



Product Brochure

# HT500 Synchronous Drive



We provide electric motors, drives, and mechanical power transmission products, services and expertise to save energy and improve customers' processes over the total lifecycle of our products, and beyond.



# HT500

## Energy efficient, high torque belt drive system

Synchronous belt drives run slip-free and are proven to be more efficient and provide better performance than V-belt drives. They also offer significant performance advantages over chain drives related to wear and elongation resistance, require no lubrication and have broad applicability. It is not necessary to re-tension synchronous drives – a significant advantage over alternative drive solutions. HT500 synchronous drives can also operate in wet and oily environments.

The Dodge high torque HT500 Synchronous Drive product line delivers high torque, low maintenance, and high energy efficiency with less overhung load than V-belt drives. The HT500 product family features a complete offering of TAPER-LOCK® synchronous sprockets; as well as minimum plain bore sprockets (MPB) available from stock. Made-to-order capabilities include different shaft mounting options, as well as a wide range of materials.

Dodge also offers the HT500 belt as a companion to our sprocket products. The HT500 belt is made of polyurethane and carbon fiber cords ensuring high durability in severe environments and higher torque transmission than similar rubber made products. With our HT500 Synchronous Drive product, We are committed to your success by providing you energy savings and overall cost reductions.



# HT500

## Energy efficient, high torque belt drive system

### HT500 product highlights

- Energy Efficiency, HT500 synchronous drive system is 98% efficient vs. typical V-belt drive efficiency of 93%
- Offers decreased maintenance cost vs. V-belt drive designs
- No lubrication cost
- Reduces overhung load on installed system components
- Less overhung load will potentially extend operating L10 life of motor's drive-end bearing
- Reduced overhung load increases probability to keep a deep groove ball bearing design over need for a roller bearing and shaft of higher strength steel in electric motors
- HT500 drive packages - more compact and power dense than V-belts and other synchronous drives
- Overall system's weight and tension forces often reduced
- HT500 belt features modified curvilinear tooth profile
- Our high strength synchronous belt made of polyurethane with carbon fiber cords and black nylon tooth facing ensures optimum traction and long belt life
- HT500 belt runs slip free requiring less maintenance and re-tensioning (over traditional V-belts)
- HT500 belts operate in wet, dusty, and oily environments, it also has the capability to handle higher temperature than V-belts
- Available in 8mm & 14mm metric pitches
- From fractional - 1,100+ kW
- Special shaft attachment, bores, materials, and designs available made-to-order



# HT500

## Energy efficient, high torque belt drive system

The International Energy Agency's paper on "Energy-Efficiency Policy Opportunities for Electric Motor-Driven Systems" advises to use synchronous belts as an improvement possibility for energy savings. The US Department of Energy also encourages the use of synchronous belts in all motor installations to maintain an overall efficiency rating of 98% across a wide load range. The HT500 Synchronous Belt is designed to offer the energy efficiency of a synchronous belt drive in a compact design.

### HT500 55kW Drive example

Motor kW=	55	Energy price kWh	€ 0,10	Electric Motor	Efficiency 95.4%	Mechanical Drive System	
Fixed kW load demand =	38.4			V -belt	Eff 93%	HT500	Eff 98%
Hours of operation x year	6,000						
(1) Mechanical power out of driven sheave or sprocket					38.4	38.4	
(2) Mechanical power into driver sheave or sprocket from the motor					41	39	
% of rated load					75.1%	71.2%	
(3) kW into motor					43	41	
(4) kWh/year used					259,688	246,438	
(5) Energy cost per year					€ 25.968,76	€ 24.643,82	
<b>(6) Savings</b>							<b>€ 1.324,94</b>
Mechanical drive system eff =					93%	98%	
Motor Efficiency =					95.4%	95.4%	
(7) Overall system Efficiency =					89%	93%	
(Fixed kW load demand)/(Mtr Eff x V-belt Eff)*(Hrs of operation)*(Energy price kWh) =					€ 25.968,76		
(Fixed kW load demand)/(Mtr Eff x HT500 Eff) *(Hrs of operation)*(Energy price kWh) =							€ 24.643,82
<b>Savings</b>							<b>€ 1.324,94</b>

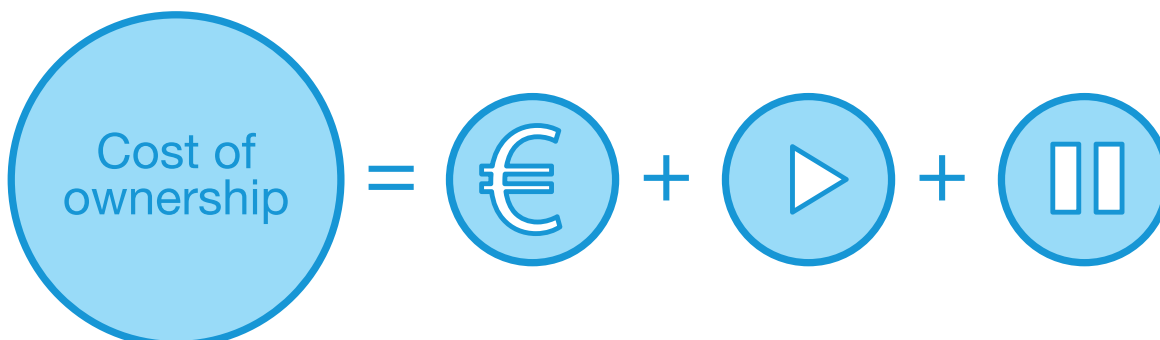


- (1) = Fixed kW load demand
- (2) = (motor's nominal kW) / (drive system efficiency) = Mechanical Power into driver sheave/sprocket from the motor
- (3) = (Mechanical Power into driver sheave or sprocket) / (motor's efficiency) = kW into motor
- (4) = (kW into motor) X (Hours of operation x year) = kWh/year
- (5) = (Power cost per kWh/year) x (kWh/year used) = Energy cost per year
- (6) = Savings: the difference between the kWh cost using a V-belt drive vs a Synchronous drive
- (7) = (Mechanical drive system efficiency)\*(Motor's efficiency) = Overall system's efficiency

#### Additional Benefits from HT500

- No Maintenance Cost
- Zero slip
- Constant time, speed
- Positive engagement
- Less downtime

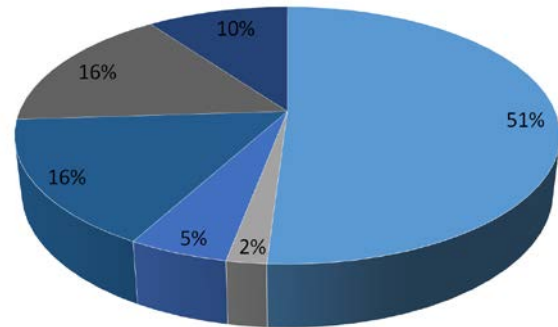
Our Value added solution will not only save you time and money short term, but many years thereafter



# HT500

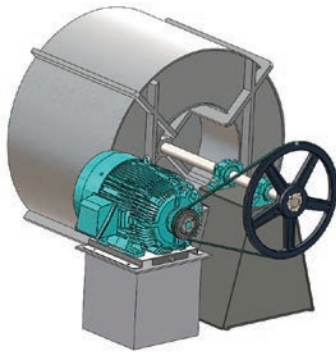
## Energy efficient, high torque belt drive system

The Institute Electrical and Electronics Engineers (IEEE) conducted a survey to identify major causes of motor failures; the chart below is an abstract from their Petro-Chemical paper PCIC-94-01. It concludes that 51% of all motor failure is attributed to bearing problems. By decreasing the belt pull and overall overhung load, a motor bearing will last longer.



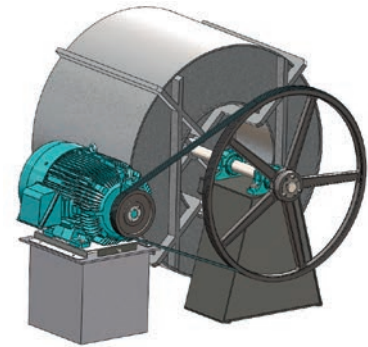
- Bearings
- Shaft couplings
- Rotor bar
- Stator winding
- External - environment, voltage & load. Likely to happen again.
- Unknown - no root failure analysis

## HT500 55kW Synchronous drive vs. V-belt drive comparison



### General application specifications

**KW:** 55  
**Freq:** 50HZ  
**Enclosure:** TEFC  
**RPM:** 1500  
**Frame:** 250M (IEC)  
**Ratio:** 4:1



Name	Description	Part number
Driver sprocket	14MX-45S-20	482031
Driver bushing	3020W x 65M	115449
Driven sprocket	14MX-180S-20	482048
Driven bushing	3525W x 50M	100025
Belt(s) (Qty:1)	HT500 Belt 3500-14MX-20	142766
Motor	M3BP2505MA4	3GBP2520RADK

**HT500  
vs  
V-belt**

Name	Description	Part number
Driver sheave	3/5V12.5-3020	111103
Driver bushing	3020W x 65M	115449
Driven sheave	3/5V50.0-4040	111014
Driven bushing	4040W x 50M	115921
Belt(s) (QTY:3)	5VX1800 Belt	107186
Motor	M3BP2505MA4	3GBP2520RADK

## Our total cost of ownership solution!

### We want to offer you added value solutions so you can achieve your maximum potential cost savings

- Driver sheave diameter reduced by 38%
- Driven sheave diameter reduced by 37%
- Used 1 belt instead of 3
- Cost reduction
- Reduced overall drive weight by 51%
- Belt pull reduced by 23% which increases the L10 life of the motor bearing by a factor of 2

# HT500

## HT500 Sprocket and belt sizes chart

### HT500 Sprocket and belt size

#### 8MM Pitch

Width	Sprocket range	Bushing min – max	Belt length range
12mm	22T – 224T	MPB/1008 - 2517	248mm – 4480mm
21mm	22T – 224T	MPB/1008 - 3020	248mm – 4480mm
36mm	22T – 244T	MPB - 3525	248mm – 4480mm
62mm	22T – 224T	MPB - 3525	640mm – 4480mm

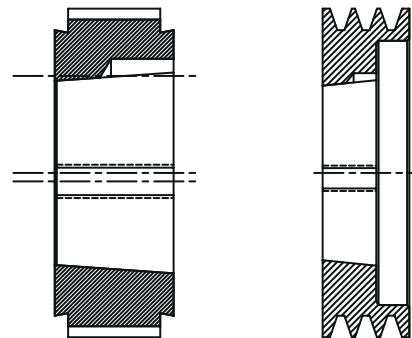
#### 14MM Pitch

Width	Sprocket range	Bushing min – max	Belt length range
20mm	28T – 224T	2012 - 4030	994mm – 4410mm
37mm	28T – 224T	MPB/2012 - 4030	994mm – 4410mm
68mm	28T – 244T	MPB - 5040	994mm – 4410mm
90mm	28T – 224T	MPB - 6050	994mm – 4410mm
125mm	28T – 224T	MPB - 7060	994mm – 4410mm

## MTO capabilities and accessories

### MTO capabilities

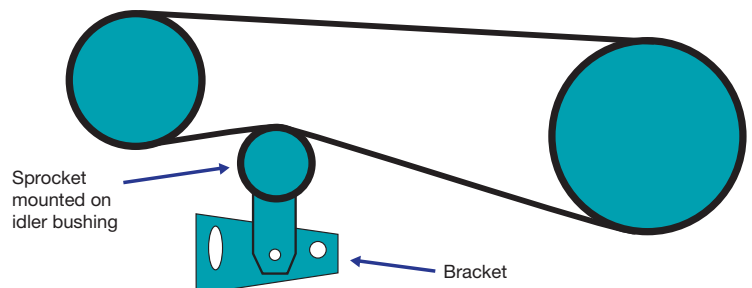
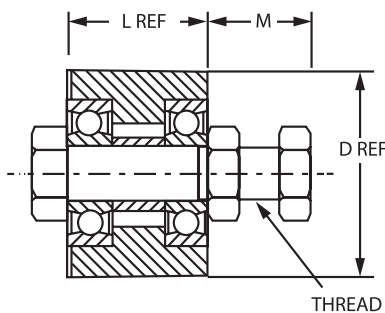
- Materials: Cast Iron, Ductile Iron, Steel, Stainless Steel & Aluminum construction available.
  - Cast Iron, Steel, Stainless Steel and Aluminum Bar stocked through 381mm
  - Ductile Bar stocked through 762mm
  - Larger diameters available using standard and special castings
- Plating: Zinc & Nickel
- Shaft attachments & bores: TAPER-LOCK®, Minimum-Plain-Bore (MPB), and custom sizes



### Idler bushings & brackets

Used to tension fixed center belt drives

- |                     |                        |
|---------------------|------------------------|
| <b>TAPER-LOCK®:</b> | <b>Idler brackets:</b> |
| - 1610 - IDL        | - # 5                  |
| - 2012 - IDL        | - # 10                 |
| - 2517 - IDL        | - # 20                 |



- Sealed ball bearings
- Mount standard TAPER-LOCK®
- Use as-is or with idler bracket

# Contact us

You can find the address of your local sales organisation on the ABB homepage:

**[www.abb.com/mechanicalpowertransmission](http://www.abb.com/mechanicalpowertransmission)**

**Note:** We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG.

Copyright © 2014 ABB  
All rights reserved