



Sumitomo Drive Technologies

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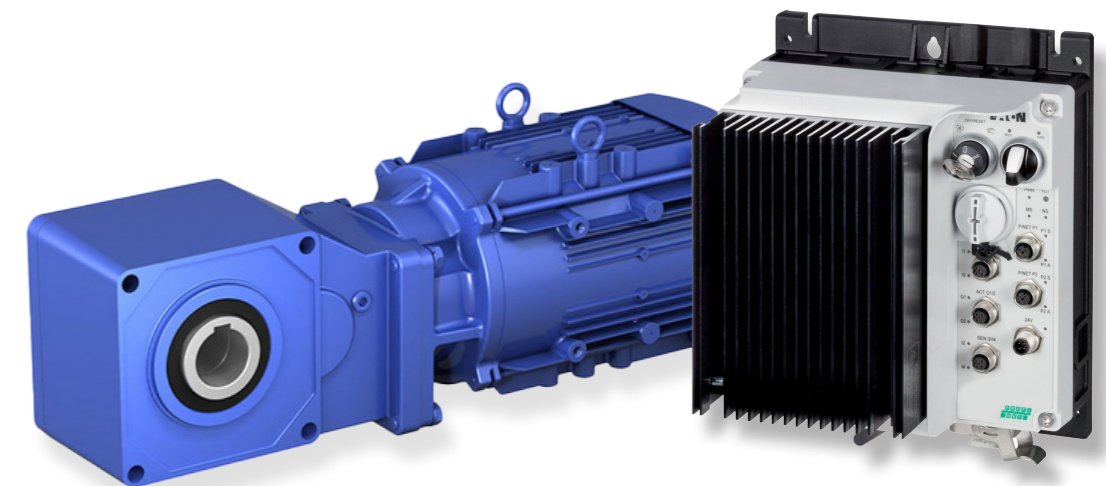
Sumitomo, Hansen and Seisa. Three brands, one global power transmission solutions provider. Sumitomo Drive Technologies has facilities strategically located throughout the world, providing comprehensive products and services in your region.

- ★ MANUFACTURING HUB
- ASSEMBLY & SERVICE
- SERVICE
- ▲ REGIONAL SALES OFFICE

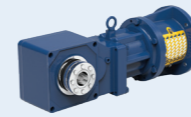


BH CYCLO® BEVEL BUDDYBOX® - H SERIES

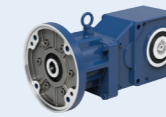
with IE5 Motor & RAMO5, RASP5 VFD



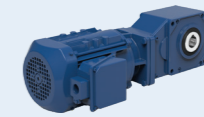
• Shrink



• Keyed Hollow



• Gearmotor



INPUTS & OUTPUTS

HARDENED STEEL GEARING

QUALITY HOUSING

Aluminum housing is lighter and increases thermal capacity.

SEALS

Multiple lip, harsh duty, and food-grade designs available to prevent leaks.

BEVEL PINION & HELICAL GEARING

A combination of power and speed. Up to 97% gear efficient across all ratios providing a smooth, quiet operation which does not require a cooling fan.

BEVEL PINION

Single-piece all steel bevel pinion for longer life. Lasts millions of cycles without measurable wear.

BH BEVEL BUDDYBOX® H SERIES

EXTREMELY EFFICIENT AND COMPACT WITH LOW REDUCTION RATIOS

The combination of a **Bevel Input** and a **Helical Output** make this unit **extremely efficient** with the capacity for input speeds up to **3,600 rpm**. Dependable **hardened steel gearing** inside a **lightweight, compact housing** allows for **easy installation** with less load on the head shaft. Aluminum construction provides **high thermal capacity**.

The **maintenance-free** grease lubrication enables the unit to be mounted in any orientation without custom modifications. The **greater efficiency** of the BBB-H allows for use of a **smaller motor**, resulting in the same performance with much **lower operating costs**. Its **power and speed** make this unit perfect for airport baggage handling and general conveying applications.

OPTIONS



SPECS



HP RATING
From 0.75-4.0kW



DIAMETER
35,45,55mm
(Hollow Bore)

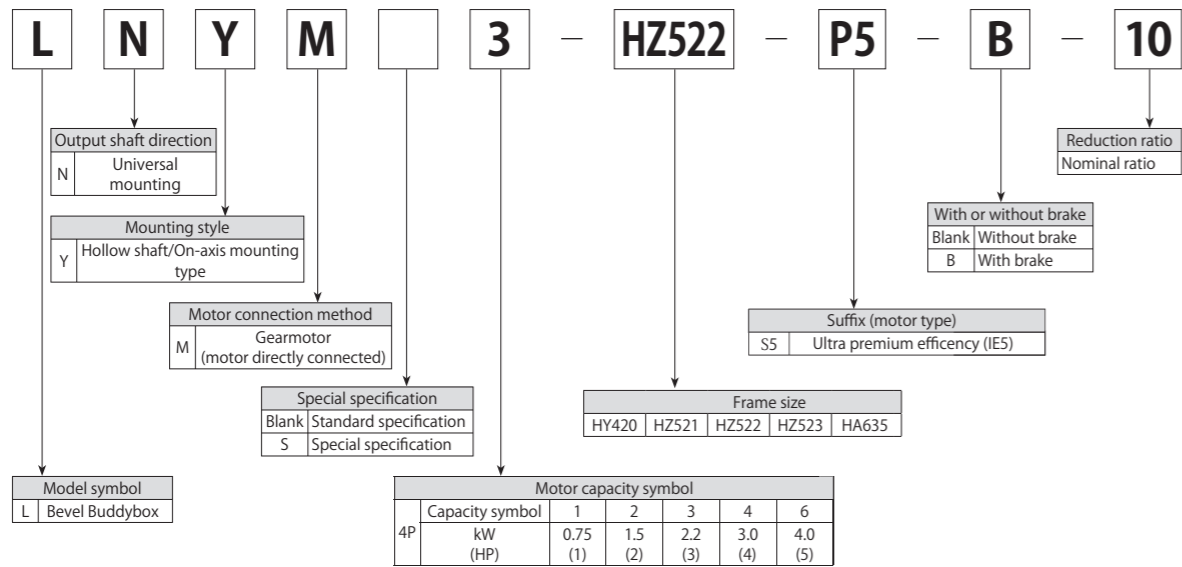


TORQUE
Up to 1,020 N·m

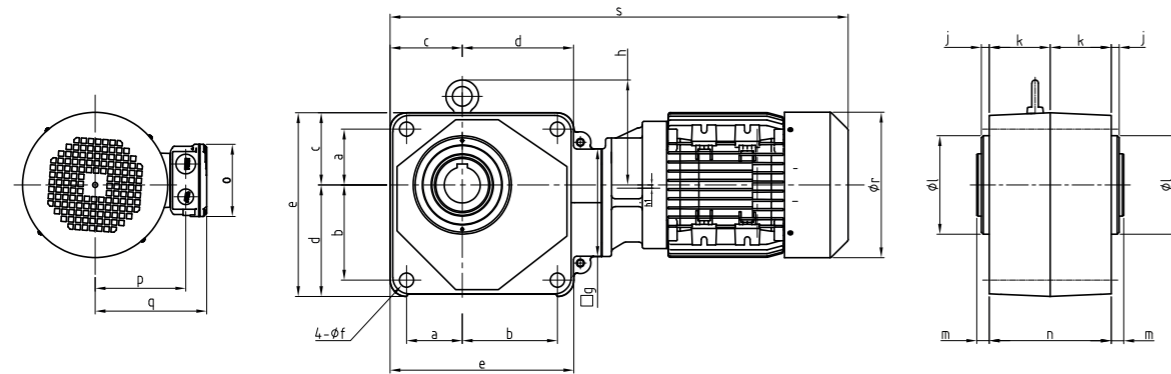


RATIO RANGE
5:1 up to 30:1

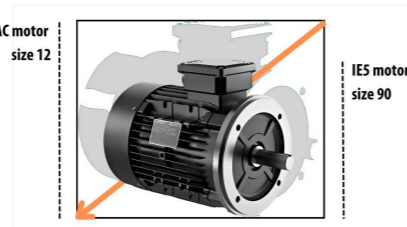
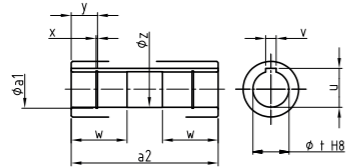
NOMENCLATURE



DIMENSION DRAWINGS



REDUCTION OF DIMENSIONS & WEIGHT



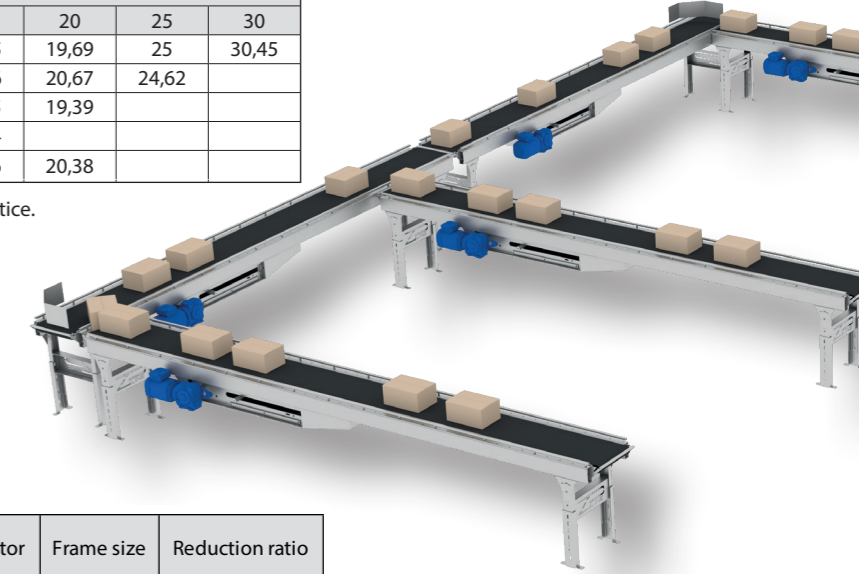
Weight AC Motor
Size 112 - 5.5kW - 34kg
Size 132 - 7.5kW - 53kg
Weight HPS Motor
Size 90 - 5.5kW - 16kg
Size 112 - 7.5kW - 26kg

Type	a	b	c	d	e	f	g	h	h1	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a1	a2
LN YM1-HY420 HPS71	57	75	70	88	158	14	-	-	3	5	59	95	10	118	93	90	114	136	461	35	38,3	10	52	1,75	26	35,6	37	138
LN YM2-HZ521 HPS90	70	80	84	94	178	14	150	-	6	5	68	110	10	136	110	115	147	179	547	45	48,8	14	67	1,95	30	45,6	47,5	156
LN YM4-HZ522 HPS90	70	80	84	94	178	14	150	-	6	5	68	110	10	136	110	115	147	179	554	45	48,8	14	67	1,95	30	45,6	47,5	156
LN YM4-HZ523 HPS90	70	80	84	94	178	14	150	-	6	5	68	110	10	136	110	138	170	222	621	45	48,8	14	67	1,95	30	45,6	47,5	156
LN YM5-HA635 HPS112	85	145	110	170	280	22	164	160	0	12	93	150	19	186	110	138	170	222	698	55	59,3	16	85	2,2	40	55,6	58	224

ACTUAL REDUCTION RATIO

Frame size	Reduction ratio							
	5	7	10	12	15	20	25	30
HY420	5	6,97	10	11,96	14,75	19,69	25	30,45
HZ521	5	7,03	9,81	11,74	15,26	20,67	24,62	
HZ522	5,059	7	10	12,21	15,25	19,39		
HZ523	5,143	7,043	9,833	12,20	14,54			
HA635	5,020	6,949	10	12,35	14,86	20,38		

Note: The contents of this table may be changed without notice.



SELECTION TABLE

kW	Output speed (1/min)	Output torque (Nm)	Service factor	Frame size	Reduction ratio	
0,75	360	18,9	2,00	HY420	5	
	258	26,3	2,00		7	
	180	37,8	2,00		10	
	151	45,2	2,00		12	
	122	55,8	2,00		15	
	91,4	74,4	2,00		20	
1,1	72,0	94,5	2,00	HY521	25	
	59,1	115	2,00		30	
	360	27,7	3,35		5	
	256	39,0	3,35		7	
	183	54,4	3,35		10	
	153	65,1	3,35		12	
1,5	118	84,6	3,35	HY521	15	
	87,1	115	3,35		20	
	73,1	136	3,35		25	
	360	37,8	2,47		HY521	5
	256	53,1	2,47			7
	183	74,2	2,47			10
153	88,7	2,47	12			
118	115	2,47	15			
87,1	156	2,47	20			
2,2	73,1	186	2,47	HZ522	25	
	356	56,1	2,50		5	
	257	77,6	2,50		7	
	180	111	2,50		10	
	147	135	2,50		12	
	118	169	2,50		15	
3	92,8	215	2,50	HZ522	20	
	356	76,5	1,83		5	
	257	106	1,83		7	
	180	151	1,83		10	
	147	185	1,83		12	
	118	231	1,83		15	
4	92,8	293	1,83	HZ523	20	
	350	104	1,87		5	
	256	142	1,87		7	
	183	198	1,87		10	
	148	246	1,87		12	
	124	293	1,87		15	
HA635	88,3	411	2,75	20		

Construction Drawing

Construction Drawing

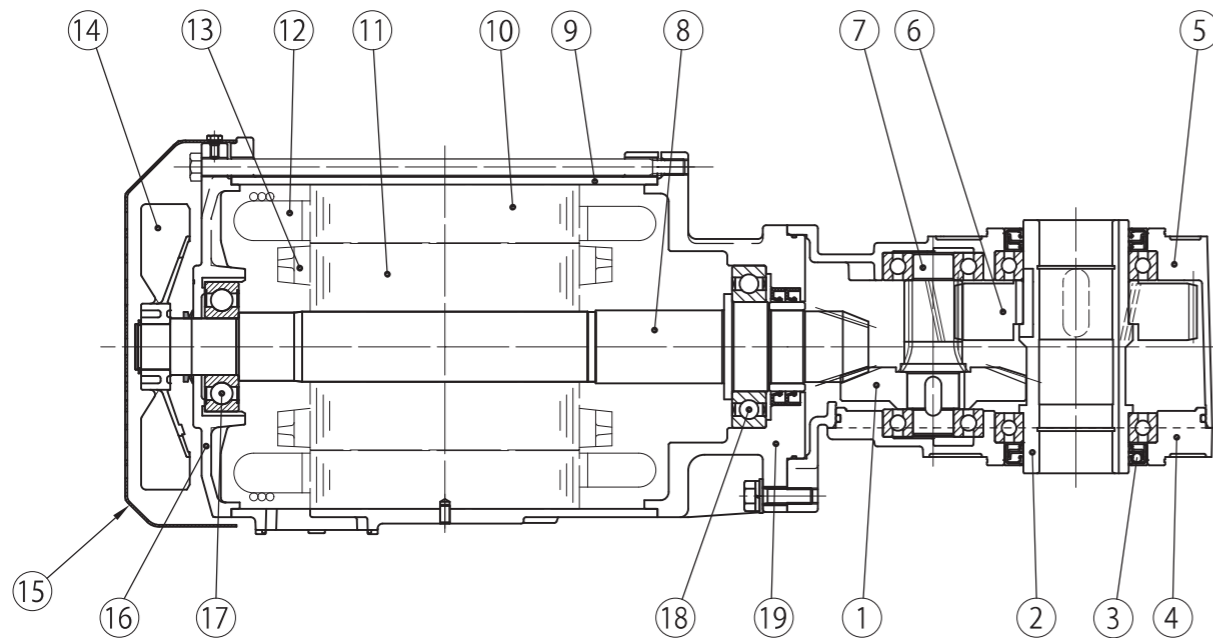


Figure J1 LNYM8-HZ523-EP

Table J1 Gearmotor main parts

Part number (PN)	Part Name	Part number (PN)	Part Name	Part number (PN)	Part Name
1	Bevel gear	8	Bevel pinion shaft	15	Fan cover
2	Output Shaft	9	Motor frame	16	Anti-load side cover
3	Oil seal	10	Stationary core	17	Bearing
4	Case (1)	11	Rotor core	18	Bearing
5	Case (2)	12	Stationary coil	19	Motor flange bracket
6	Gear	13	Rotor conductor		
7	Pinion shaft	14	Fan		

Output Shaft Rotational Direction and Bore Diameter

Output Shaft Rotational Direction

The motor shaft rotates to the right when viewed seen from the fan cover side, if connections are carried out according to the connection diagrams (during forward running) on pages C34 to C41. The output shaft rotational direction at this time will be as follows.

Table J2 Output shaft rotational direction

Frame size	Reduction ratio		
HZ522	5, 7, 10, 12, 15, 20		
HZ523	5, 7, 10, 12, 15		
HZ524	5, 7, 10		
HA635	5, 7, 10, 12, 15		
Rotation direction			

Note) For reverse rotation, swap the Rs and Ts on pages C34 and C36-C39.

Output Shaft Bore Diameter

The output shaft bore diameter can be made to an optional dimension, other than the standard dimension.

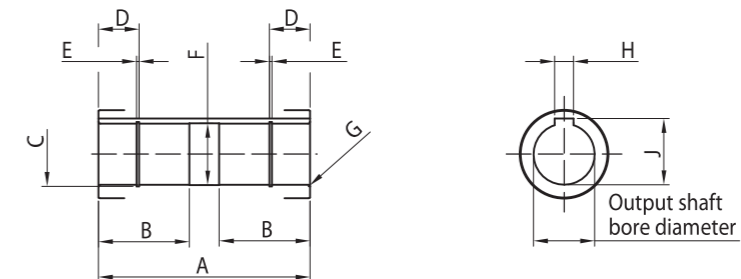


Figure J4 Output shaft bore diameter

Table J3 Output shaft bore diameter

Frame size	Output shaft bore diameter	A	B	C	D	E	F	G	H	J
HZ522, HZ523, HZ524	∅ 40 (Optional)	156	60	∅ 42.5	30	1.95	∅ 40.6	R1.5	12	43.3
	∅ 45 (Standard)		67	∅ 47.5						
HA635	∅ 50 (Optional)	224	76	∅ 53	30	2.2	∅ 50.6	R1.5	14	53.8
	∅ 55 (Standard)		85	∅ 58						

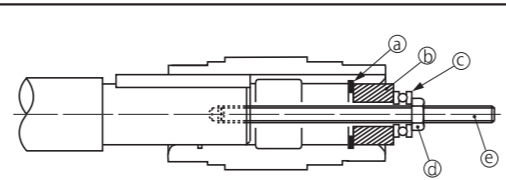
Notes: 1. Output shaft bore diameter dimension: Dimension tolerance is JIS B 0401-1998 "H8."
2. Output shaft keyway dimension: Conforms to JIS B 1301-1996 (ISO) "Keys and their corresponding keyways (normal form)."

Output Shaft (Hollow Shaft) Handling Document

■ Attaching the Output Shaft (Hollow Shaft)

1. Attachment to the driven shaft

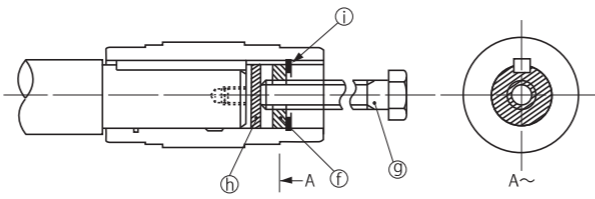
- Apply molybdenum disulfide grease to the surface of the driven shaft and the inner diameter of the output shaft (hollow shaft), and insert the drive into the driven shaft.
- If the fitting is tight, insert by lightly hitting the end face of the output shaft (hollow shaft) with a wooden hammer. Never hit the casing at this time. Additionally, as seen in the diagram, insertion can be done more smoothly by making and using jigs [a] to [e].
- The output shaft (hollow shaft) is made according to the JIS H8 tolerance. The recommended dimension tolerance of the driven shaft is as follows.
When the load is uniform and a shock does not occur: JIS h6 or js6
When there is an impact load or when the radial load is large: JIS js6 or k6
- The size of the snap ring is in accordance with the JIS B2804, C-type retaining ring.
- When making the driven shaft stepped, please check the shaft stress.



[a] Snap ring [b] Spacer [c] Thrust bearing
[d] Nut [e] Screw bolt

2. Removal from the driven shaft

Be careful not to apply excess force between the casing and the output shaft (hollow shaft). Removal can be done more smoothly by using the jigs [f] to [i], as shown in the diagram.



[f] Spacer [g] Finished bolt [h] Discoid [i] Snap ring

3. The length of the driven shaft

The length L, for which the driven shaft is inserted, must be equal to or longer than the recommended length of the driven shaft.

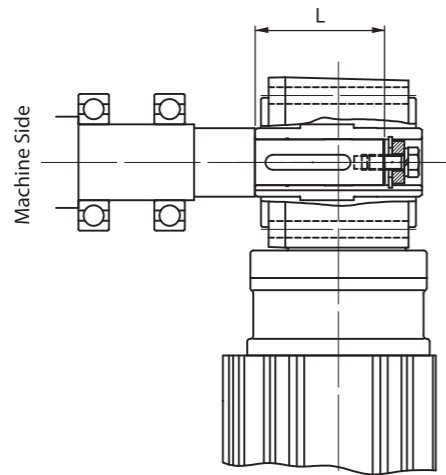


Figure J5 Driven shaft length

Table J4 Recommended length of driven shaft

Frame size	Output shaft bore diameter	Recommended length of driven shaft	Effective length of driven shaft key
HZ522, HZ523, HZ524	∅ 40	108	85
	∅ 45	104	70
HA635	∅ 50	169	110
	∅ 55	159	90

Output Shaft (Hollow Shaft) Handling Document

4. Fixing to the driven shaft

When locking with a torque arm, always fix the drive to the driven shaft.

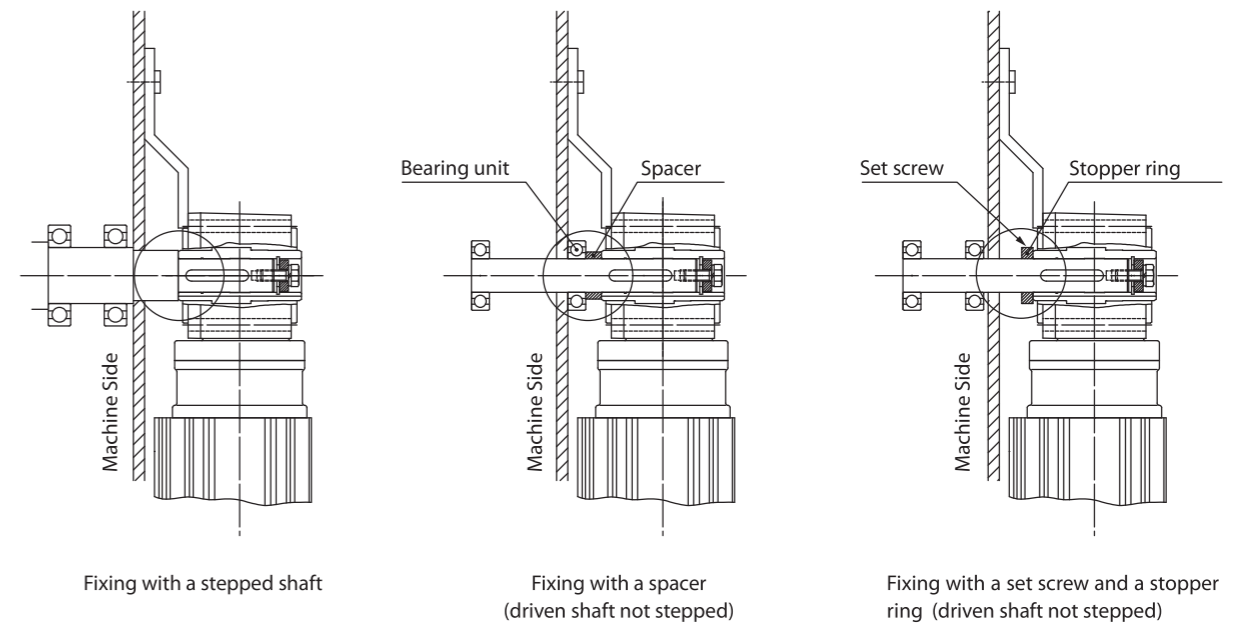


Figure J6 Fixing methods in which the present product does not move to the machine side.

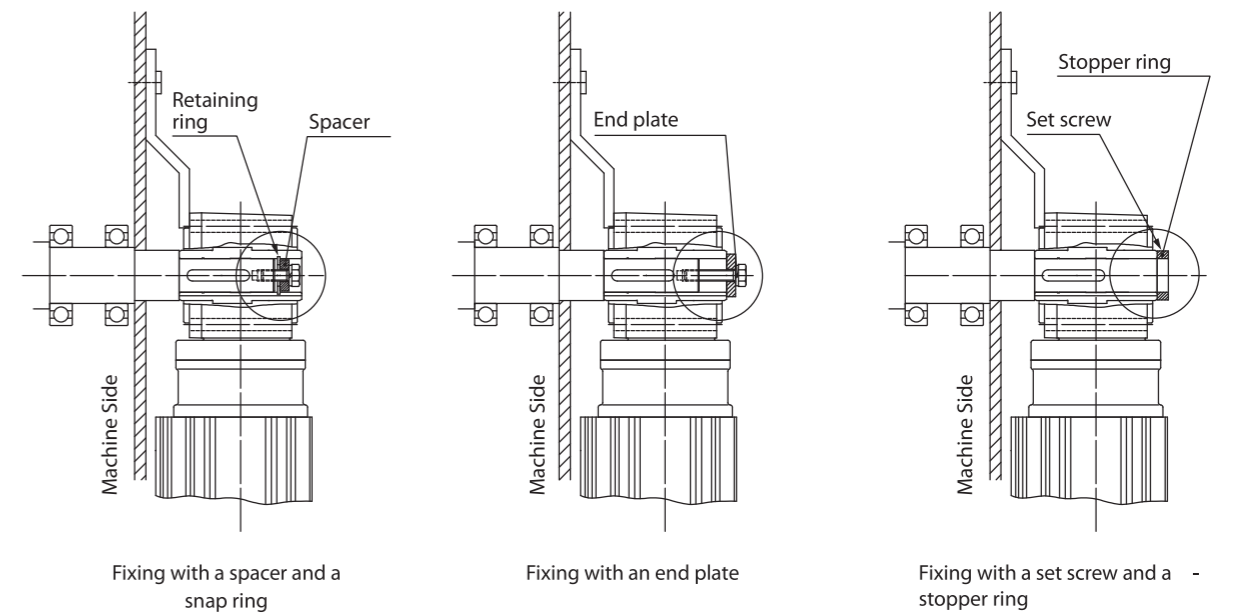
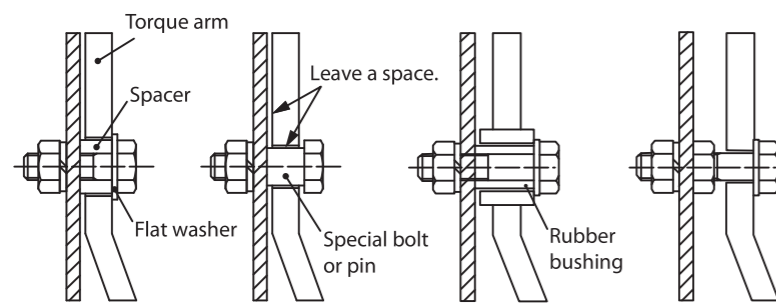
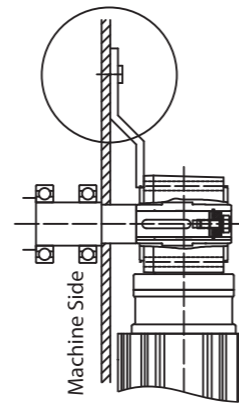


Figure J7 Fixing methods in which the present product does not move to the opposite of the machine.

Output Shaft (Hollow Shaft) Handling Document

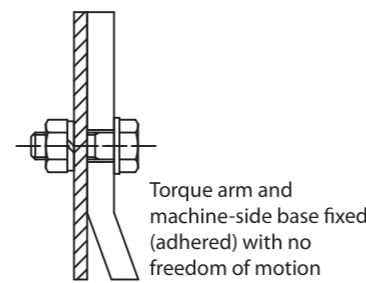
5. Locking the torque arm

- [1] Attach the torque arm to the driven machine side of the case. Use a hexagon socket head bolt to mount on the case. (See Table C6 for size)
- [2] Allow a degree of freedom to the locking part of the torque arm so that excess force is not applied between the product and the driven shaft. Never fix the torque arm using a retainer bolt.
- [3] If starting and stopping frequency is high, and when repeating forward and reverse operations, etc., the impact can be mitigated by installing rubber bushing between the torque arm and the mounting bolt (or spacer).



Adjust the amount of the space to a size that does not result in excessive force or contact in accordance with the movement of the machine.

Good example



Torque arm and machine-side base fixed (adhered) with no freedom of motion

Bad example

Figure J8 Locking part installation example

Table J5 Hexagon socket head bolt size

Frame Size	Bolt size
HZ522, HZ523, HZ524	M12
HA635	M20

Output Shaft (Hollow Shaft) Handling Document

Design example of the Torque Arm

The torque arm is prepared by the customer. The designing procedure of the torque arm is shown below. Meanwhile, for applications in which continuous operation and starting/stopping are infrequent, there is an optional torque arm. See page J14 for details.

1. Calculation method of the strength check of the torque arm

Please refer to the following figures and formulas, and check the strength of the torque arm and driven shaft, and the service life of the bearing.

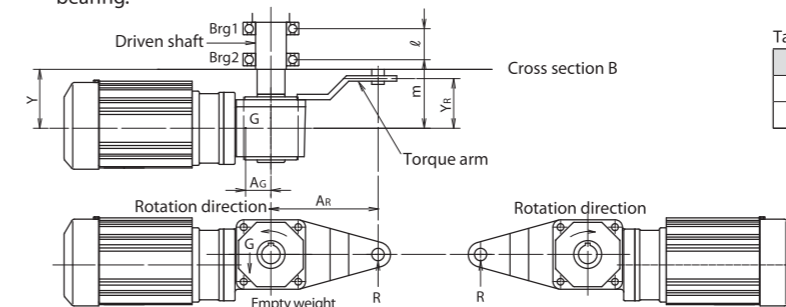


Table J6 (m)

Frame Size	AG
HZ522, HZ523, HZ524	0.25
HA635	0.30

(Approximate values)

Figure J9: Example design

1. Torque arm load : $R = \frac{T + A_G \cdot G}{A_R}$
 2. Brg. 1 load : $B1 = \frac{m(R-G) - Y_R \cdot R}{l}$
 3. Brg. 2 load : $B2 = \frac{(l+m)(R-G) - Y_R \cdot R}{l}$
 4. Bending moment for cross section B of the driven shaft : $M = Y_R \cdot R \cdot Y - (R-G) \cdot Y$ but $0 < Y \leq m$
- T** : Output torque (N·m)
G : Empty weight of drive (N)
R : Torque arm load (N)
AG : Distance from drive shaft center to gravitational center of drive (m)
AR : Distance from drive shaft center to torque arm retainer (m)
YR : Distance from drive center to torque arm retainer (m)
m : Distance from drive center to Brg. 2 (m)
l : Distance from Brg. 1 to Brg. 2 (m)
Y : Distance from drive center to cross section B (m)

Note: Change + to - if the rotation direction of the output torque is opposite from that shown above.

2. Recommended dimensions of the torque arm

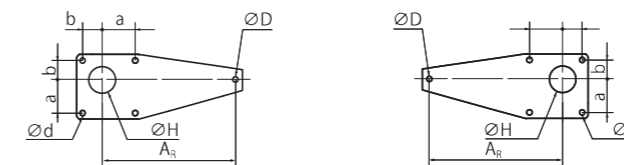


Figure J10 Recommended dimensions

Table J7 Recommended dimensions

Frame size	Torque arm length	Torque arm bore diameter	Bore diameter of the torque arm locking part.	Torque arm mounting pitch			Torque arm mounting bore diameter	Torque arm plate thickness
				a	b	c		
HZ522 HZ523 HZ524	150	112	22	80	70	-	14	9
HA635	280	152	22	145	85	-	22	12

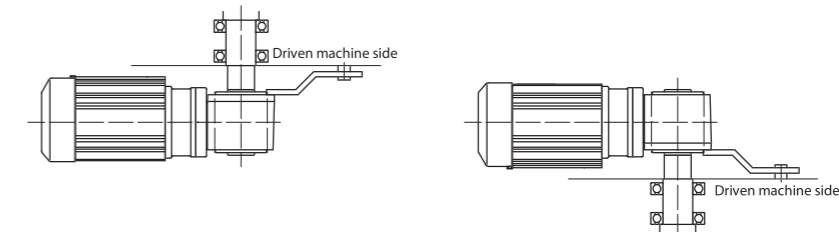


Figure J11 Installation method

- Notes:
1. Attach the torque arm to the driven machine side.
 2. The torque arm is mountable on either the left or right side of the case flange surface.
 3. When mounting on the motor side, beware of interference with the motor.

Output Shaft (Hollow Shaft) Handling Document

Torque Arm Option

- There is an optional torque arm. This can be used if continuous operation, and starting and stopping are infrequent.
- It cannot be mounted on the motor side from the output shaft (hollow shaft).
- When preparing the torque arm on your own, if starting and stopping is frequent, or if mounting the torque arm on the motor side, please refer to page J13 while carrying out the design.

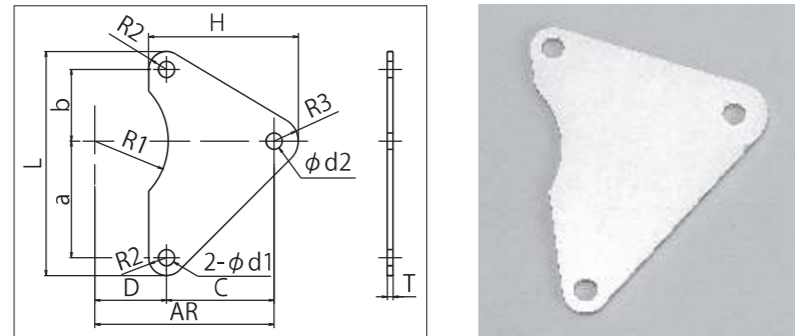


Figure J12 Torque arm

Table J8 Dimension table

Frame size	a	b	C	D	H	L	d1	d2	R1	R2	R3	T
HZ522												
HZ523	80	70	80	—	127	178	∅ 14	∅ 22	—	14	33	9
HZ524												
HA635	145	85	195	85	250	274	∅ 22	∅ 22	80	22	33	12

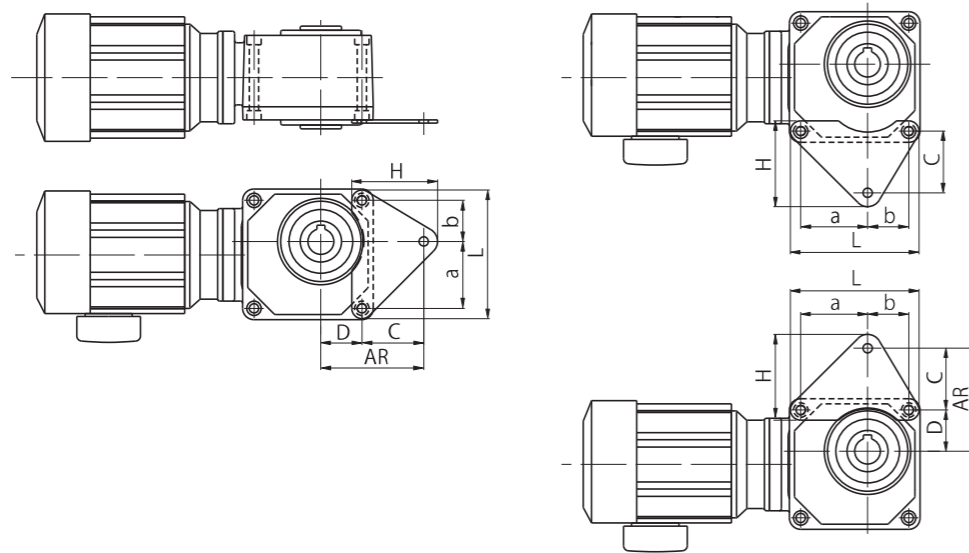


Figure J13 Installation example

- Notes:
1. Please use the torque arm only for the locking function.
 2. Please use the driven shaft to affix the drive in the axial direction.

Output Shaft (Hollow Shaft) Handling Document

Safety Cover of the Output Shaft

- One safety cover made of resin is attached.
Mounting on either the left or right side is possible.

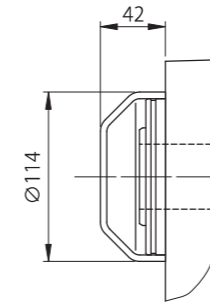


Figure J14 Safety cover (for HZ522, HZ523 and HZ524)

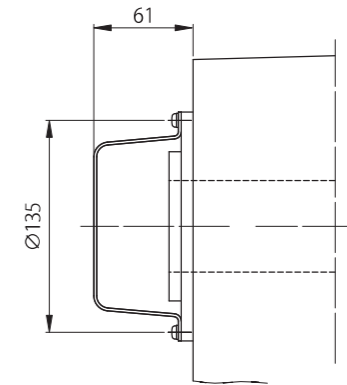


Figure J15 Safety cover (for HA635)

BEVEL BUDDYBOX® WITH IE5 GEARMOTOR

HIGHLY EFFICIENT. COMPACT. HIGH SPEED.

Are you looking for an energy-saving, compact, high speed drive solution for your application? The Bevel BuddyBox-H with a high performance Permanent magnet IE5 motor is the product you need! The drive package ranges from 0,75–4kW and consists of Sumitomo Drive Technologies Bevel Buddy-Box-H a top-rated right angle helical bevel gear unit with a IE5 permanent magnet synchronous magnet motor complete with a variable frequency drive.

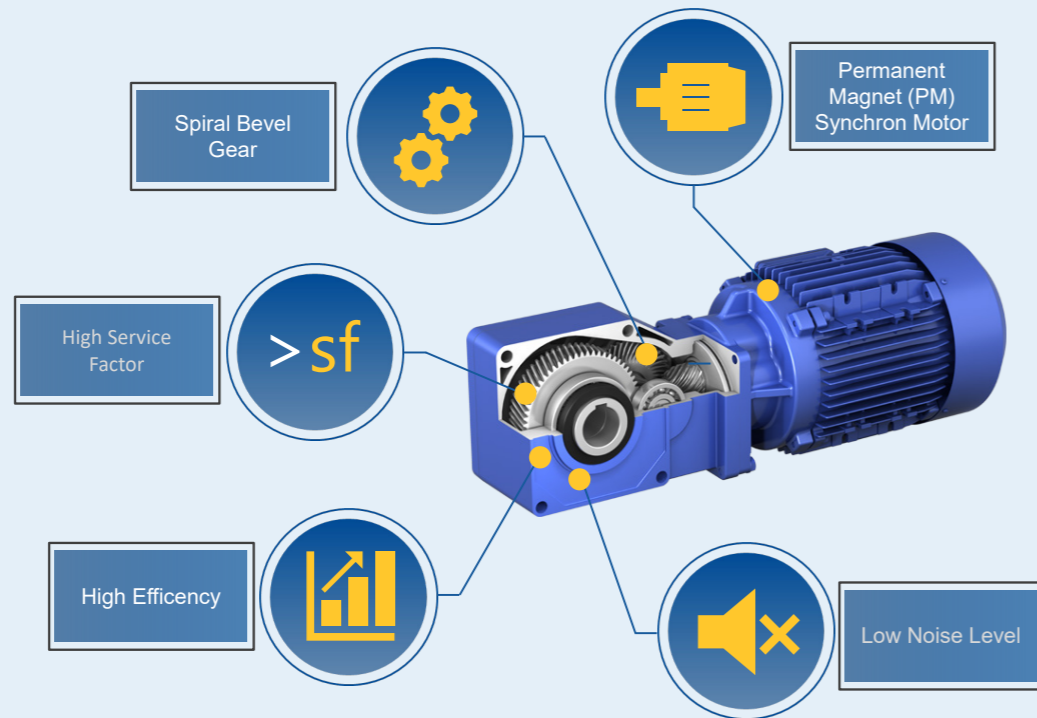
What makes the Bevel BuddyBox-H special is its combination of a bevel input and a helical output that make this unit extremely efficient with the capacity for input speeds up to 3,600rpm. Aluminum construction provides high thermal capacity. Dependable hardened steel gearing inside a light weight, com-compact housing allows easy installation with less load on the head shaft.

The maintenance-free grease lubrication enables the unit to be mounted in any orientation without custom modifications.

The greater efficiency of the BBB-H is a perfect pair with our Ultra-Premium Efficiency IE5 motor. With this perfect pairing, lower energy consumption for your application is now within reach. You will decrease your ecological footprint and enjoy reduced operating costs by going green with this drive package.

This package's power and speed make it perfect for airport baggage handling and general conveying applications. When we say our products are built to last - we mean it.

Visit the Bevel BuddyBox® with IE5 motor product page here:



- Environmental Safety
- Cost Saving
- Ultra-Premium Efficiency Motor
- 5** Sizes
- Lightweight
- > 90%** Efficiency
- Compact
- Lifetime **Grease** Lubrication

CYCLOSMART™

HIGH PERFORMANCE MOTORS STAND-ALONE MOTOR



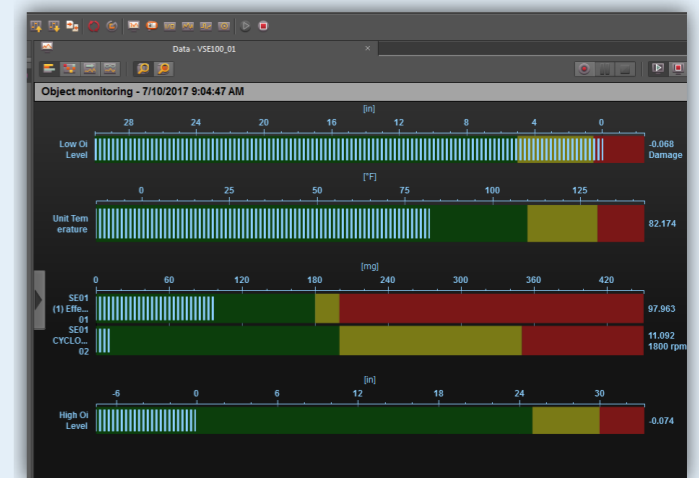
SMART (System Management & System Reliability Technology) is a range of products and reducer options that were developed to help end users in their reliability and asset

Benefits

- **Safe**
Monitor assets from the safety of your desk via networked connections
- **Expandable**
Multi-reducer monitoring
- **Predictive**
Machine diagnostics for early warning and detection to avoid failure
- **Reliable**
Schedule machine downtime to avoid lost production
- **Optimization**
Customizable systems to meet many different application needs
- **Cost-Effective**
Lower overall ownership cost

System

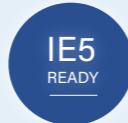
- Uses Accelerometers to gather vibration data on the units continuously
- Values read by diagnostic electronics
- Diagnostic analyzes data by performing FFT (Fast Fourier Transform)
- FFT pinpoints specific causes of the vibration
- Diagnostic Unit then compares component vibration to the set limits, and provide status



DECENTRALISED ELECTRONIC DRIVE SYSTEM

Whether it's baggage handling systems at airports, parcel distribution systems or production logistics: Eaton's Rapid Link 5 offers the right solution for a wide range of material handling applications. Rapid Link 5, the latest addition to the PowerXL™ family, takes the success of this series (which was first launched in 2004) to the next level by enabling integration into modern Internet of Things (IoT) applications.

Rapid Link 5 consists of two product lines: the RAMO5 motor starter, as a direct and reversing starter, and the RASP5 frequency inverter, which is used for variable speed control.



SYSTEM PROPERTIES

- Switching and protection of 3~AC 400/480V motors
- Manual/Automatic mode available
- Quick and error-free installation with plug-in connections
- Wide range of fieldbus systems: AS-Interface, PROFINET, Ethernet/IP
- Identical footprint and drilling pattern for all types and performances classes
- Sensor inputs via fieldbus or for direct signal processing device
- Quick stop: Direct sensor signal processing (PLC free)
- IP65 approved for use in harsh environments
- Secured and protected in compliance with future cyber security standards



Felxible Commissioning

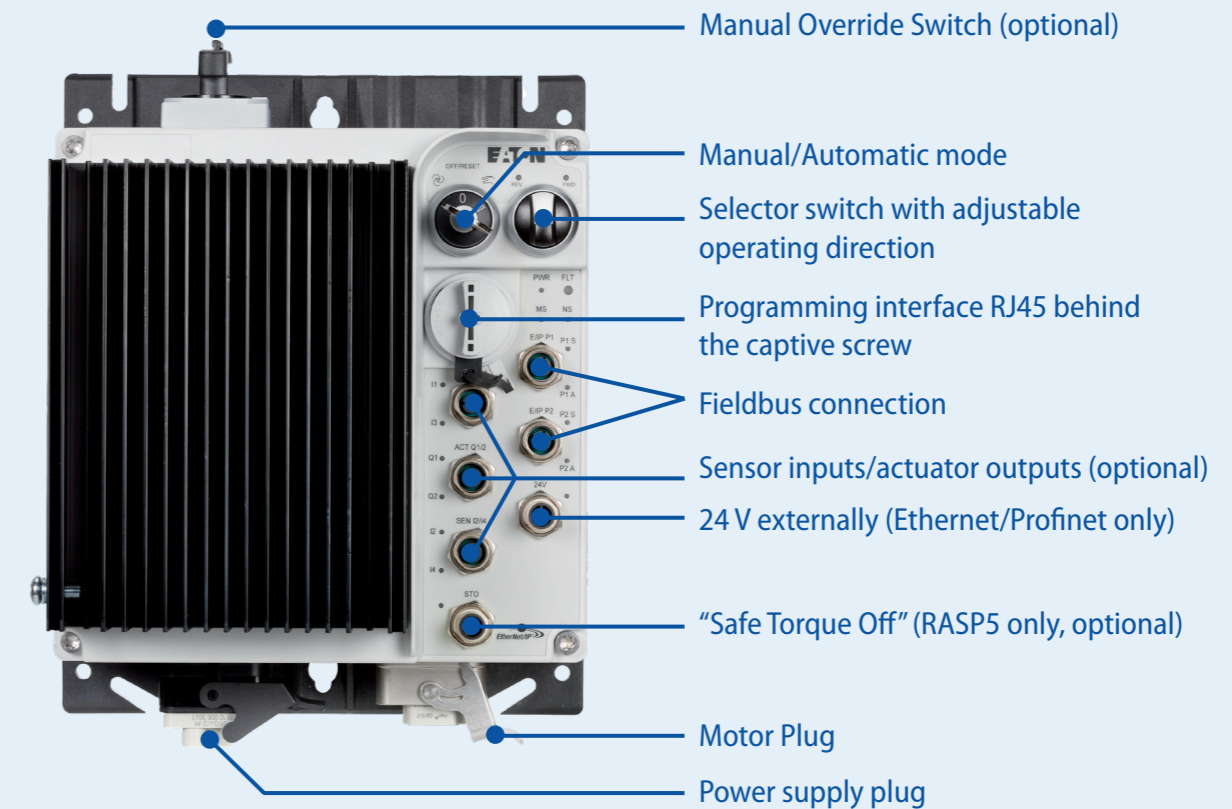
With 14 basic parameters, the configuration of the devices are quick and easy thanks to the uniform PowerXL tools. The COM-Stick 3 communication stick transfers parameters from your laptop to Rapid Link 5 via Bluetooth easily so you can use the stick to copy parameter sets from one frequency inverter to another - an ideal aid, especially for series applications.

Mounting options



Frequency Inverter RASP5

DEVICE FUNCTIONS



Compatible with Eaton's external keypad

Eaton's external keypads provide full access to all RAMO and RASP parameters. In addition, they can also be used to monitor system values (current values, fault history, etc.).

The high-resolution OLED keypad also supports plain text display and multiple languages.



Eaton's drivesConnect mobile app

Eaton's drivesConnect mobile app turns any smartphone or tablet into a human-machine interface, for easy configuration, control and monitoring.

Download the software and the drivesConnect app: www.eaton.eu/rapidlink



MOTOR DATA HPS - ULTRA PREMIUM EFFICIENCY

Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant	BEMF at rated speed	Rated current	Efficiency IES
	n 1/min	P _n kW	M _n Nm	M _{pk} Nm	K _e Vs	K _t Nm/A	E _n Vrs	I _n Arms	η %
HPS 71	1800	0,75	4,0	11,9	1,45	2,5	272	1,6	86,7
HPS 90	1800	1,1	5,8	17,5	1,45	2,5	272	2,3	88,1
HPS 90	1800	1,5	8,0	23,9	1,45	2,5	272	3,2	89,1
HPS 90	1800	2,2	11,7	35,0	1,45	2,5	272	4,6	90,2
HPS 90	1800	3	15,9	47,7	1,45	2,5	272	6,3	91,0
HPS 112	1800	4	21,2	63,7	1,45	2,5	272	8,4	91,8

VARIABLE FREQUENCY DRIVES (VFD) Powering Business Worldwide

Frequency Inverter RASP5



- Power range of 0.75 kW – 1.5 kW – 2.2 kW – 4.0 kW in one frame size only
- 2/4 sensor inputs, 0/2 actuator outputs
- Control of IE2, IE3 and high efficient IE4 motors
- Sensor less vector control
- Integrated EMC-filter up to 25m motor cable length
- Integrated brake resistor
- Integrates safety function "Safe Torque Off" (SIL3, PLe)

Motor Starter RAMO5



- Direct- und reverse starter
- Programmable motor protection from 0.09 kW up to 3.0 kW (400 V) with only one device
- 2/4 sensor inputs, 0/1/2 actuator outputs
- Electronic hybrid-switch
- Lifetime about more than 10 million switching cycles

System Features RAMO5 und RASP5

- AS-Interface, ProfiNet, EtherNet/IP



- Local-/remote switch on-board
- Integrated functions for material handling applications
- One drilling pattern for all types and power ratings

- Parameterizing via OLED-Keypad, drivesConnect or drivesConnect mobile App
- Integrated thermistor protection
- Control of electromagnetic motor brake
- Isolator switch
- Degree of protection: IP65 / NEMA 12
- Approvals: CE, cUL, CCC (RAMO5)

SHAPING THE FUTURE TOGETHER

Sumitomo Heavy Industries (SHI) is a leading global innovator, manufacturer and distributor of power transmission and control (PTC) equipment that is known under the Sumitomo Drive Technologies brand.

Our strategy is to strengthen and expand our business through the integration of new technologies in the areas of highly efficient electric motors and energy saving variable frequency drives (VFD).

The strategy also includes global growth in target segments such as robotics and positioning, material handling and intralogistics, and food and beverages.

As part of this strategy we invested in new partnerships which not only expanded the SHI family, but also grew our product portfolio and global reach.

Lafert Group is a world-leader in the design and manufacture of super premium efficiency electric motors for industrial use. With our focus on innovation and customization we aim to improve performance and reduce environmental impact.

In 2019, Invertek Drives Ltd has been part of SHI. Invertek is a global innovator and manufacturer of energy-saving VFDs. It has undergone year-on-year growth over the past 24 years, including the development of enhanced research and development facilities and the expansion of its global manufacturing facility.

Bringing together Lafert's motor and Invertek's VFD technology allows Sumitomo Drive Technologies to extend its product portfolio in the motor control industry.

This has become increasingly important as demand for IoT, automation, labour productivity and energy-saving solutions also increases.

Moreover, these partnerships will be forged in the technology hub of Europe while responding to the advanced market needed of our customers in EMEA and around the world.

The union of three such large companies as Sumitomo Drive Technologies, Lafert Group and Invertek Drives elevates our operational vision, triggering the design evolution, especially in the field of integrated solutions and solidifying the strength of our position within European markets.

Our technology is enhancing society, supporting our customers, people and communities, economically, socially and environmentally on a global scale.

We have created a powerful claim - a statement that sets a long-term goal and represents the ideal to which we aim to "Shape the Future Together".

www.shapingthefuturetogether.com

Shaping the future together



Sumitomo Drive Technologies

 LAFERTGROUP

 InvertekDrives.com