



Torque Feedback Device

Cost Effective High Quality Tactile Interface

Description

The new Torque Feedback Device (TFD) provides a variable torque output, in proportion to a DC input, for steering and other by-wire applications. This innovative design offers a cost effective, high quality user interface by applying state-of-the-art friction materials and a patent pending electromagnetic actuation system.

Incorporated into the TFD are two redundant sensors for fail-safe shaft feedback. Several standard product configurations are offered with torques ranging from 2.5 to 20Nm, and the TFD's modular design makes it easily adaptable to specific application requirements.

Features

- Integrated design combines both tactile and position/velocity feedback with a steering wheel interface in one mechanical package.
- Compact design offers high torque densities and energy efficient operation.
- Continuously variable torque output for high quality operator interface or "feel".

- Redundant sensors for safety and field serviceability.
- Modular design allows the product to be easily scaled to specific application requirements.
- Repeatable operation over a wide range of operating conditions and product life.
- Assembly and all components meet EU Directive 2002/95/EC (RoHS)

Typical Steer-By-Wire Applications

- Electric vehicles including:
 - Lift trucks
 - Golf carts
 - Pallet trucks
 - Floor sweepers
 - Cleaning equipment
- Turf & garden equipment (professional lawnmowers)
- Military/aerospace
- Construction equipment
- Industrial & recreational marine/boats

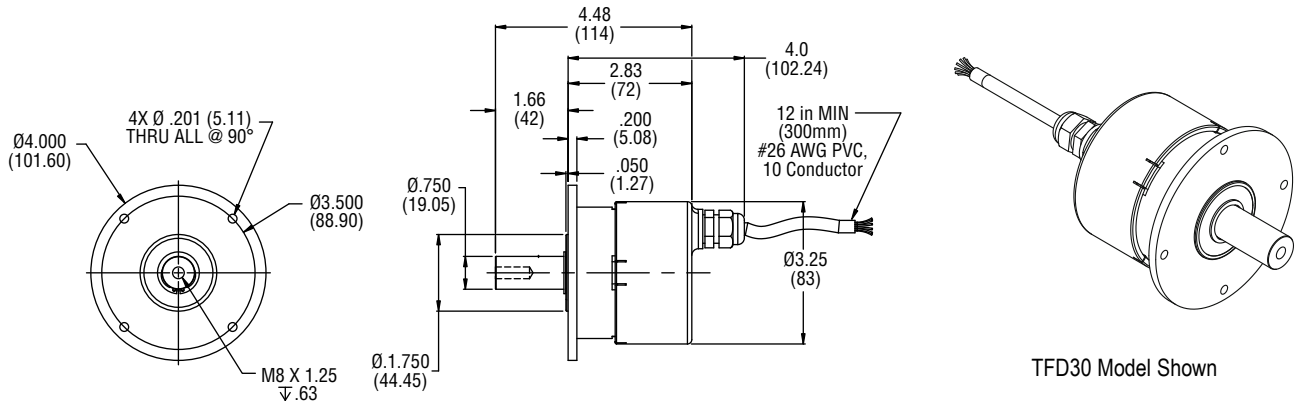
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Helping you build a better machine, faster.

TFD-30

Dimensions & Specifications



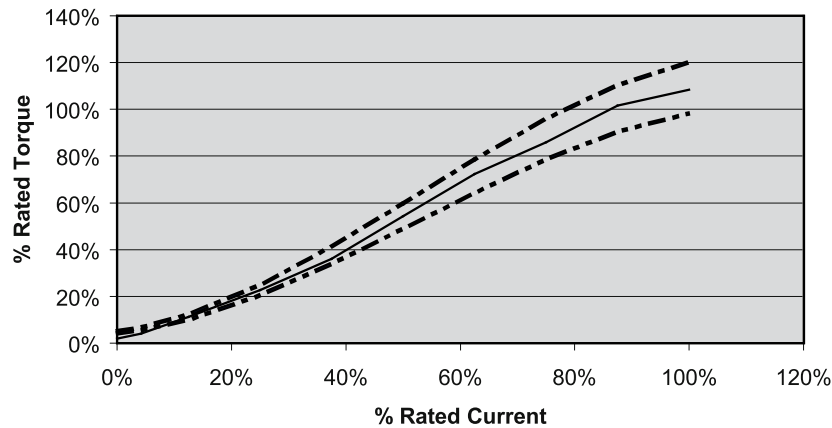
TFD30 Model Shown

Dimensions (mm)

PERFORMANCE							
Model	Static Torque lb-in (Nm)	Coil Voltage* VDC	Resistance Ohms @ 20°C nom	Power Watts max	Speed* RPM	Rotor Inertia lb-in-sec ²	Weight lb (kg)
TFD-30 025	22 (2.5)	12	3.6	40	300/120	35 X 10 ⁻³	3.5 (1.59)
		24	12.5	46	300/120	35 X 10 ⁻³	3.5 (1.59)
		36	32.6	40	300/120	35 X 10 ⁻³	3.5 (1.59)
		48	55.0	42	300/120	35 X 10 ⁻³	3.5 (1.59)
TFD-30 050	44 (5.0)	12	3.6	40	300/120	62 X 10 ⁻³	3.5 (1.59)
		24	12.5	46	300/120	62 X 10 ⁻³	3.5 (1.59)
		36	32.6	40	300/120	62 X 10 ⁻³	3.5 (1.59)
		48	55.0	42	300/120	62 X 10 ⁻³	3.5 (1.59)

(-) denotes metric equivalents. Specifications subject to change without notice.
*Intermittent/Continuous

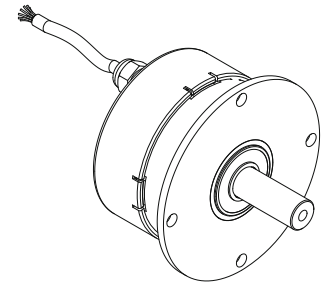
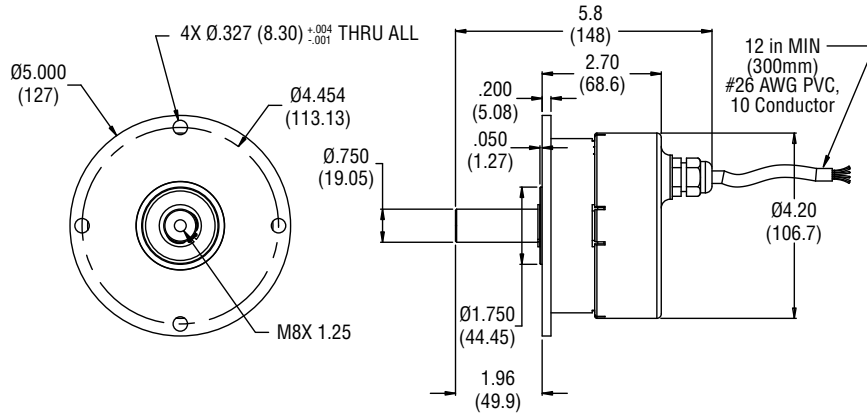
Typical Torque Performance



% Rated Torque	% Rated Current
2%	0%
25%	28%
50%	47%
75%	65%
100%	88%

TFD-40

Dimensions & Specifications



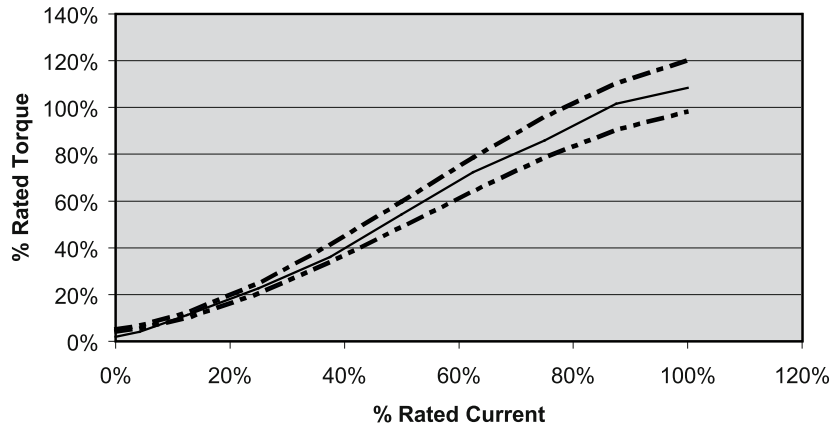
TFD40 Model Shown

Dimensions (mm)

PERFORMANCE							
Model	Static Torque lb-in (Nm)	Coil Voltage* VDC	Resistance Ohms @ 20°C nom	Power Watts max	Speed* RPM	Rotor Inertia lb-in-sec ²	Weight lb (kg)
TFD-40 050	44 (5.0)	12	3.5	42	300/120	76 X 10 ⁻³	6.2 (2.8)
		24	11.0	51	300/120	76 X 10 ⁻³	6.2 (2.8)
		36	22.7	57	300/120	76 X 10 ⁻³	6.2 (2.8)
		48	35.5	65	300/120	76 X 10 ⁻³	6.2 (2.8)
TFD-40 090	80 (9.0)	12	3.5	42	300/120	10 X 10 ⁻²	6.2 (2.8)
		24	11.0	51	300/120	10 X 10 ⁻²	6.2 (2.8)
		36	22.7	57	300/120	10 X 10 ⁻²	6.2 (2.8)
		48	35.5	65	300/120	10 X 10 ⁻²	6.2 (2.8)
TFD-40 120	106 (12.0)	12	3.5	42	300/120	13 X 10 ⁻²	6.2 (2.8)
		24	11.0	51	300/120	13 X 10 ⁻²	6.2 (2.8)
		36	22.7	57	300/120	13 X 10 ⁻²	6.2 (2.8)
		48	35.5	65	300/120	13 X 10 ⁻²	6.2 (2.8)

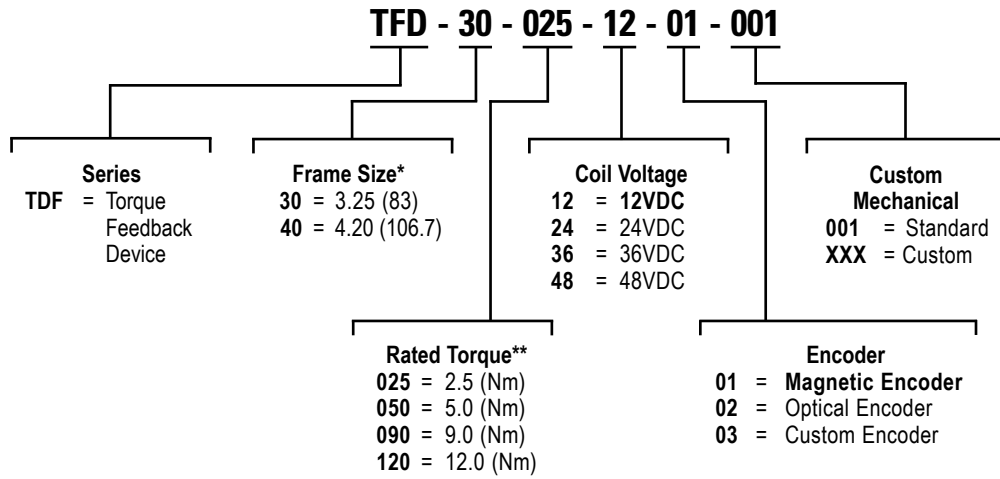
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*Intermittent/Continuous

Typical Torque Performance



% Rated Torque	% Rated Current
2%	0%
25%	28%
50%	47%
75%	65%
100%	88%

How to order



*Case diameter

** Rated Torque availability

2.5 (Nm) - TFD30 only

5.0 (Nm) - TFD30 & TFD40

9.0 (Nm) - TFD40 only

12.0 (Nm) - TFD40 only