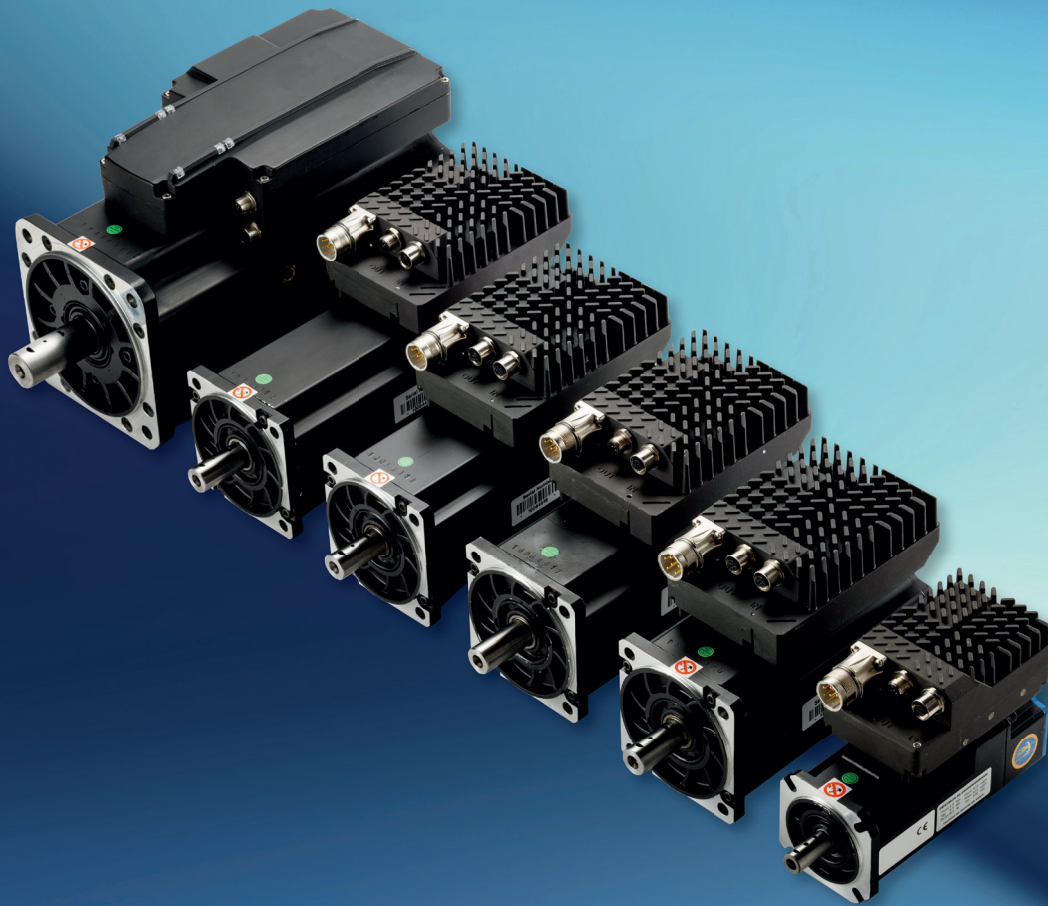


HTW Motor  
Integrated Servodrive

**HITACHI**  
Inspire the Next



EtherCAT®

Automation Solutions by **Hitachi**

# Introduction

The new Hitachi TorqueWire series of integral servo systems sets a new style in complex automatic machinery architecture. Hitachi TorqueWire motors are complete, self-sufficient servo axis building blocks which allow the design, integration and operation of large multi axis-systems with minimum hardware and surprising ease. The Hitachi TorqueWire motor system consists of an advanced, high performance rare earth brushless servo motor, a DSP based, high voltage interpolating servo drive and a single or multi-turn absolute encoder, all assembled in a very compact IP 67 protected frame.

The motor systems are controlled via a multi-drop EtherCAT field bus, linking together groups of motors on a single bus system. The motors are supplied from a common DC bus and braking energy from any drive is intrinsically recycled on any other axis on the network. The performance of Hitachi TorqueWire originates in the advanced design of both motor and drives.

The motor parts take advantage of a novel, patent pending winding design, along with new magnetic materials and a special winding technique, all of which result in a servo motor with about 60% of the size of a conventional servo design. Such advantage is invested in both temperature rise derating and space for the drive, so that Hitachi TorqueWire motors, including the drive, are smaller than comparable motors with a similar rating.

## 1.1 Main application

---

HTW Motor Series create a different approach to complex automatic machinery architecture. They are complete, self-sufficient servo axis building blocks which allow the design, integration and operation of large multi-axis systems with minimum and simplified hardware.

- Work-piece setting for wood and metal forming
- Packaging, bottling, wrapping, especially on rotary machine (single wire command for multi-axis)
- Tool changers
- Laser plotter
- Pick and place robots
- Mould automation
- Assembly machines

## 1.2 Main features

---

- Typical Supply Voltage Range: 310 – 560 Vdc
- Rated Torque Range: 2,4 Nm – 70 Nm
- Type of cooling: natural convection, water cooling and fan cooling (only for HTW07 models)
- Servo Integrated Drive
- Endat Heidenhain Absolute Encoder single or multi-turn (280 arcsec accuracy) or two-pole resolver
- Integrated RFI filter Class B
- Protection degree: IP 67

### 1.3 Mode of operation

---

The HTW motor is compatible with EtherCAT- COE (CANopen over EtherCAT), using the CiA DSP402 V2.0 (Device Profile Drives and Motion Control)

- Profile position mode
- Profile velocity mode
- Interpolated position mode
- Factor group
- Homing mode
- Cyclic Synchronous velocity (CSV)
- Cyclic Synchronous Position (CSP)
- Cyclic Synchronous Torque (CST)

### 1.4 HTW special functions

---

- Torque (current) mode
- Auxiliary digital input for emergency disable
- 2nd order digital filters
- Rotary table control

### 1.5 HTW Motor option ordering code

---

- Optional integrated holding brake (B)
- Optional shaft forelock (K)

### 1.6 HTW programming tools

---

- Free Hitachi programming tool: Cockpit3
- Integrated powerful debugging tool: SoftScope

### 1.7 STO safety function performance

---

STO function on HTW03A – HTW05A motor according to IEC EN 61800-5-2:2007

The comparison between PFH value, SFF value, and HFT value shows that STO function on HTW3 motor reaches a level of SIL3.

## 1.8 Motor LED status

The HTW Motor is equipped with two couples of LED'S, which indicate the motor status (LED on the upper and lower side of the motor give redundant information, except when different noted)



Figure 1: LED identifications

LED1	LED2	Motor Status
Blinking	Off	Power supply Ok. Power output disabled
On	Blinking	Power supply Ok. Power output enabled
Blinking alternately		Fault
Blinking simultaneously		Waiting for firmware download (due to Firmware download activation or wrong firmware CRC check)
Off	Two fast blink	Low DC link circuit voltage
On (one side)	Off (both side)	Flash memory corrupted, contact technical service

EtherCAT Status	Communication Status
Off	No physical link connection
On	Physical link connection established

## 1.9 HTW Motor Technical Data Overview

HTW03A Model	
HTW03A02A.40	
Flange Size [mm]	75
Length Range [mm]	167
Rated Speed (rpm)	4000
Rated Torque S1 [Nm]	1.9
Nominal Power [kW]	0.8
Max. Torque S6 (40%) [Nm]	7.1



HTW05A Model	
HTW05A03A.40	
Flange Size [mm]	100
Length Range [mm]	195
Rated Speed (rpm)	4000
Rated Torque S1 [Nm]	2.4
Nominal Power [kW]	1.0
Max. Torque S6 (40%) [Nm]	9.0



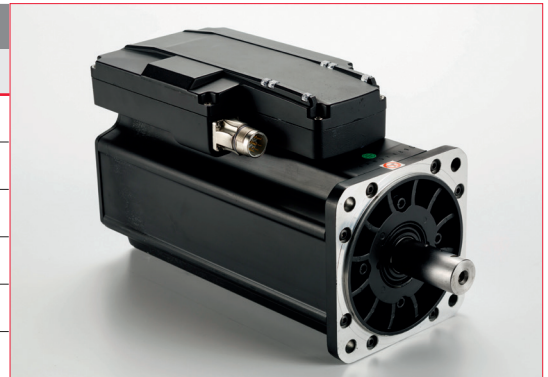
HTW05A Model	
HTW05A06A.30	
Flange Size [mm]	100
Length Range [mm]	239
Rated Speed (rpm)	3000
Rated Torque S1 [Nm]	5.5
Nominal Power [kW]	1.6
Max. Torque S6 (40%) [Nm]	13.0



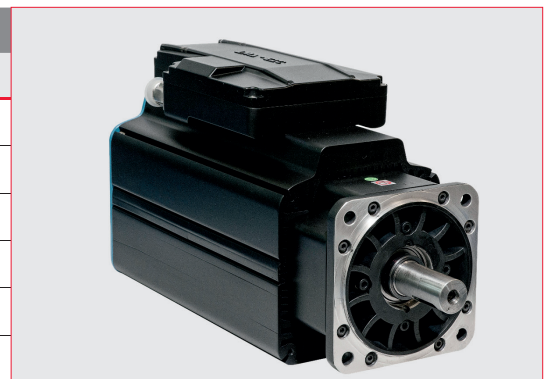
HTW05A Model	
HTW05A09A.20	
Flange Size [mm]	100
Length Range [mm]	279
Rated Speed (rpm)	2000
Rated Torque S1 [Nm]	8.5
Nominal Power [kW]	1.75
Max. Torque S6 (40%) [Nm]	20.0



HTW07C Model	
HTW07C30.30	
Flange Size [mm]	145
Length Range [mm]	355
Rated Speed (rpm)	3000
Rated Torque S1 [Nm]	55.0
Nominal Power [kW]	17.0
Max. Torque S6 (40%) [Nm]	74.0



HTW07F Model	
HTW07F30.30	
Flange Size [mm]	145
Length Range [mm]	370
Rated Speed (rpm)	3000
Rated Torque S1 [Nm]	45.0
Nominal Power [kW]	13.6
Max. Torque S6 (40%) [Nm]	70.0



HTW07 motor additional models	HTW07C Model	HTW07C Model	HTW07F Model	HTW07F Model
	HTW07C20.40	HTW07C40.20	HTW07F20.40	HTW07F40.20
Flange Size [mm]	145	145	145	145
Length Range [mm]	305	406	340	440
Rated Speed (rpm)	4000	2000	4000	2000
Rated Torque S1 [Nm]	36.0	80.0	30.0	66.0
Nominal Power [kW]	14.0	20.0	11.2	16.0
Max. Torque S6 (40%) [Nm]	57.0	108.0	45.0	90.0

## 1.10 Cockpit3 Interface

The Cockpit configuration tool is useful to create, analyze, modify, and copy all parameters for your applications.

This tool has to be installed on a PC. The Cockpit configurator is able to:

- Access to all functionalities and to all parameters of the drive
- Identify the unit ID number by the CiA DSP305 V1.1 (Layer Setting Services protocol)
- Read all parameters from the drive and save them into backup file \*.par
- Download the firmware release when necessary
- Makes powerful diagnostic with the Monitor Page, Monitor window, and Graphic window functions

## 1.11 SoftScope Interface

SoftScope is a powerful debugging tool, which can be working either as the asynchronous debugger or as the synchronous debugger. Being an asynchronous tool, SoftScope allows you to plot the evolution of the values of a set of parameters. In addition, being a synchronous tool, it allows you to select a set of parameters, to have them sampled synchronously which occurs when the processor reaches the position where you place the trigger and to have their curve displayed in a proper window.

## HTW Power Supply (HTW PSU) Technical Information

HTW Power Supply	PX1.001.4			PX1.010.2		PX1.015.4
Main Power	230V single phase	230V 3-phase	400V 3-phase	230V single phase	230V 3-phase	400V 3-phase
Rated Output Voltage	310 Vdc		530 Vdc	310 Vdc		530 Vdc
Rated Output Power	500W	700W	1.2kW	4kW	8kW	15k kW
Peak Output Power	2kW	2.8kW	4.8kW	5.5kW	16kW	30kW
Clamping Voltage Value	375Vdc		750Vdc	375Vdc		750 Vdc
Overload Current	>1.6	>2.5	>2.5	>15A	>27A	>27A
Brake Voltage	400 Vdc			400 Vdc		800 Vdc
Recommend Braking Resistor	70 Ω		100 Ω	20 Ω		20 Ω
Auxiliary Power Supply	100 W		300 W	1000 W		1000 W
				Bluetooth communication available		



# HITACHI

## Inspire the Next

Hitachi Europe GmbH, Niederkasseler Lohweg 191, D-40547 Düsseldorf  
Phone: +49 (0)211-5283-0  
[www.hitachi-industrial.eu](http://www.hitachi-industrial.eu), [info@hitachi-ds.com](mailto:info@hitachi-ds.com)  
© Hitachi Industrial Equipment Systems Co., Ltd., Japan