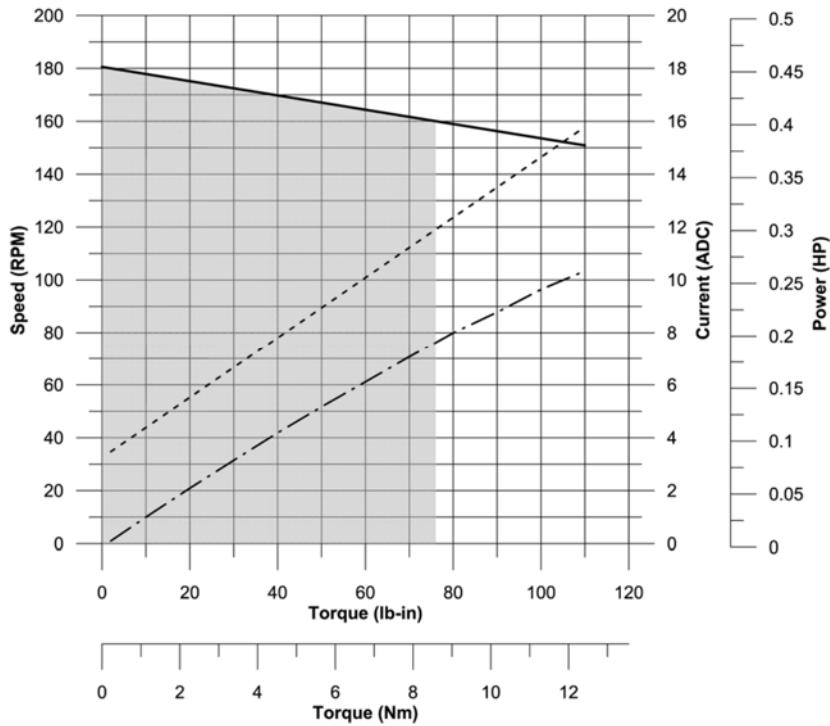| WheelMax Model	GWM-5257xxxx		GWM-5267xxxx	
Rated Load Capacity [kg (lb)]	227 (500)		454 (1000)	
Nominal Tire Diameter [mm (in)]	152.4 (6)		203.2 (8)	
Gear Ratio	20:1		30:1	
Max. Continuous Wheel Torque [Nm (lb-in)]	8.59 (76)		21.02 (186)	
No-Load Wheel Speed [rpm]	180		110	
No-Load Linear Speed [km/h (mph)]	5.31 (3.30)		5.71 (3.55)	
Wheel Speed at Max. Continuous Torque [rpm]	160		102	
Linear Speed at Max. Continuous Torque [km/h (mph)]	4.59 (2.85)		5.02 (3.12)	
Max. Continuous Power [W (hp)]	246 (.33)		350 (.47)	
Max. Incline at Rated Load (degree)	5.0		3.2	
Max. Load at 5° Incline [kg (lb)]	227 (500)		295 (650)	
Motor Voltage [VDC ± 15%]	24	48	24	48
Max. Continuous Current [ADC]	11.9	8.1	16.9	11.4
Brake Holding Torque at Wheel [Nm (lb-in)]	40 (360)		120 (1050)	
Integral Electronic Drive	PWM (20 kHz) 4-quadrant control			
Current (Torque) Loop Type	DQ PI, 100 µs update time			
Velocity Loop	PID / PDF 200 µs update time			
Position Loop	PFF, 500 µs update time (position control available through CANopen channel only)			
Analog Input	Primary analog input: differential ±10 VDC, 10 kΩ, 12-bit resolution			
Analog Output	0 - 3.3 V, 10 mA max.			
Setup Port	RS232, 460800 baud, 8 data bits, no parity, 1 stop bit for setup and tuning using *IN Control* software application running on a PC			
Bus Port (Option)	CANopen over isolated CAN bus, software configurable up to 1000k baud			
Digital I/O—Standard	• 6 inputs (e.g. CW, CCW limits, Enable): +3 to +60 V (OFF); 0 to 0.5 V (ON) at 3 mA nominal draw • 3 outputs (e.g. Fault): open collector, +60 V max., 100 mA max. sink			
Digital I/O—Encoder-Output Option	• 2 inputs (e.g. CW, CCW limits, Enable): Programmable as sinking (~10 kΩ input impedance , 8 - 32 V ON (active), 0 - 3 V OFF) or sourcing (0 - 0.5 V active at 3mA; 3 V - 60 V in active) • 1 output (e.g. Fault): Programmable as sinking (up to +60 V, 100 mA max.) or sourcing (up to 24 V, 20mA)			
Encoder—Standard	• Type: Magnetic, integrated (not available external to motor) • Effective resolution: 4096 cpr • Accuracy: ±0.5 degree			
Encoder— Encoder-Output Option	• Type: Magnetic, integrated • Line count: 4096 per rev; effective resolution • Accuracy: ±0.5 degree • ABZ channels made accessible via I/O connector (J2); line-driver output, 120 Ω minimum load			
Protection Features	• Over-voltage detection (with Encoder-Out Option; threshold at 60 V) • Under-voltage detection (threshold at 10 V) • Reverse-voltage protection (with Encoder-Out Option) • Over-temperature shutdown at 100 °C heat sink temperature • I²T current foldback • IP50			

Model No. ("xxxx" in Model No.)	GWM-5257xxxx Models			Model No. ("xxxx" in Model No.)	GWM-5267xxxx Models			
	Brake	CANopen	Motor Voltage		Brake	CANopen	Encoder Outputs	Motor Voltage
0003	X		24 VDC	0003	X			24 VDC
0004	X	X	24 VDC	0004	X	X		24 VDC
0005	X		48 VDC	0005	X			48 VDC
0006	X	X	48 VDC	0006	X	X		48 VDC
				0009	X		X	24 VDC
				0011	X		X	48 VDC

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PERFORMANCE

Performance for GWM-52570003/0004

Legend:
- —— Speed
- ------ Current
- —·—· Horsepower
- ▨ Continuous Operation

Performance for GWM-52670003/0004

Legend:
- —— Speed
- ------ Current
- —·—· Horsepower
- ▨ Continuous Operation
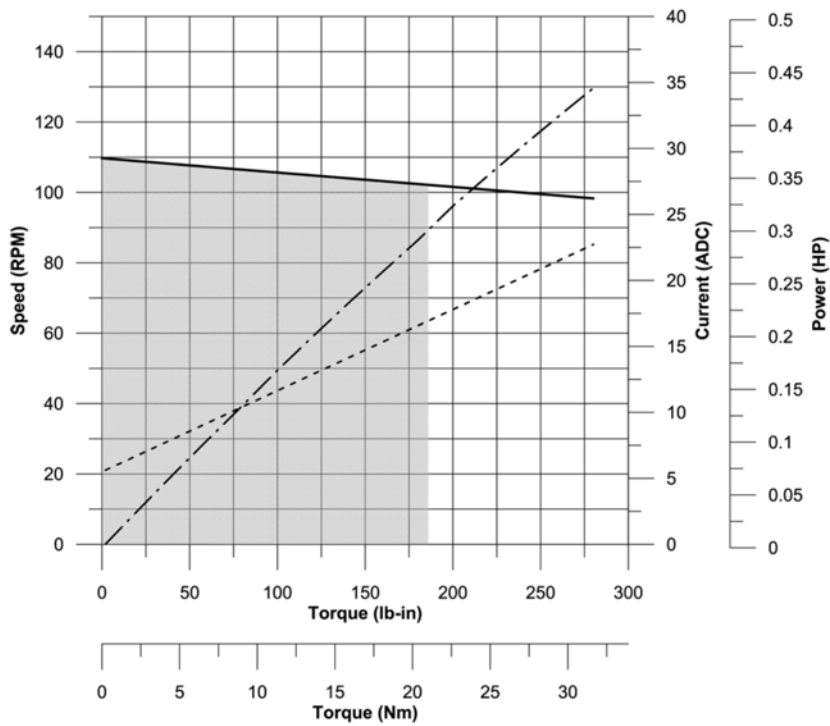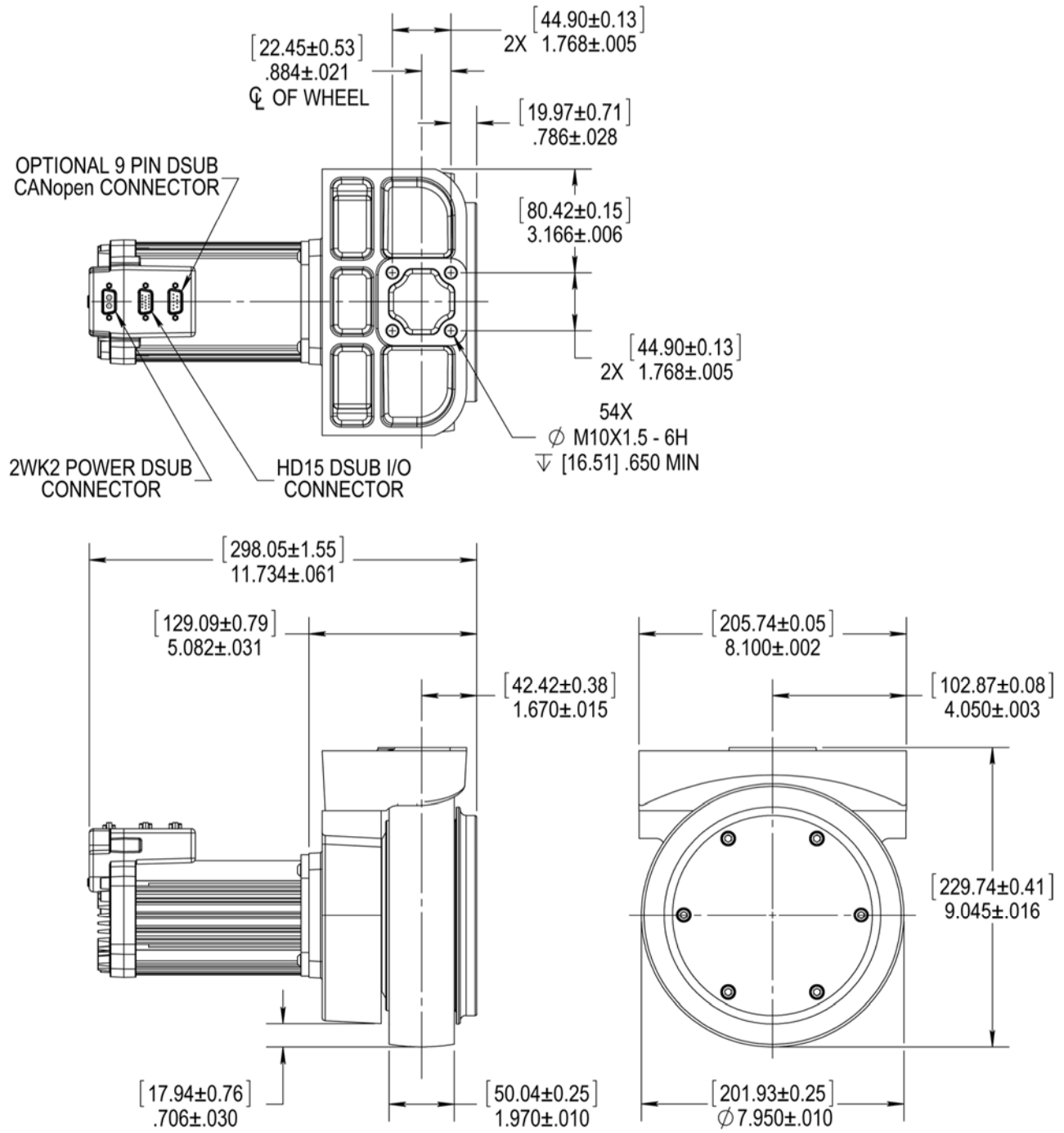
Wheel Drives

WheelMax™ Series

DIMENSIONS FOR BRUSHLESS MODEL GWM-5257XXXX
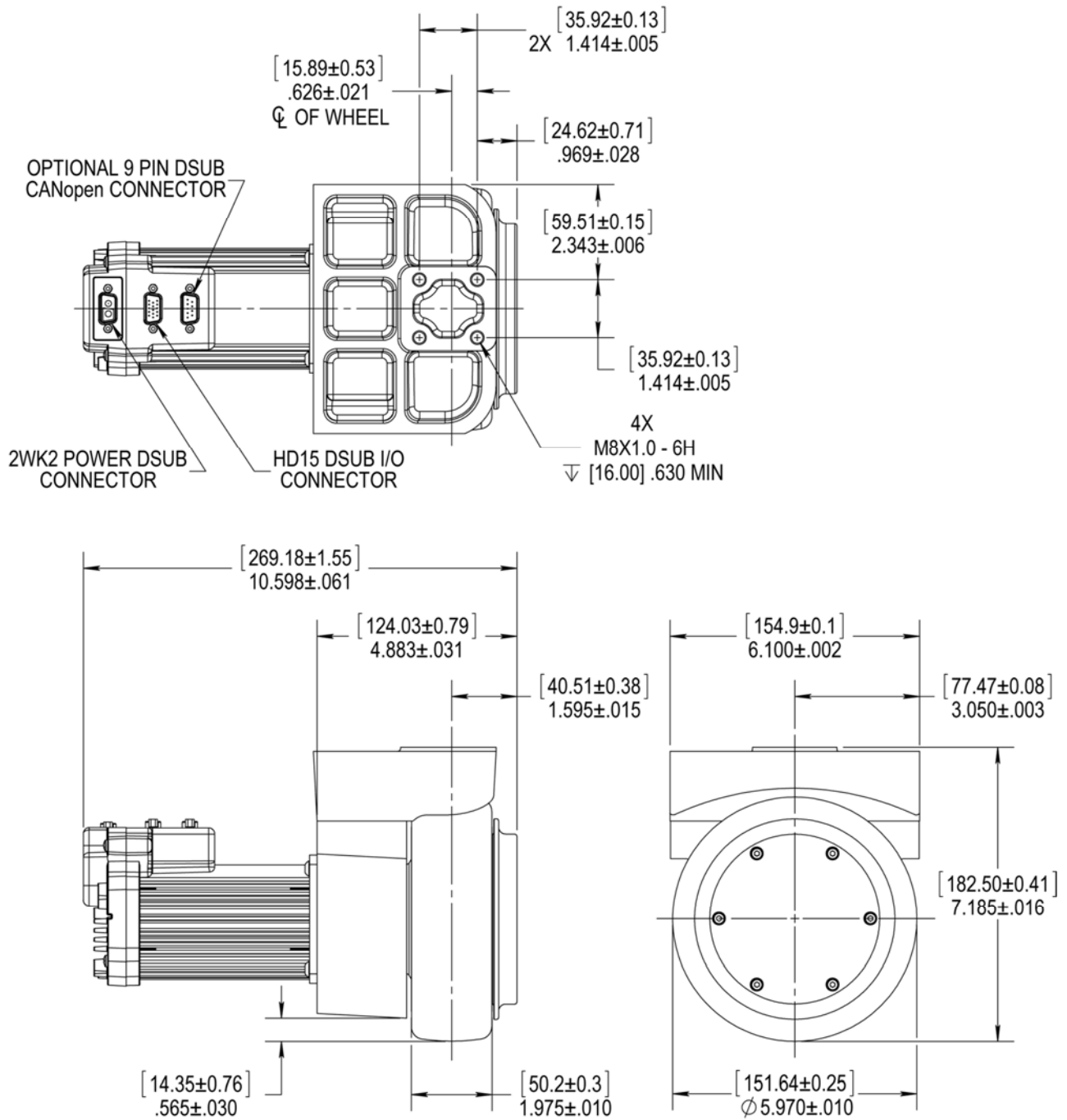
WheelMax™ Series

DIMENSIONS FOR BRUSHLESS MODEL GWM-5267XXXX

[22.45±0.53]
.884±.021
℄ OF WHEEL

[44.90±0.13]
2X 1.768±.005

[19.97±0.71]
.786±.028

OPTIONAL 9 PIN DSUB
CANopen CONNECTOR

[80.42±0.15]
3.166±.006

[44.90±0.13]
2X 1.768±.005

54X
Ø M10X1.5 - 6H
▽ [16.51] .650 MIN

2WK2 POWER DSUB
CONNECTOR

HD15 DSUB I/O
CONNECTOR

[298.05±1.55]
11.734±.061

[205.74±0.05]
8.100±.002

[129.09±0.79]
5.082±.031

[42.42±0.38]
1.670±.015

[102.87±0.08]
4.050±.003

[229.74±0.41]
9.045±.016

[17.94±0.76]
.706±.030

[50.04±0.25]
1.970±.010

[201.93±0.25]
Ø 7.950±.010

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BRUSHLESS MOTOR ELECTRICAL CONNECTIONS

J1

J2

J3
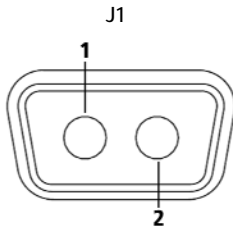
Motor Power (J1)	
Pin	Function
1	DC Power (–)
2	DC Power (+)
Mate: Konmek PS400N- 2WK2FTB0 Sealed Mate: Konmek PS400N- 2WK2FTB0 / HW1-1	
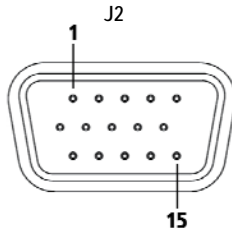
Standard	
User I/O (J2)	
Pin	Function
1	INPUT 1
2	INPUT 2
3	INPUT 3
4	INPUT 4
5	Analog Input 1 (+)
6	INPUT 5
7	INPUT 6
8	RS232 Rx / RS485 (–)
9	OUTPUT 1
10	Analog Input 1 (–)
11	OUTPUT 2
12	OUTPUT 3
13	RS232 Tx / RS485 (+)
14	COMMON
15	Analog Output
Mate: Konmek HS0-15FTB0 Sealed Mate: Konmek HS0-15FTB0 w/ HW1-1 shroud	

Encoder-Output Option	
User I/O (J2)	
Pin	Function
1	INPUT 1
2	INPUT 2
3	Encoder B (+)
4	Encoder B (-)
5	Analog Input 1 (+)
6	Encoder A (+)
7	Encoder A (-)
8	RS232 Rx
9	OUTPUT 1
10	Analog Input 1 (–)
11	Encoder Z (+)
12	Encoder Z (-)
13	RS232 Tx
14	COMMON
15	Analog Output
Mate: Konmek HS0-15FTB0 Sealed Mate: Konmek HS0-15FTB0 w/ HW1-1 shroud	
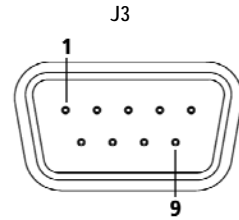
CANopen (J3)	
Pin	Function
1	
2	CANL
3	CAN COM
4	
5	
6	
7	CANH
8	
9	CANV+
Mate: Konmek DS0-09FTB0 Sealed Mate: Konmek DS0-09FTB0 w/ HW1-1 shroud	

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