



Geared servo motors

g500-S / m850 shaft-mounted helical geared servo motor

Contents

About this document	5
Document description	5
Further documents	5
Notations and conventions	6
Product information	7
Product description	7
Identification of the products	8
Features	9
The modular system	10
Designs	12
Mounting positions	16
Information on project planning	18
Safety instructions	18
Basic safety instructions	18
Application as directed	18
Residual hazards	19
General information	21
Drive dimensioning	22
Final configuration	28
Surface and corrosion protection	29
Lubricants	30
Ventilation	31
Mechanical installation	37
Important notes	37
Transport	37
Installation	37
Electrical installation	38
Important notes	38
Preparation	38
Technical data	39
Notes regarding the given data	39
Standards and operating conditions	40
Conformities and approvals	40
Protection of persons and device protection	40
EMC data	41
Environmental conditions	41
Data overview	42
Radial forces and axial forces	50
Selection tables	52
Inverter mains connection 400 V, Self-ventilated motors	53
Dimensions	71
Basic dimensions	73
Gearbox with pre-stage	105
Additional lengths	105
Weights	106
Basic weights	106
Additional weights	106

Contents

Product extensions	107
Torque plates	107
Shaft covers	108
Motor connection	109
Connection via ICN connector	109
Brakes	117
Spring-applied brakes	119
Feedback	120
Resolver	121
Absolute value encoder	122
Temperature monitoring	123
Thermal detectors PT1000	123
Product codes	124
Motor data	126
Rated data	126
Inverter mains connection 400 V, Self-ventilated motors	126
Torque characteristics	128
Environmental notes and recycling	133
Appendix	134
Good to know	134
Operating modes of the motor	134
Enclosures	135



About this document

Document description

This document addresses to all persons who want to carry out any configurations with the products described.

The data and information compiled in this document serve to support you in the dimensioning and selection processes and in carrying out the electrical and mechanical installation. You will receive information regarding product extensions and accessories.

- The document includes safety instructions which must be observed.
- All persons working on and with the drives must have the documentation at hand during work and observe the information and notes relevant for it.
- The documentation must always be complete and in a perfectly readable state.

Further documents



Information and tools with regard to the Lenze products can be found on the Internet:

www.Lenze.com → Downloads

About this document

Notations and conventions



Notations and conventions

Conventions are used in this document to distinguish between different types of information.

Numeric notation		
Decimal separator	Point	Generally shown as a decimal point. Example: 1 234.56
Warnings		
UL Warnings	UL	Are used in English and French.
UR warnings	UR	
Text		
Engineering Tools	" "	Software Example: "Engineer", "EASY Starter"
Icons		
Page reference		Reference to another page with additional information. Example:  16 = see page 16
Documentation reference		Reference to other documentation with additional information. Example:  EDKxxx = see documentation EDKxxx

Layout of the safety instructions

DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

WARNING!

Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.



Product information

Product description

When used in combination with servo motors, our shaft-mounted helical gearboxes form a compact, powerful and dynamic drive unit. Numerous options at the input and output end provide for the drive to be exactly adapted to your application.

The slimline shaft-mounted helical gearboxes are characterized by high permissible radial forces, closely stepped speed reduction ratios and a low backlash. They are available in a 2-, 3- and 4-stage design with a torque of up to 4500 Nm and a ratio of up to $i = 5849$.

Designs

- Slimline design saves installation space of the machine
- Solid shaft, hollow shaft and shrink disc for direct integration into the machine
- High accuracy with axial output provide for the highest efficiency

Synchronous servo motor m850 as basis for geared motor

In a power range of 2.0 to 9.2 kW, Lenze offers servo motors with an easily scalable modular design.

The drives are designed for the open-loop or closed-loop controlled servo inverter operation.

Medium dynamics and easy controllability via a favourable mass inertia ratio of the load to the motor characterise these motors.

Customer benefit

- Easy controllability by an advantageous ratio of the mass inertia of the load and that of the motor
- High overload capacity of the motors
- Easy assembly and easy servicing thanks to connectors with bayonet catch and rotatable connector boxes
- Reduced cabling thanks to one-cable technology in connection with digital absolute value encoders
- High efficiency
- Space-saving thanks to compact direct attachment to Lenze gearboxes
- Can be used universally for a wide range of machine tasks due to the market-oriented modular system



m850-S120/L3960 synchronous servo motor- g500-S660 shaft-mounted helical gearbox



m850-S120/L3960 synchronous servo motor- g500-S660 shaft-mounted helical gearbox with One Cable Technology (OCT) in connection with a digital absolute value encoder

Product information

Identification of the products



Identification of the products

Gearbox product name

Gearbox type	Product series		Type	Rated torque Nm	Product
Shaft-mounted helical gearbox	g500	-	S	130	g500-S130
				220	g500-S220
				400	g500-S400
				660	g500-S660
				950	g500-S950
				2100	g500-S2100
				3100	g500-S3100
				4500	g500-S4500

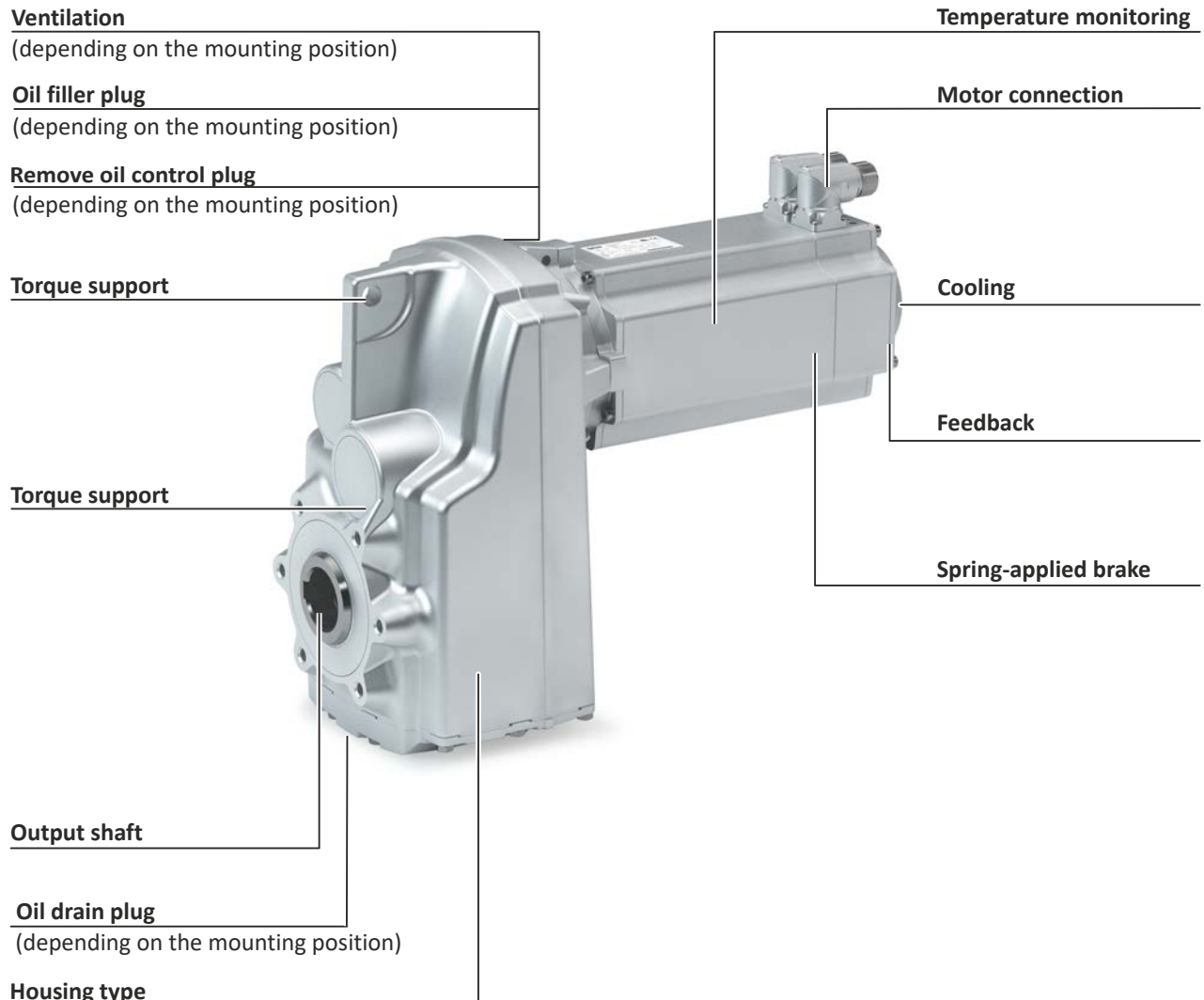
Product name: m850 synchronous servo motor

Product range		Version	Flange height		Overall length	Rated speed	Motor
			mm			rpm	
m850	-	S (synchronous)	120	supply	S (short)	3960	m850-S120/S3960
					M (medium)	3960	m850-S120/M3960
					L (long)	3960	m850-S120/L3960
			140		S (short)	3240	m850-S140/S3240
					M (medium)	3240	m850-S140/M3240
					L (long)	3240	m850-S140/L3240
			190		S (short)	3000	m850-S190/S3000
					M (medium)	3000	m850-S190/M3000
					L (long)	2520	m850-S190/L2520



Features

The following figure provides an overview of the elements and connections on the product. Their position, size and appearance may vary.



Product information

The modular system



The modular system



Values printed in bold are standard designs. Values that are not printed in bold are potential extensions, some of them including a surcharge.

Geared motors up to 660 Nm

Gearbox		g500-S130	g500-S220	g500-S400	g500-S660
Min. motor assignment		m850-S120	m850-S120	m850-S120	m850-S120
Max. motor assignment		m850-S120	m850-S140	m850-S140	m850-S190
Technical data					
Max. output torque	Nm	130	220	400	660
Min. drive torque	Nm	4.8	4.8	4.8	4.8
Max. drive torque	Nm	7.4	14	17.4	35
Mounting position					
Standard		M1, M2, M3, M4, M5, M6 (ABCDEF)			
Combined		M1/5/6 (AEF)			
Color		Primed Painted in RAL colors			
Surface and corrosion protection		OKS-G Different types of OKS			
Output shaft					
Solid shaft with featherkey (V)	mm	25 x 50	25 x 50	30 x 60	35 x 70 40 x 80
Hollow shaft with keyway (H)	mm	25	25/30	30/35	40/45
Hollow shaft with shrink disc (S)	mm	25	25/30	35	40
Shaft material		Steel Stainless steel			
Shaft sealing ring material		NBR FKM (Viton)			
Output shaft bearing		Normal			
Gearbox version		With foot (HBR/VBR) Without foot and centring (HCR)/(VCR/SCR) With centring (HCR/VCR/SCR) With output flange (HCK/VCK/SCK)			
Output flange (K)	mm	160	160	200	200/250
Lubricant		Synthetic oil Food-compatible oil			
Ventilation		Without		Vent valve	
Cooling		Self-ventilated			
Torque plate		Rubber buffers			
Shaft cover		Shrink disc cover			
Motor connection		Connector ICN hybrid connector for One Cable Technology (OCT)			
Permanent magnet holding brake		Without With			
Feedback					
Without functional safety		Resolver Absolute value encoder Digital absolute value encoder for One Cable Technology (OCT))			
With functional safety		Resolver Absolute value encoder Digital absolute value encoder for One Cable Technology (OCT)			
Temperature monitoring		PT1000 temperature sensor			



Geared motors from 950 Nm to 4500 Nm

Gearbox		g500-S950	g500-S2100	g500-S3100	g500-S4500
Min. motor assignment		m850-S120	m850-S120	m850-S120	m850-S120
Max. motor assignment		m850-S190	m850-S190	m850-S190	m850-S190
Technical data					
Max. output torque	Nm	950	2100	3100	4500
Min. drive torque	Nm	4.8	4.8	4.8	4.8
Max. drive torque	Nm	35	35	35	35
Mounting position					
Standard		M1, M2, M3, M4, M5, M6 (ABCDEF)			
Combined					
Color		Primed Painted in RAL colors			
Surface and corrosion protection		OKS-G Different types of OKS			
Output shaft					
Solid shaft with featherkey (V)	mm	40 x 80	50 x 100	60 x 120	70 x 140 80 x 160
Hollow shaft with keyway (H)	mm	40	50/55	60/70	70/80
Hollow shaft with shrink disc (S)	mm	40	50	65	75/80
Shaft material		Steel Stainless steel			
Shaft sealing ring material		NBR FKM (Viton)			
Output shaft bearing		Normal			
Gearbox version		With foot (HBR)/(VBR/SBR) With foot and centering (HAR/VAR(SAR)) With foot and output flange (HAK/VAK/SAK)			
Output flange (K)	mm	250	250/300	350	400/450
Lubricant		Synthetic oil Food-compatible oil			
Ventilation		Vent valve Oil compensation reservoir			
Cooling		Self-ventilated Forced-ventilated			
Torque plate		Rubber buffers			
Shaft cover		Shrink disc cover			
Motor connection		Connector ICN hybrid connector for One Cable Technology (OCT)			
Permanent magnet holding brake		Without With			
Feedback					
Without functional safety		Resolver Absolute value encoder Digital absolute value encoder for One Cable Technology (OCT)			
With functional safety		Resolver Absolute value encoder Digital absolute value encoder for One Cable Technology (OCT)			
Temperature monitoring		PT1000 temperature sensor			

Product information

The modular system
Designs



Designs

Gearbox designs



Observe the available gearbox designs!

► [The modular system](#)  10

g500-S130 ... S660

Hollow shaft, with foot



Without centring (HBR)

Hollow shaft, without foot



Without centring (HDR)



With centering (HCR)



Flange with through holes (HCK)



Product information

The modular system
Designs

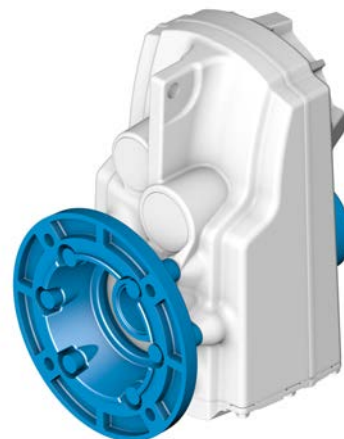
Shrink disc, without foot



Without centring (SDR)

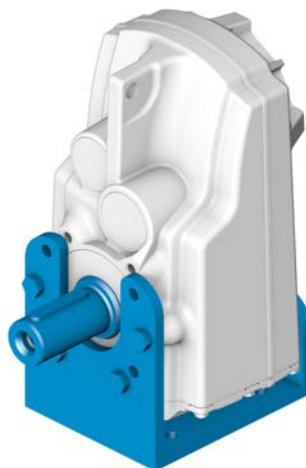


With centring (SCR)



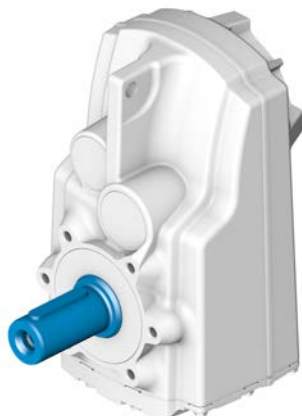
Flange with through holes (SCK)

Solid shaft, with foot

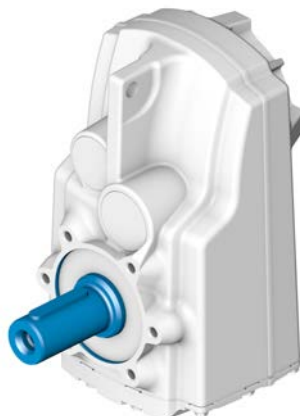


Without centring (VBR)

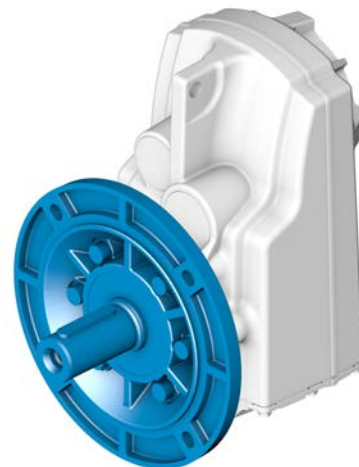
Solid shaft, without foot



Without centring (VDR)



With centering (VCR)



Flange with through holes (VCK)

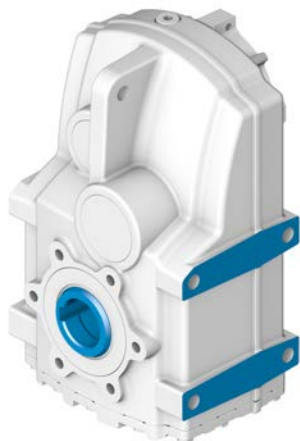
Product information

The modular system
Designs



g500-S950 ... S4500

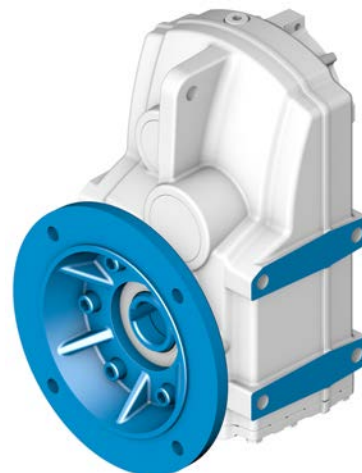
Hollow shaft, with foot



Without centring (HBR)

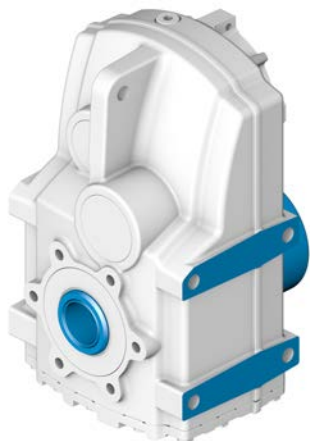


With centring (HAR)



Flange with through holes (HAK)

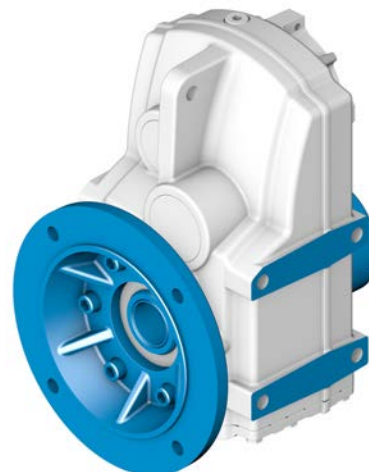
Shrink disc, with foot



Without centring (SBR)

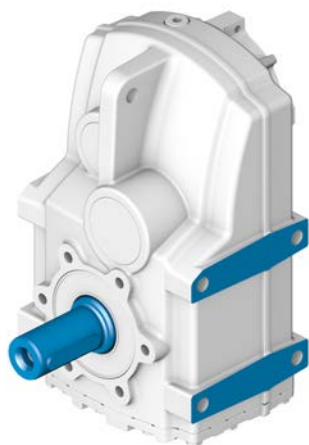


With centring (SAR)

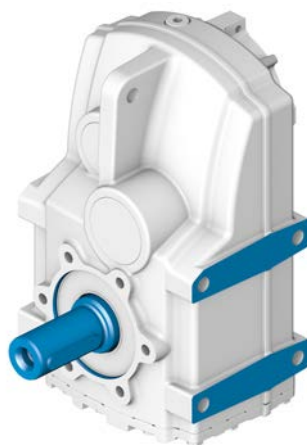


Flange with through holes (SAK)

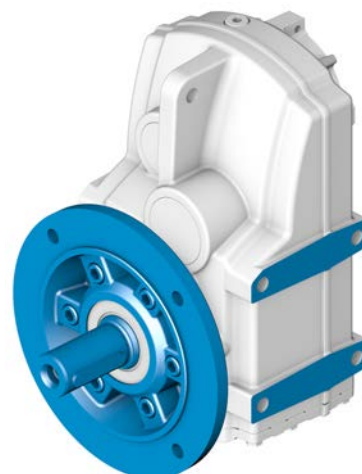
Solid shaft, with foot



Without centring (VBR)



With centring (VAR)

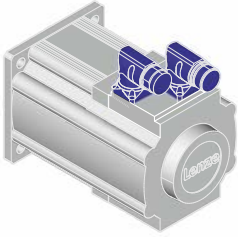


Flange with through holes (VAK)

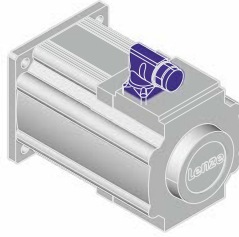


Models at the output

Motor connection

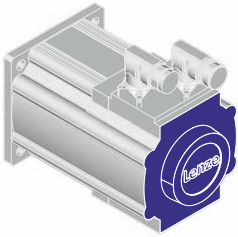


ICN connector

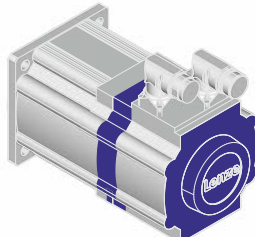


ICN hybrid connector for One Cable
Technology (OCT)

Cooling: Self-ventilated



Feedback



Feedback and brake

Product information

The modular system
Mounting positions

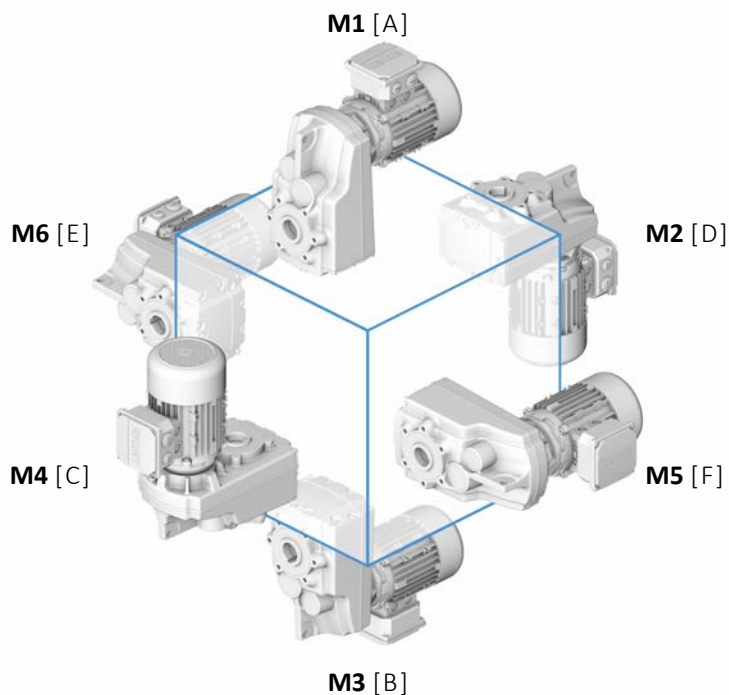


Mounting positions

Details of the mounting position are needed to ensure the corresponding lubricant amount, position of the ventilation, oil checks and oil drain plug on the gearbox.

To reduce the number of different versions, the following gearboxes can also be ordered with combined mounting positions:

- g500-S130 ... S660 in mounting position M1/5/6 (AEF)



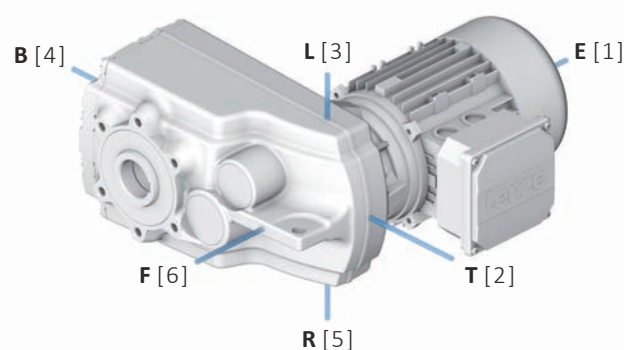
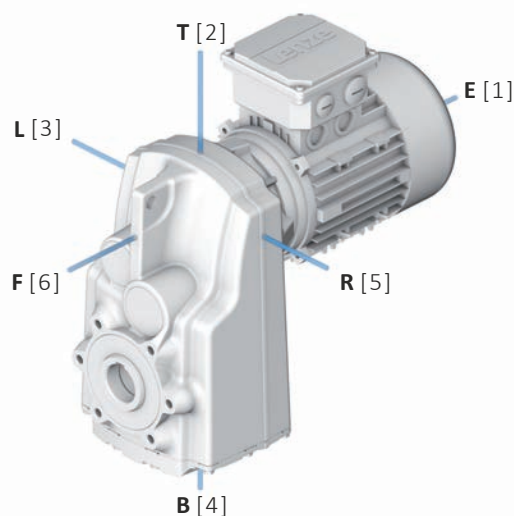
Defined positions on the geared motor

All of the defined positions refer to the areas on the geared motor in mounting position **M1 (A)**.

Position of the built-on accessories with T, L, R, B, F, E (Top, Left, Right, Bottom, Front and End)

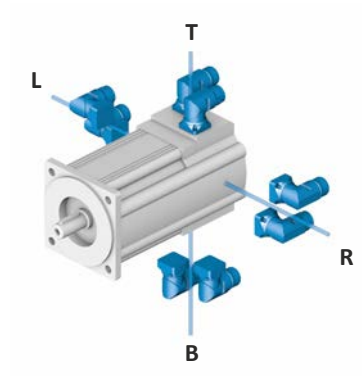
If the geared motor is rotated into a different mounting position M2 ... M6 (B...F), the defined positions on the geared motor are retained.

Example: Mounting position M5 (F)





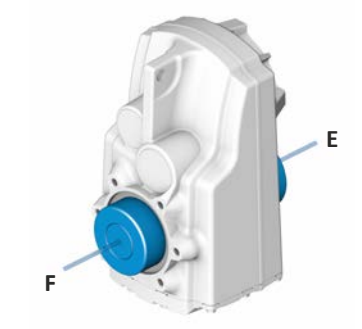
Position of the ICN connectors



Position of the hollow shaft with shrink disc



The output flange is only available in position "F".
Output flange and shrink disc are not possible in the same position.





Information on project planning

Safety instructions

Basic safety instructions

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never modify the product technically.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- The product can – depending on their degree of protection – have live, movable or rotating parts during or after operation. Surfaces can be hot.
- Observe all specifications of the corresponding documentation supplied. This is the condition for safe and trouble-free operation and the achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of these persons:
 - They are familiar with installing, mounting, commissioning, and operating the product.
 - They have the corresponding qualifications for their work.
 - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

Application as directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- Mounted eye bolts on the motor are not suitable for transporting geared motors.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product may only be operated on the inverter.
- Built-in brakes must not be used as safety brakes.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.



Residual hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system.

If the above is disregarded, this can lead to severe injuries to persons and damage to property!

Product

Observe the warning labels on the product!



Dangerous electrical voltage:

Before working on the product, make sure there is no voltage applied to the power terminals! After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!



High leakage current:

Carry out fixed installation and PE connection in compliance with:
EN 61800-5-1 / EN 60204-1



Hot surface:

Use personal protective equipment or wait until the device has cooled down!

Protection of persons

- The power terminals may carry voltage in the switched-off state or when the motor is stopped.
 - Before working, check whether all power terminals are deenergized.
- Voltages may occur on the drive components (e.g. capacitive, caused by inverter supply).
 - Careful earthing in the marked positions of the components must be carried out.
- There is a risk of burns from hot surfaces.
 - Provide protection against accidental contact.
 - Use personal protective equipment or wait until the device has cooled down.
 - Prevent contact with flammable substances.
- There is a risk of injury due to rotating parts.
 - Before working on the drive system, ensure that the motor is at a standstill.
- There is a risk of accidental start-up or electric shock.

Motor protection

- Installed temperature sensors are no full protection for the machine.
 - If necessary, limit the maximum current. Parameterize the inverter so that it will be switched off after some seconds of operation with $I > I_{rated}$, especially if there is a risk of blocking.
 - Integrated overload protection does not prevent overloading under all conditions.
- The fuses are no motor protection.
 - Use a current-dependent motor protection switch.
 - Use the built-in temperature sensors.

Information on project planning

Safety instructions
Residual hazards



Gearbox protection

- Excessive vibration accelerations and resonances will damage the gearbox.
 - Do not operate the gearbox at vibration accelerations $> 2 \text{ g}$ (20 m/s^2) of the machine.
 - Do not operate the gearbox in the resonance range of the machine.
- Excessive torques will damage the gearboxes.
 - Do not exceed the output torques specified on the nameplate.
- Excessive input speeds lead to increased temperatures.
 - Do not exceed the input speeds specified on the nameplate.
- Avoid excessive lateral forces on the gearbox shaft.
 - Align the shafts of the gearbox and driven machine exactly with each other.
- Machine elements can be damaged by a lack of lubricant.
 - Mount the gearbox only in the mounting position indicated on the nameplate.
 - When changing the lubricant, use the lubricant type and quantity specified on the nameplate.



General information

NOTICE

For gearboxes with hollow shaft and shrink disk observe the following requirements for the machine shaft:

- Fit tolerance h6
- Material yield strength $R_e \geq 360 \text{ MPa}$
- Modulus of elasticity approx. 210000 MPa
- Surface roughness $R_z \leq 15 \text{ }\mu\text{m}$
- No radial, axial forces and forces due to stress/rotation permissible

Thermal power limit

The thermal power limit, defined by the heat balance, limits the permissible continuous gearbox power. It is affected by

- the churning losses in the lubricant. These are determined by the mounting position and the circumferential speed of the gears
- the load and the speed spectrum.
- the ambient conditions: temperature, air circulation, input or dissipation of heat via shafts and the foundations.

NOTICE

A thermal check with the Drive Solution Designer (DSD) or contacting your Lenze representative is required if

- the input speed $n_1 > 1500 \text{ rpm}$ is fallen below in case of the gearbox ratios given in the following.
- the drive speeds mentioned in the following will be exceeded as a function of the mounting position. For a short period of time up to 5 min, 30 % higher speeds are permissible.
- the ambient temperature is predominantly above +30 °C.

Gearboxes		Ratio i	
g500-S2100 ... S4500		≤ 50	

Motor	Mounting position M5, M6	Mounting position M1, M3	Mounting position M2, M4
m850-S120	4000 rpm	3500 rpm	3000 rpm
m850-S140/S190	3000 rpm	2600 rpm	1500 rpm

Possible ways of extending the application area

- Shaft sealing ring made of FKM material/Viton (option)
- Reducing the lubricant amount (after consultation with Lenze)
- Cooling the geared motor by air convection on the machine/system



Drive dimensioning

In order to carry out an accurate drive dimensioning process, you can use our configuring software, the »Drive Solution Designer«.

With the »Drive Solution Designer«, you can design the drive both quickly and to a high quality. The software contains profound and proven expertise with regard to drive applications and mechatronic drive components.

Please get in touch with your Lenze representative.

NOTICE

The dimensioning is suitable for the operating modes S1, S2, S3 and S6

The following 3 elements are taken into consideration in the dimensioning process :

Drive function

On the basis of the values required for the process that are specified, a drive is selected, for which all operating points are within the speed-torque characteristic curve of the motor.

As a result, a motor with a suitable speed with an inverter with a sufficient maximum current is selected. Further limits (maximum speed, installation height...) are specified in tables.

Mechanical strength

On the basis of the forces and torques which build, a drive is selected that has a sufficient mechanic strength (endurance strength for the periodically occurring torques and fatigue strength for the sporadically occurring torques).

Thermal dimensioning

For the inverter, the thermal dimensioning process is carried out on the basis of the continuous inverter current or on the basis of the continuous torque from the motor-inverter combination, which can be reached.

The motor is thermally dimensioned on the basis of the mean speed and the effective torque.

The thermal dimensioning of the gearbox is based on the medium speed and the permanent torque of the motor/gearbox combination. The thermal limit speed is to be understood as a recommendation.

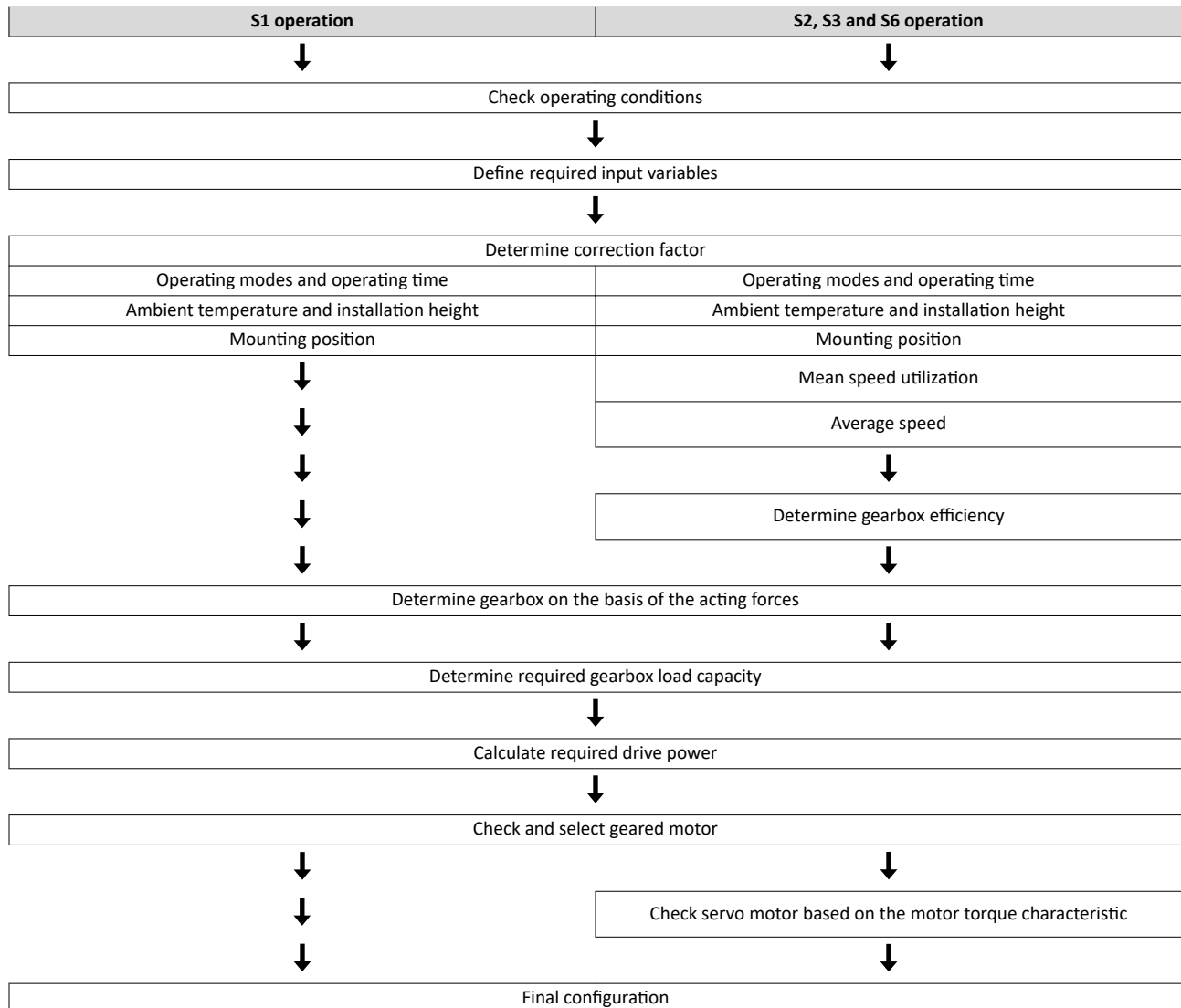
The mean speed of the drive should not exceed the values specified.



If dimensioning processes are complex or reach limit loads, please refer to your Lenze branch office



Workflow



Check operating conditions

Check
Approvals Conformities Supply voltage Degree of protection Ambient temperature Surface protection

► Standards and operating conditions [40](#)

► Surface and corrosion protection [29](#)



Define required input variables

Necessary input variables	Note	Symbol	Unit
Operating time/day		BD	h
Mean speed utilization of the geared motor	Relating to the load speed n_L		%
Ambient temperature		T_V	°C
Site altitude Amsl		H	m
Radial force		F_{rad}	rated
Axial force		F_{ax}	rated
Transmission element at the output	Gear wheels, sprockets ...		
Effective diameter of the transmission element		d_w	mm
Load torque	Only with S1, S2, S3, and S6 operating modes	M_L	Nm
Load speed	Only with S1, S2, S3, and S6 operating modes	n_L	rpm
Short-time maximum torque	Emergency off, quick stop, occasional high starting duty	$M_{L,max}$	Nm
Runtime with maximum torque		t_L	%

Determine correction factor

Operating modes S1, S2, S3, S6, and operating time							
Operating mode S1		Operating mode S2		Operating mode S3		Operating mode S6	
ED	k_L	ED	k_L	ED	k_L	ED	k_L
%		min		%		%	
100	1.0	10	1.4 - 1.5	15	1.4 - 1.5	15	1.5 - 1.6
		30	1.15 - 1.2	25	1.3 - 1.4	25	1.4 - 1.5
		60	1.07 - 1.1	40	1.15 - 1.2	40	1.3 - 1.4
		90	1.0 - 1.05	60	1.05 - 1.1	60	1.15 - 1.2

► Operating modes of the motor [134](#)

Ambient temperature and installation height		
Ambient temperature	Installation height amsl	
	≤ 1000 m	≤ 2000 m
	Correction factor	
T_U	k_H	k_H
≤ 20 °C	1.10	1.04
30 °C	1.05	1.00
40 °C	1.00	0.95
50 °C	0.80	0.76
60 °C	0.60	0.57

Mounting position						
Gearboxes	Mounting position					
	M1	M2	M3	M4	M5	M6
	Correction factor					
	k_E	k_E	k_E	k_E	k_E	k_E
g500-H	1.00	0.70	0.80	0.80	1.00	1.00
g500-S	1.00	0.70	0.80	0.85	0.80	0.90
g500-B	1.00	0.70	0.80	0.80	0.80	0.80

► Selection tables [52](#)



Mean speed utilisation					
Daily operating time	Mean speed utilisation relating to the load speed n_L				
	100 %	80 %	60 %	50 %	25 %
	Correction factor				
	k_N	k_N	k_N	k_N	k_N
1.0 h	1.29	1.33	1.38	1.42	1.55
2.0 h	1.15	1.20	1.25	1.29	1.42
3.0 h	1.08	1.12	1.17	1.21	1.34
4.0 h	1.02	1.06	1.12	1.15	1.29
5.5 h	0.96	1.00	1.06	1.09	1.22
8.0 h	0.89	0.93	0.99	1.02	1.15
12.0 h	0.81	0.85	0.91	0.94	1.08
16.0 h	0.76	0.80	0.85	0.89	1.02
22.0 h	0.71	0.76	0.81	0.85	0.98
24.0 h	0.68	0.72	0.78	0.81	0.94

Mean speed					
Operating mode S2		Operating mode S3		Operating mode S6	
ED	k_M	ED	k_M	ED	k_M
min		%		%]	
10	0.16	15	0.15	15	1.00
30	0.50	25	0.25	25	
60	1.00	40	0.40	40	
90		60	0.60	60	

Gearbox efficiency

Gearboxes	Gearbox efficiency	
	η_{c1}	
g500-S		
2-stage	0.96	
3-stage	0.95	
4-stage	0.94	

Determine product on the basis of the forces

Transmission element			Gear wheels	Sprockets	Toothed belt pulleys (depending on the pretension)	Narrow V-belt (depending on the pretension)
Additional radial force factor	f _z		≥ 17 teeth: 1.0 < 17 teeth: 1.15	≥ 20 teeth: 1.0 < 20 teeth: 1.25 < 13 teeth: 1.4	With belt tightener: 2.0 – 2.5 Without belt tightener: 2.5 – 3.0	1.5 – 2.0
			Calculation			Check
Radial force	F _{rad}	N	$F_{rad} = 2000 \times \frac{M_{L,max} \times f_z}{dw}$			$F_{rad} \leq f_w \times F_{rad,max}$
Axial force	F _{ax}	N				$F_{ax} \leq F_{rad,max} \times 0.5$

dw Effective diameter of transmission element in mm

f_w Additional load factor

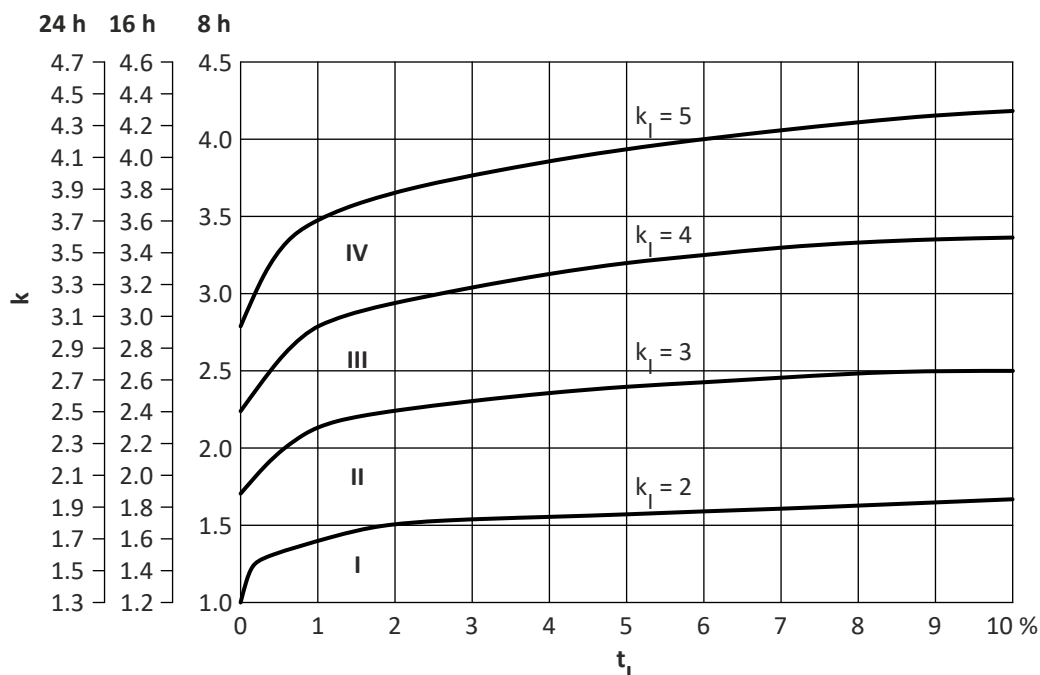
► [Radial forces and axial forces](#) 50



Determination of the required gearbox load capacity

Define the required load factor at runtime t_L		
Runtime $t_L \leq 10\%$	Take the load factor k from diagram into account	
Runtime $t_L > 10\%$	Take intensity k_I from calculation into account	
Calculate intensity		
no alternating load	$k_I = M_{L,max} / M_L$	$k_I =$
at alternating load	$k_I = M_{L,max} / M_L \times 1.4$	$k_I =$

Load factor k



Operating mode S1

Calculation of the required drive power			
	Calculation	Result	Unit
Output torque	$M_R \geq M_L / (k_L \times k_H)$	$M_R =$	Nm
Output speed	$n_R \geq n_L / k_E$	$n_R =$	rpm
Drive power	$P_R \geq M_R \times n_R / 9549$	$P_R =$	kW

Check geared servo motor and determine from the selection table			
	Check	Selection	Unit
Drive power	$P_1 \geq P_R$	$P_1 =$	kW
Output torque	$M_2 \geq M_L$	$M_2 =$	Nm
Output speed	$n_{2,th} \geq n_L$	$n_{2,th} =$	rpm
Load capacity of the geared motor	$c \geq k$ $c \geq k_I$	$c =$	
Short-time maximum torque			
no alternating load	$M_{2,max} \geq M_{L,max}$	$M_{2,max} =$	Nm
at alternating load	$M_{2,max} \times 1.5 \geq M_{L,max}$	$M_{2,max} =$	Nm
Ratio		$i =$	

► Selection tables [52](#)



Order data			
	Ratio i	Geared motor	
Example	3.267	g500-H140	m850-S120/S3960
Example	3.661	g500-S130	m850-S120/S3960
Example	4.889	g500-B240	m850-S120/S3960

Operating modes S2, S3, and S6

Calculation of the required drive power			
	Calculation	Result	Unit
Output torque	$M_R \geq M_L / (k_L \times k_H)$	$M_R =$	Nm
Output speed	$n_R \geq (n_L \times k_M) / (k_E \times k_{rated})$	$n_R =$	rpm
Drive power	$P_R \geq M_R \times n_R / 9549$	$p_R =$	kW

Check geared servo motor and determine from the selection table			
	Check	Selection	Unit
Drive power	$P_1 \geq P_R$	$p_1 =$	kW
Output torque	$M_2 \geq M_L$	$M_2 =$	Nm
Output speed	$n_2 \geq n_L$	$n_2 =$	rpm
Load capacity of the geared motor	$c \geq k$ $c \geq k_I$	$c =$	
Short-time maximum torque			
no alternating load	$M_{2,max} \geq M_{L,max}$	$M_{2,max} =$	Nm
at alternating load	$M_{2,max} \times 1.5 \geq M_{L,max}$	$M_{2,max} =$	Nm
Ratio		$i =$	

Selection tables [52](#)

Check servo motor based on the motor torque characteristic		
Gearbox efficiency	$\eta_G = \eta_{c1} - (c - 1) \times 0.01$	$\eta_G =$
All operating points (●)		$i \times n_L$
below the maximum torque characteristic of the servo motor/ inverter combination here, $M_{L,max}$ must be considered		$M_L / (i \times \eta_G)$
Thermally effective operating point (○)		$(i \times n_L \times k_M) / (k_E \times k_{rated})$
below the S1 torque characteristic of the servo motor		$M_L / (k_L \times k_H \times i \times \eta_G)$

Torque characteristics [128](#)

Order data			
	Ratio i	Geared motor	
Example	3.267	g500-H140	m850-S120/S3960
Example	3.661	g500-S130	m850-S120/S3960
Example	4.889	g500-B240	m850-S120/S3960



Final configuration

	Screening
Connection dimensions	Output shaft Output flange/foot
Mounting position	Geared motor Connector/terminal box Driven shaft/output flange
Product extensions	Torque plate Shaft cover Connector/terminal box Brake Feedback Blower Temperature monitoring Second shaft end Handwheel Protection cover ...

More information about the final configuration:

- ▶ [The modular system](#) 10
- ▶ [Product extensions](#) 107



Surface and corrosion protection

Depending on the ambient conditions, the surface and corrosion protection system (called OKS) offers tailor-made solutions for optimum protection.

Various surface coatings ensure that the motors operate reliably even at high air humidity, in outdoor installation or in the presence of atmospheric impurities. Any color from the "RAL Classic" collection can be chosen for the top coat.



The OKS-XL (extra Large) version requires a check by your responsible Lenze subsidiary.

Surface and corrosion protection	Applications	Product g500
OKS-G (primed)	Dependent on subsequent top coat applied	Standard
OKS-S (small)	- Standard applications - Internal installation in heated buildings - Air humidity up to 90%	Optional
OKS-M (medium)	- Internal installation in non-heated buildings - Covered, protected external installation - Air humidity up to 95 %	Optional
OKS-L (large)	- External installation - Air humidity above 95 % - Chemical industrial plants - Food industry	
OKS-XL (extra Large)	- External installation - Air humidity above 95 % - Chemical industrial plants - Food industry - Coastal areas with moderate salinity	

Surface and corrosion protection	Corrosivity category	Surface coating	Color	Coating thickness
	DIN EN ISO 12944-2	Design		
OKS-G (primed)		2K PUR priming coat	- Standard: RAL 9005 - Optional: RAL Classic	60 ... 90 µm
OKS-S (small)	Comparable to C1	2K-PUR top coat		80 ... 120 µm
OKS-M (medium)	Comparable to C2	2K PUR priming coat 2K-PUR top coat		110 ... 160 µm
OKS-L (large)	Comparable to C3	2K-PUR top coat		140 ... 200 µm
OKS-XL (extra large)	Comparable to C4	2K-EP priming coat (two times) 2K-PUR top coat		160 ... 240 µm

Information on project planning

Final configuration
Lubricants



Lubricants

The following gearboxes are lubricated for life:

- g500-S130

Recommended lubricants:

Lubricant	CLP HC 220	CLP HC 320	CLP HC 46 NSF H1	CLP HC 220 NSF H1
Ambient temperature	-30 ... +40 °C	-20 ... +50 °C	-30 ... +10 °C	-20 ... +40 °C
Specification	Synthetic oil (polyalphaolefins basis)			
Changing interval				
Operating hours	25000	25000	16000	16000
Not later than after	4 years	4 years	3 Jahren	3 Jahren
At oil temperature	70 C°			
Fuchs	Renolin Unisyn XT 220	Renolin Unisyn XT 320		Cassida Fluid GL 220
Klüber	Klübersynth GEM4-220 N	Klübersynth GEM4-320 N	Klüberoil Summit HYSYN FG-46	Klüberoil 4 UH1-220 N
SHELL	Shell Omala S4 GXV 220	Shell Omala S4 GXV 320		

Lubricant amounts for stocking

All lubricant amounts are reference values for a change of lubricant. They serve stocking purposes, for example.

The exact values can be found on the nameplate.

Mounting position		M1 (A)	M2 (D)	M3 (B)	M4 (C)	M5 (F)	M6 (E)	M1, M5, M6 (AEF)
Gearboxes								
g500-S130	I	0.7	0.8	0.7	0.7	0.6	0.6	0.7
g500-S220	I	1.1	1.1	.9	1.1	1.0	0.8	1.1
g500-S400	I	1.6	1.3	1.2	1.5	1.3	1.1	1.6
g500-S660	I	2.5	2.4	1.8	2.4	1.9	1.9	2.5
g500-S950	I	2.9	3.2	2.4	3.2	2.4	2.4	-
g500-S2100	I	7.1	7.5	6.0	7.5	5.6	5.5	-
g500-S3100	I	9.7	10.6	8.0	11.7	8.7	7.3	-
g500-S4500	I	19.4	20.0	13.7	21.2	14.7	15.8	-
Pre-stage	I	0.4						

► Gearbox with pre-stage [105](#)



Ventilation



No venting measures are required for the g500-S130 ... S220 gearboxes.

The g500-S220 gearbox can optionally be equipped with a breather element.

From g500-S400 onwards, the gearboxes are supplied with breather elements as standard.

To reduce the number of different versions, the following gearboxes can also be ordered with combined mounting positions:

- g500-S130 ... S660 in mounting position M1/5/6 (AEF)



In these gearboxes, the lubricant amount has been optimised for the use in different mounting positions. If required, the breather elements are loosely enclosed and must be mounted before commissioning depending on the mounting position.

► [The modular system](#)  10

NOTICE

- For gearboxes with ventilation, a gap of at least 30 mm has to be observed to the machine wall on the corresponding gearbox side.

Information on project planning

Final configuration
Ventilation



g500-S220 ... S660

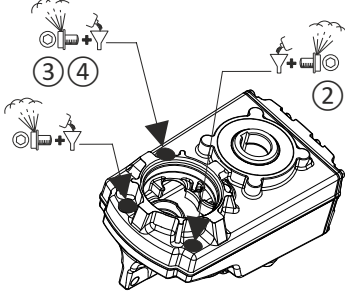
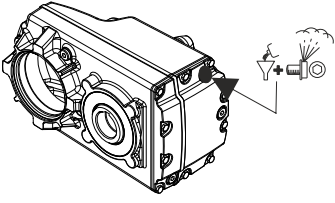
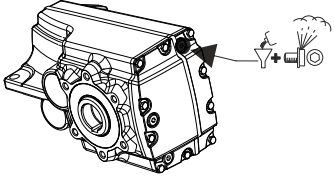
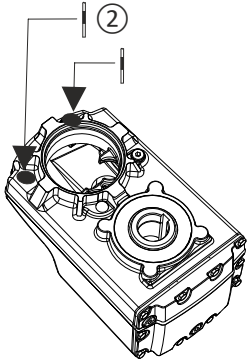
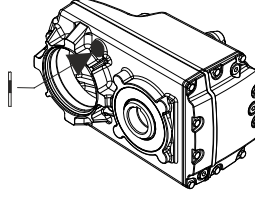
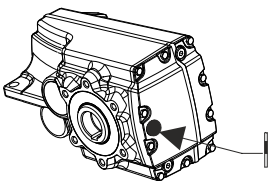
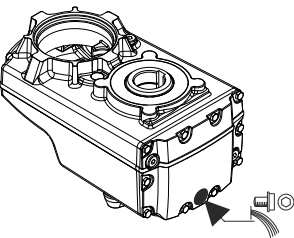
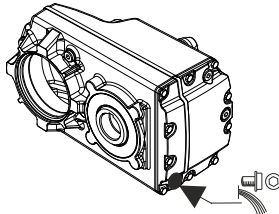
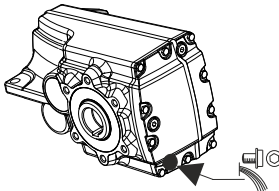
Mounting position M1 (A)	Mounting position M2 (D)	Mounting position M3 (B)
Filling and ventilation		
Check		
Drain		

- ② g500-S220
- ③ g500-S400



Information on project planning

Final configuration
Ventilation

Mounting position M4 (C)	Mounting position M5 (F)	Mounting position M6 (E)
Filling and ventilation		
		
Check		
		
Drain		
		

- ② g500-S220
- ③ g500-S400
- ④ g500-S660

Information on project planning

Final configuration
Ventilation



g500-S950 ... S4500

Mounting position M1 (A)	Mounting position M2 (D)	Mounting position M3 (B)
Filling and ventilation		
Check		
Drain		



Information on project planning

Final configuration
Ventilation

Mounting position M4 (C)	Mounting position M5 (F)	Mounting position M6 (E)
Filling and ventilation		
Check		
Drain		

⑤ g500-S3100

Gearbox with oil compensation reservoir for mounting position M4 (C)

In order to guarantee a reliable lubrication of the toothed parts in mounting position M4 (C) (motor is on the gearbox vertical from the top), a high filling level is required in the gearbox. As a result of the reduced volume of air in the gearbox, this may lead to oil escaping from the ventilation at higher input speeds. The oil compensation reservoir increases the expansion space for the lubricant.

The oil compensation reservoir can be ordered as a mounting set for fastening to the gearbox.

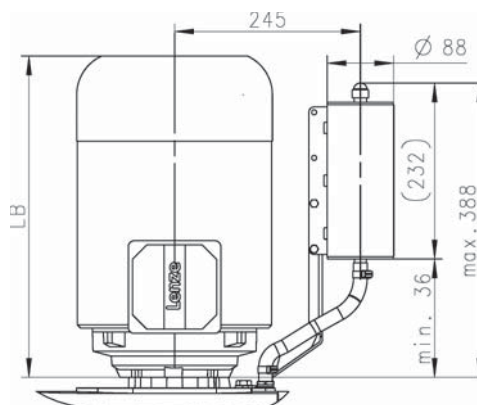
If insufficient space is available, the oil compensation reservoir can also be mounted over the gearbox hose connection on nearby system parts.

Information on project planning

Final configuration
Ventilation



Dimensions of the oil compensation reservoir



8800783-00

For the following gearboxes in mounting position M4 (C), which exceed the specified min. input speed, an oil expansion reservoir is required depending on the specified gear ratio:

g500-S2100		g500-S3100		g500-S4500	
Gearbox ratio	Min. input speed	Gearbox ratio	Min. input speed	Gearbox ratio	Min. input speed
	rpm		rpm		rpm
4.593	2000	4.951	2000	4.914	2000
6.029	2000	6.499	2000	6.450	2000
6.870	2000	7.406	2000	7.056	2000
8.272	2000	8.917	2000	8.944	2000
9.452	2000	10.932	2000	9.984	2000
10.504	2000	11.128	2000	11.740	2000
12.406	2000	12.584	2000	12.843	2000
13.787	2000	14.606	2000	13.105	2000
14.137	2000	16.517	2000	14.336	2000
15.711	2000	16.644	2000	16.381	2000
17.022	3000	18.822	2000	18.286	2000
18.917	3000	20.041	3000	20.067	2000
20.869	3000	22.663	3000	22.400	2000
23.193	3000	24.570	3000	26.437	3000
28.275	3000	27.785	3000	29.511	3000
31.422	3000	33.289	3000	32.489	3000
34.333	3000	37.644	3000	36.267	3000
38.156	3000	40.422	3000	42.044	3000
44.431	4000	45.711	3000	46.933	3000
49.378	4000	52.311	4000	51.027	4000
53.924	4000	59.156	4000	56.960	4000
59.927	4000	63.487	4000	64.500	4000
68.162	4000	71.793	4000	72.000	4000
75.750	4000				



Mechanical installation

Important notes

- Install the product according to the information in the chapter "Standards and operating conditions".
 - ▶ [Standards and operating conditions](#) 40
- The technical data and the data regarding the supply conditions can be found on the nameplate and in this documentation.
- Ambient media – especially chemically aggressive ones – may damage shaft sealing rings, lacquers and plastics.
- Lenze offers special surface and corrosion protection in this case.

Transport

- Ensure appropriate handling.
- Make sure that all component parts are securely mounted. Secure or remove loose component parts.
- Only use safely fixed transport aids (e.g., eye bolts or support plates).
- Do not damage any components during transport.
- Avoid electrostatic discharges on electronic components and contacts.
- Avoid impacts.
- Check the carrying capacity of the hoists and load handling devices. The weights can be found in the shipping documents.
- Secure the load against tipping and falling down.
- Standing beneath suspended loads is prohibited.

Installation

- The mounting surfaces must be plane, torsionally rigid and free from vibrations.
- The mounting areas must be suited to absorb the forces and torques generated during operation.
- Ensure an unhindered ventilation.
- For versions with a fan, keep a minimum distance of 10 % from the outside diameter of the fan cover in intake direction.



Electrical installation

Important notes



Risk of injury and risk of burns from dangerous voltage

Power terminals may also carry voltage in the switched-off state or when the motor is stopped and may cause life-threatening cardiac arrhythmia and serious burns.

- ▶ Disconnect the product from the mains.
- ▶ Check that the power terminals are deenergized before starting work.

- When working on energized products, comply with the applicable national accident prevention regulations.
- The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE connection).
- The manufacturer of the system or machine is responsible for adherence to the limits required in connection with EMC legislation.

Operation on an external inverter

A max. pulse voltage amplitude of $U_{pk} = 1560 \text{ V}$ at the motor terminals must not be exceeded. Here, the minimum pulse rise time must be $t_R = 0.1 \text{ } \mu\text{s}$.

If it cannot be ruled out that the permissible voltage peaks will be exceeded or that the minimum pulse rise time will not be reached, the following measures must be initiated:

- Reduction of the DC-bus voltage (threshold for brake chopper voltage)
- Use of filters, chokes
- Use of special motor cables

Preparation



The notes for the electrical connection can be found in the enclosed mounting instructions.

EMC-compliant wiring



The EMC-compliant wiring is described in detail in the documentation of the Lenze inverters.



Technical data

Notes regarding the given data

Catalog data

The power values, torques and speeds specified in the configuration are rounded values and apply to:

- Operating time per day = 8 hrs (100 % ED)
- Duty class up to 10 switching operations per hour
- Ambient temperature = 40 °C
- Site altitude ≤ 1000 m above mean sea level
- The selection tables indicate the mechanically permissible power levels and torques.
- The ratings apply to the operating mode S1 (acc. to EN 60034-1).

NOTICE

In case of other operating conditions, the achievable values can differ for those mentioned.

► In case of extreme operating conditions, please get in touch with your Lenze representative.

Technical data

Standards and operating conditions
Conformities and approvals



Standards and operating conditions

Conformities and approvals

More information and certificates of approval can be found under

[g500 + m850 shaft-mounted helical geared motors](#)

Europe					
Country	Conformity/ approval	Law/standard	Description	Special feature	Product representation
European Union	CE	2006/42/EC	Machinery Directive	Only for safety-relevant components	CE mark
		2014/35/EU	Low-Voltage Directive		
		2014/30/EU	EMC Directive		
		2011/65/EU	RoHS		
				-	
Great Britain	UKCA	S.I. 2008/1597	The Supply of Machinery (Safety) Regulations 2008	Only for safety-relevant components	UKCA mark
		S.I. 2016/1091	The Electromagnetic Compatibility Regulations 2016	-	
		S.I. 2016/1101	The Electrical Equipment (Safety) Regulations 2016		
		S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012		

America					
Country	Conformity/ approval	Law/standard	Description	Special feature	Product representation
Canada	CSA	CSA 22.1 No. 100	CSA Standard for Motors and Generators		cULus mark
USA	UL	UL 1004-1	UL Standard for Rotating Electrical Machines		

Asia					
Country	Conformity/ approval	Law/standard	Description	Special feature	Product representation
China		GB 30253	Minimum allowable values of energy efficiency and energy efficiency grades for permanent magnet synchronous motors		CEL mark
		GB/T 26572	Requirements on concentration limits for certain restricted substances in electrical and electronic products		EFUP mark

Protection of persons and device protection

Degree of protection			
-	EN IEC 60529, EN IEC 60034-5	IP54 IP65	Information applies to the mounted and ready-for-use state
Temperature class			
-	EN IEC 60034-1	F (155 °C)	Insulation system
Permissible voltage			
-	IEC 60034-18-41	IVIC C	At 500 V
	IEC/TS 60034-25:2007	Limit curve A	Of the pulse voltage



Technical data

Standards and operating conditions

EMC data

EMC data

Noise emission		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable
Noise immunity		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable

Environmental conditions

Climate			
Storage	EN 60721-3-1:1997	1K3 (-20 ... +40 °C)	>3 months
		1K3 (-20 ... +60 °C)	<3 months
Transport	EN 60721-3-2:1997	2K3 (-20 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-10 ... +40 °C)	Operation, without brake
		3K3 (-15 ...+40 °C)	Operation without brake, forced ventilated
		3K3 (-20 ...+40 °C)	Operation without brake, self-ventilated
Site altitude			
0 ... 1000 m amsl	-	Without current derating	
1000 ... 2000 m. amsl		Reduce rated output current by 5 %/1000 m	
Air humidity			
-	-	Average relative humidity 85 %	Without condensation



Technical data

Data overview

In order to calculate the exact ratio, the number of teeth z_g (driven) can be divided by the number of teeth z_t (driving).

g500-S130, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{z, max}	i	z _g	z _t	
Nm				'
63.0	3.661	637	174	19
76.0	5.021	728	145	18
87.0	6.425	559	87	18
92.0	7.029	5096	725	18
116	8.322	749	90	13
125	9.411	847	90	12
130	11.413	856	75	13
130	12.907	968	75	12
130	14.606	4601	315	12
130	15.979	5992	375	12
130	18.069	6776	375	12
130	20.381	428	21	13
130	23.048	484	21	12
130	24.967	749	30	12
130	28.233	847	30	12
130	35.493	2662	75	12
130	45.711	2057	45	12

g500-S220, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{2, max}	i	z _g	z _t	
Nm				'
178	3.840	553	144	16
181	5.267	79	15	16
220	6.767	203	30	13
217	7.667	23	3	12
220	9.280	232	25	13
220	10.514	368	35	12
220	11.876	1247	105	12
220	12.992	1624	125	12
220	13.456	1978	147	12
220	14.720	368	25	12
220	16.571	116	7	12
220	18.776	920	49	12
220	20.300	203	10	12
220	23.000	23	1	11
220	26.422	1189	45	12
220	29.937	1886	63	11
220	32.867	493	15	12
220	37.238	782	21	11
220	48.190	1012	21	11
220	58.486	2047	35	11



g500-S400, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{z, max}	i	z _g	z _t	'
Nm				
203	3.339	581	174	16
243	4.579	664	145	16
258	5.860	3569	609	13
261	6.411	4648	725	12
365	7.467	112	15	13
380	8.436	329	39	12
400	10.240	256	25	12
400	11.569	752	65	12
400	13.105	1376	105	12
400	14.336	1792	125	12
400	14.806	4042	273	12
400	16.197	5264	325	12
400	18.286	128	7	12
400	20.659	1880	91	11
400	22.400	112	5	12
400	25.308	329	13	11
400	29.156	1312	45	12
400	32.940	3854	117	11
400	36.267	544	15	12
400	40.974	1598	39	11
348	53.026	2068	39	11
302	64.354	4183	65	11

g500-S660, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{2, max}	i	z _g	z _t	'
Nm				
419	3.920	98	25	14
492	5.376	672	125	13
601	6.417	77	12	11
496	6.880	172	25	13
593	7.311	329	45	11
638	8.800	44	5	10
625	10.027	752	75	10
660	11.262	473	42	10
660	12.320	308	25	10
660	12.832	4042	315	10
660	14.037	5264	375	10
660	15.714	110	7	10
660	17.905	376	21	10
660	19.250	77	4	10
660	21.933	329	15	9
578	25.056	451	18	10
660	28.548	3854	135	9
660	31.167	187	6	10
660	35.511	1598	45	9
545	40.333	121	3	10
620	45.956	2068	45	9
446	48.950	979	20	10
508	55.773	4183	75	9



g500-S660, 3-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
625	49.867	748	15	10
650	56.818	12784	225	10
660	63.817	8041	126	10
660	69.813	5236	75	10
660	72.713	68714	945	10
660	79.545	89488	1125	10
660	89.048	1870	21	10
660	101.460	6392	63	10
660	109.083	1309	12	10
660	124.289	5593	45	10
660	156.249	35156	225	10
660	201.230	27166	135	10

g500-S950, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
621	4.380	403	92	15
691	5.391	124	23	14
732	6.038	3472	575	14
783	7.702	1240	161	14
950	9.100	91	10	10
950	10.183	611	60	10
950	11.200	56	5	10
950	12.544	1568	125	9
950	14.037	5264	375	9
950	16.000	16	1	9
950	17.905	376	21	9
950	19.600	98	5	9
950	21.933	329	15	9
950	25.511	1148	45	9
950	28.548	3854	135	9
950	31.267	469	15	9
950	34.989	3149	90	9
950	41.067	616	15	9
950	45.956	2068	45	9
924	49.840	1246	25	9
950	55.773	4183	75	9
668	63.000	63	1	9
736	70.500	141	2	9



g500-S950, 3-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
950	50.027	3752	75	10
950	55.982	12596	225	9
950	64.022	2881	45	10
950	70.037	26264	375	9
950	71.644	135407	1890	10
950	78.375	88172	1125	9
950	89.333	268	3	10
950	99.968	6298	63	9
950	109.433	3283	30	9
950	122.461	22043	180	9
950	142.437	19229	135	9
950	159.394	129109	810	9
950	177.178	7973	45	9
950	198.270	53533	270	9
950	256.585	34639	135	9
950	311.401	280261	900	9

g500-S950, 4-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
950	319.059	1076824	3375	10
950	357.042	3615052	10125	10



g500-S2100, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{2, max}	i	z _g	z _t	'
Nm				
1331	4.593	689	150	12
1487	6.029	2279	378	11
1487	6.870	371	54	11
1487	8.272	3127	378	11
1866	9.452	4017	425	8
1872	10.504	1313	125	8
2030	12.406	4429	357	7
2047	13.787	4343	315	7
2050	14.137	721	51	7
2050	15.711	707	45	7
2050	17.022	6077	357	7
2050	18.917	5959	315	7
2050	20.869	3193	153	7
2050	23.193	3131	135	7
2050	28.275	1442	51	8
2050	31.422	1414	45	7
2050	34.333	103	3	7
2050	38.156	1717	45	7
2044	44.431	2266	51	7
2050	49.378	2222	45	7
1957	53.924	9167	170	7
2050	59.927	8989	150	7
1454	68.162	4635	68	7
1576	75.750	303	4	7

g500-S2100, 3-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
M _{2, max}	i	z _g	z _t	
Nm				'
1945	40.056	721	18	8
2050	44.515	12019	270	8
2050	54.933	824	15	8
2050	61.049	13736	225	8
2050	70.302	4429	63	8
2050	76.907	5768	75	8
2050	78.128	73831	945	7
2050	85.468	96152	1125	7
2050	98.095	2060	21	8
2050	109.016	6868	63	7
2050	120.167	721	6	8
2050	133.544	12019	90	7
2050	156.407	4223	27	8
2050	173.820	70397	405	7
2050	194.556	1751	9	8
2050	216.215	29189	135	7
2050	251.778	2266	9	8
2050	279.807	37774	135	7
2050	305.567	9167	30	8
2050	339.584	152813	450	7
2050	429.250	1717	4	7



g500-S2100, 4-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
2050	320.263	181589	567	8
2050	350.353	236488	675	8
2050	389.356	3942232	10125	8
2050	446.878	84460	189	8
2050	496.628	281588	567	8
2050	547.426	29561	54	8
2050	608.369	492779	810	8
2050	712.523	173143	243	8
2050	791.846	2886277	3645	8

g500-S3100, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
1842	4.951	2847	575	10
2110	6.499	3139	483	10
2235	7.406	511	69	9
2264	8.917	4307	483	9
2275	10.932	2263	207	9
3022	11.128	1391	125	6
2965	12.584	1573	125	6
3100	14.606	4601	315	6
3100	16.517	5203	315	6
3100	16.644	749	45	6
3100	18.822	847	45	6
3100	20.041	6313	315	6
3100	22.663	7139	315	6
3100	24.570	3317	135	6
3100	27.785	3751	135	6
3100	33.289	1498	45	6
3100	37.644	1694	45	6
3100	40.422	1819	45	6
3100	45.711	2057	45	6
2587	52.311	2354	45	6
2743	59.156	2662	45	6
2250	63.487	9523	150	6
2408	71.793	10769	150	6



g500-S3100, 3-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
2958	47.159	12733	270	6
3054	53.330	14399	270	6
3100	64.676	14552	225	6
3100	73.138	16456	225	6
3100	82.769	78217	945	6
3100	90.546	101864	1125	6
3100	93.599	88451	945	6
3100	102.393	115192	1125	6
3100	115.492	7276	63	6
3100	130.603	8228	63	6
3100	141.478	12733	90	6
3100	159.989	14399	90	6
3100	184.146	74579	405	6
3100	208.240	84337	405	6
3100	229.059	30923	135	6
3100	259.030	34969	135	6
3100	296.430	40018	135	6
3100	335.215	45254	135	6
3100	359.758	161891	450	6
3100	406.829	183073	450	6

g500-S3100, 4-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
3100	316.910	356524	1125	7
3100	358.375	403172	1125	6
3100	404.222	3638	9	7
3100	457.111	4114	9	6
3100	495.172	89131	180	6
3100	559.961	100793	180	6
3100	644.510	522053	810	6
3100	728.838	590359	810	6
3100	801.707	216461	270	6
3100	906.604	244783	270	6
3100	1043.492	1267843	1215	6
3100	1180.024	1433729	1215	6



g500-S4500, 2-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
2535	7.056	882	125	9
4500	12.843	4816	375	5
4500	14.336	1792	125	4
4500	16.381	344	21	5
4500	18.286	128	7	4
4500	20.067	301	15	5
4500	22.400	112	5	4
4500	26.437	3569	135	5
4500	29.511	1328	45	4
4500	32.489	1462	45	5
4500	36.267	544	15	4
4101	42.044	1892	45	5
4394	46.933	704	15	4
3653	51.027	3827	75	5
3946	56.960	1424	25	4
2488	64.500	129	2	5
2586	72.000	72	1	4

g500-S4500, 3-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
4150	38.090	49708	1305	5
4291	42.520	18496	435	4
4500	52.794	9503	180	5
4500	58.933	884	15	4
4500	64.978	2924	45	5
4500	72.533	1088	15	4
4500	72.775	81872	1125	5
4500	81.237	30464	375	4
4500	92.825	5848	63	5
4500	103.619	2176	21	4
4500	113.711	5117	45	5
4500	126.933	1904	15	4
4500	148.005	59942	405	5
4500	165.215	22304	135	4
4500	181.396	48977	270	5
4500	202.489	9112	45	4
4500	238.252	32164	135	5
4500	265.956	11968	45	4
4500	289.151	65059	225	5
4500	322.773	24208	75	4
3962	365.500	731	2	5
4410	408.000	408	1	4



g500-S4500, 4-stage gearboxes

Max. output torque	Ratio	Number of teeth		Max. backlash
				Standard
$M_{2, \max}$	i	z_g	z_t	
Nm				'
4500	324.889	2924	9	5
4500	362.667	1088	3	5
4500	397.989	35819	90	5
4500	444.267	6664	15	5
4500	518.017	209797	405	5
4500	578.252	78064	135	4
4500	634.887	342839	540	5
4500	708.711	31892	45	4
4500	826.361	2008057	2430	5
4500	922.449	373592	405	4
4500	1027.912	832609	810	5
4500	1147.437	154904	135	4
4500	1211.575	490688	405	4
4500	1350.094	546788	405	5
4500	1507.081	203456	135	4

Technical data

Radial forces and axial forces



Radial forces and axial forces

Permissible radial force

The calculation of the permissible radial force must take account of the additional load factor f_w .

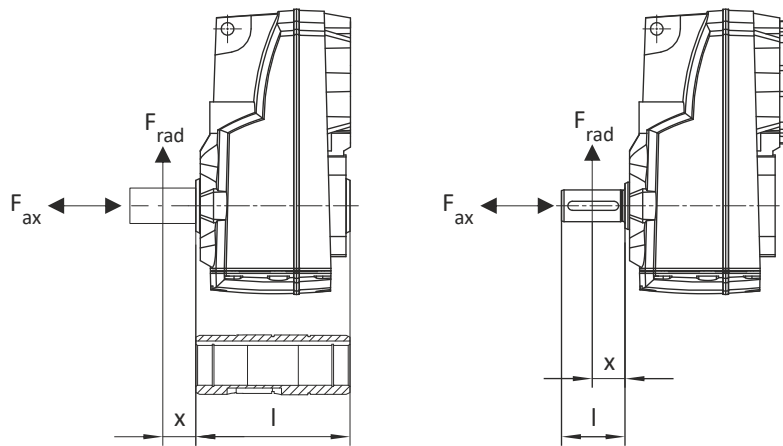
$$F_{\text{rad, perm}} = f_w \times F_{\text{rad, max}}$$

Permissible axial force

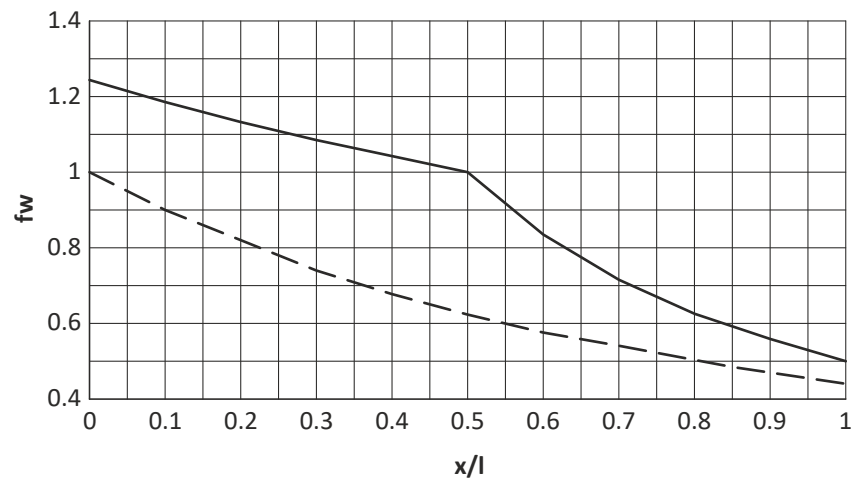
If there is no radial force, the maximum axial force is 50% of the value in the table $F_{\text{rad, max}}$

$$F_{\text{ax, zul}} = 0.5 \times F_{\text{rad, max}}$$

Application of forces



Additional load factor f_w on the drive shaft



— Solid shaft
- - - Hollow shaft



The values given in the tables refer to the centre shaft end force application point and are minimum values calculated according to the most unfavourable conditions (force application angle, mounting position, direction of rotation). The values were calculated with a load capacity of $c = 1.3$ and an input speed of 1400 rpm.



In case of different operating conditions, considerably higher forces can be transmitted. Please get in touch with your Lenze representative



A hollow shaft with shrink disc (SAR/SBR/SCR/SDR/SAK/SCK) requires a check by Lenze.

Max. radial force, gearbox with hollow shaft (H□R/H□K)

Getriebe	Output speed n_2 [rpm]									
	1000	630	400	250	160	100	63	40	25	16
	Max. radial force $F_{rad,max}$ [rated]									
g500-S130	1000	1100	1300	1500	1650	2200	2750	3450	4200	4500
g500-S220	2100	2300	2800	3200	3800	4600	5500	6300	7000	7000
g500-S400	2200	2500	3000	3400	4100	5000	6000	7100	8000	8000
g500-S660	2500	2900	3500	4000	5000	6600	8500	10800	12000	12000
g500-S950	3400	4000	4300	5000	6000	8000	10300	11500	12500	13000
g500-S2100	4500	5100	6200	6500	7500	10000	12000	15700	15700	16000
g500-S3100	5200	5700	7000	8000	9000	12500	15000	17000	19800	19800
g500-S4500	11100	12900	15000	17500	19000	20000	23000	30000	30000	30000

Max. radial force, gearbox with solid shaft, without flange (V□R)

Getriebe	Output speed n_2 [rpm]									
	1000	630	400	250	160	100	63	40	25	16
	Max. radial force $F_{rad,max}$ [rated]									
g500-S130	1000	1100	1300	1500	1650	2200	2750	3450	4200	4500
g500-S220	1700	1900	2300	2700	3200	3600	3600	3600	3600	3600
g500-S400	1700	1900	2300	2700	3200	4000	4800	5800	6200	6200
g500-S660	2300	2600	3100	3600	3900	5100	6500	8400	9000	9000
g500-S950	6100	6800	8200	9500	10300	10300	10300	10300	10300	10300
g500-S2100	7500	8200	10000	11500	13600	15700	15700	15700	15700	15700
g500-S3100	9400	10300	12600	14500	16500	18000	19800	19800	19800	19800
g500-S4500	12000	13100	16100	18500	20000	22000	25000	30000	30000	30000

Max. radial force, gearbox with solid shaft and flange (V□K)

Getriebe	Output speed n_2 [rpm]									
	1000	630	400	250	160	100	63	40	25	16
	Max. radial force $F_{rad,max}$ [rated]									
g500-S130	1000	1100	1300	1500	1650	2200	2750	3450	4200	4500
g500-S220	2400	2600	3200	3700	4400	4600	4600	4600	4600	4600
g500-S400	3300	3600	4400	5100	5900	6800	7000	7000	7000	7000
g500-S660	4500	5000	6100	7000	7800	9600	10000	10000	10000	10000
g500-S950	4900	5300	6500	7500	8500	10300	10300	10300	10300	10300
g500-S2100	7400	8200	10000	11500	13600	15700	15700	15700	15700	15700
g500-S3100	12800	14100	17200	19800	19800	19800	19800	19800	19800	19800
g500-S4500	17500	19200	23500	27000	28000	30000	30000	30000	30000	30000



Selection tables

Notes on the selection tables

The selection tables represent the available combinations of gearbox, number of stages, ratio and motor for the mounting position M1. They only serve as a rough overview.

The following legend shows the layout of the selection tables:

Example

Inverter power supply 400 V, self-ventilated motors
2 kW

Explanation

Voltage of inverter mains connection, motor cooling type
Rated motor power

Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2,max}$	$n_{2,th}$	J	i	g500-	m850-	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
17.0	1082	2.7	52.0	876	8.063	3.661	S130	120S40	2	12
21.0	865	5.6	64.0	788	9.407	4.579	S400	120S40	2	17
23.0	789	2.4	71.0	697	7.387	5.021	S130	120S40	2	12
25.0	752	5.3	74.0	679	8.044	5.267	S220	120S40	2	14

										Mass
										Number of gear stages
										Motor product name
										Gearbox product name
										Ratio
										Moment of inertia
										With feedback, without brake
										Max. permissible output speed in S1 operation
										Max. permissible acceleration torque
										Dependent on inverter
										Load capacity of the gearbox
										c is the ratio of permissible rated torque of the gearbox to the rated torque of the motor (converted to the driven shaft). c must always be higher than the application factor detected for the application k .
										$c = \frac{M_{2,zul}}{M_{1,N} \times i \times \eta_{Getr}} > k$
										Output speed
										Output torque



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

Inverter mains connection 400 V, Self-ventilated motors

2 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
17.0	1082	2.7	52.0	876	8.063	3.661	S130	120S40	2	12
21.0	865	5.6	64.0	788	9.407	4.579	S400	120S40	2	17
23.0	789	2.4	71.0	697	7.387	5.021	S130	120S40	2	12
25.0	752	5.3	74.0	679	8.044	5.267	S220	120S40	2	14
27.0	676	4.8	82.0	650	8.361	5.860	S400	120S40	2	17
30.0	618	4.5	90.0	610	8.076	6.411	S400	120S40	2	17
30.0	616	2.1	87.0	616	7.073	6.425	S130	120S40	2	12
32.0	576	5.9	97.0	513	9.984	6.880	S660	120S40	2	23
33.0	563	2.0	92.0	563	6.988	7.029	S130	120S40	2	12
36.0	517	4.4	108	384	7.999	7.667	S220	120S40	2	14
36.0	514	5.9	108	461	11.580	7.702	S950	120S40	2	42
44.0	421	2.1	125	323	7.530	9.411	S130	120S40	2	12
49.0	377	3.3	148	310	7.461	10.514	S220	120S40	2	14
54.0	342	5.4	163	309	7.698	11.569	S400	120S40	2	17
60.0	309	5.9	181	275	8.716	12.832	S660	120S40	2	23
60.0	307	1.6	130	235	7.104	12.907	S130	120S40	2	12
63.0	294	2.5	189	254	7.173	13.456	S220	120S40	2	14
65.0	282	5.6	197	257	8.463	14.037	S660	120S40	2	23
69.0	269	2.3	207	237	7.083	14.720	S220	120S40	2	14
69.0	268	4.2	208	252	7.317	14.806	S400	120S40	2	17
75.0	245	3.8	228	235	7.204	16.197	S400	120S40	2	17
83.0	221	4.8	252	215	7.915	17.905	S660	120S40	2	23
83.0	221	5.9	252	198	9.842	17.905	S950	120S40	2	42
84.0	219	1.3	130	187	6.844	18.069	S130	120S40	2	12
87.0	211	2.1	220	211	6.918	18.776	S220	120S40	2	14
96.0	192	3.4	291	192	6.992	20.659	S400	120S40	2	17
102	181	4.6	309	181	7.589	21.933	S660	120S40	2	23
107	172	1.7	220	172	6.820	23.000	S220	120S40	2	14
107	172	1.0	130	155	6.732	23.048	S130	120S40	2	12
118	157	2.8	356	157	6.870	25.308	S400	120S40	2	17
133	139	3.7	402	139	7.109	28.548	S660	120S40	2	23
133	139	4.6	402	139	8.263	28.548	S950	120S40	2	42
139	132	1.3	220	132	6.699	29.937	S220	120S40	2	14
153	120	2.4	400	120	6.728	32.940	S400	120S40	2	17
163	113	4.4	492	113	7.714	34.989	S950	120S40	2	42
165	112	3.4	500	112	6.942	35.511	S660	120S40	2	23
173	106	1.2	220	106	6.645	37.238	S220	120S40	2	14
191	96.6	1.9	400	96.6	6.664	40.974	S400	120S40	2	17
214	86.2	2.6	620	86.2	6.775	45.956	S660	120S40	2	23
214	86.2	3.4	647	86.2	7.261	45.956	S950	120S40	2	42
230	80.2	4.3	695	80.2	9.036	49.378	S2100	120S40	2	74
257	70.7	3.0	776	70.7	7.561	55.982	S950	120S40	3	43
260	71.0	1.8	508	71.0	6.701	55.773	S660	120S40	2	23
260	71.0	2.8	785	71.0	7.060	55.773	S950	120S40	2	42
261	69.7	2.1	650	69.7	6.881	56.818	S660	120S40	3	23
275	66.9	4.3	832	66.9	9.459	59.156	S3100	120S40	2	114
279	66.1	3.6	843	66.1	8.354	59.927	S2100	120S40	2	74
328	56.2	2.0	736	56.2	6.861	70.500	S950	120S40	2	42
329	55.3	2.6	950	55.3	7.234	71.644	S950	120S40	3	43
334	55.2	3.6	1010	55.2	8.641	71.793	S3100	120S40	2	114

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
334	54.5	1.8	660	54.5	6.764	72.713	S660	120S40	3	23
353	52.3	2.9	1066	52.3	7.724	75.750	S2100	120S40	2	74
358	50.7	5.2	1083	50.7	8.646	78.128	S2100	120S40	3	75
360	50.5	2.4	950	50.5	7.134	78.375	S950	120S40	3	43
365	49.8	1.7	660	49.8	6.730	79.545	S660	120S40	3	23
392	46.3	4.8	1184	46.3	8.404	85.468	S2100	120S40	3	75
459	39.6	1.9	950	39.6	6.949	99.968	S950	120S40	3	43
465	39.0	1.3	660	39.0	6.662	101.460	S660	120S40	3	23
500	36.3	3.7	1511	36.3	7.879	109.016	S2100	120S40	3	75
562	32.3	1.5	950	32.3	6.841	122.461	S950	120S40	3	43
570	31.9	1.1	660	31.9	6.623	124.289	S660	120S40	3	23
599	30.3	4.7	1810	30.3	7.980	130.603	S3100	120S40	3	115
613	29.7	3.1	1851	29.7	7.565	133.544	S2100	120S40	3	75
731	24.8	1.2	950	24.8	6.712	159.394	S950	120S40	3	43
734	24.8	3.9	2217	24.8	7.632	159.989	S3100	120S40	3	115
758	24.0	5.1	2289	24.0	8.522	165.215	S4500	120S40	3	190
797	22.8	2.3	2050	22.8	7.095	173.820	S2100	120S40	3	75
929	19.6	4.4	2806	19.6	7.886	202.489	S4500	120S40	3	190
955	19.0	3.0	2886	19.0	7.187	208.240	S3100	120S40	3	115
992	18.3	1.9	2050	18.3	6.933	216.215	S2100	120S40	3	75
1188	15.3	2.4	3100	15.3	6.958	259.030	S3100	120S40	3	115
1220	14.9	3.4	3685	14.9	7.361	265.956	S4500	120S40	3	190
1284	14.2	1.5	2050	14.2	6.770	279.807	S2100	120S40	3	75
1481	12.3	2.8	4473	12.3	7.128	322.773	S4500	120S40	3	190
1538	11.8	1.8	3100	11.8	6.785	335.215	S3100	120S40	3	115
1558	11.7	1.2	2050	11.7	6.697	339.584	S2100	120S40	3	75
1619	11.0	1.8	3100	11.0	6.957	358.375	S3100	120S40	4	118
1639	10.9	2.5	4500	10.9	7.122	362.667	S4500	120S40	4	193
1759	10.2	1.1	2050	10.2	6.774	389.356	S2100	120S40	4	78
1866	9.7	1.5	3100	9.7	6.707	406.829	S3100	120S40	3	115
1872	9.7	2.2	4410	9.7	6.903	408.000	S4500	120S40	3	190
2007	8.9	2.0	4500	8.9	7.040	444.267	S4500	120S40	4	193
2065	8.7	1.4	3100	8.7	6.911	457.111	S3100	120S40	4	118
2530	7.1	1.1	3100	7.1	6.885	559.961	S3100	120S40	4	118
2613	6.8	1.6	4500	6.8	6.959	578.252	S4500	120S40	4	193
3202	5.6	1.3	4500	5.6	6.918	708.711	S4500	120S40	4	193



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

2.9 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
28.0	970	5.3	84.0	915	20.860	3.339	S400	140S32	2	20
32.0	844	4.4	97.0	765	18.296	3.840	S220	140S32	2	17
38.0	708	4.5	116	708	18.607	4.579	S400	140S32	2	20
43.0	615	3.2	133	615	17.244	5.267	S220	140S32	2	17
44.0	603	5.5	136	562	20.964	5.376	S660	140S32	2	26
44.0	601	5.9	136	545	24.948	5.391	S950	140S32	2	45
48.0	553	3.8	148	553	17.561	5.860	S400	140S32	2	20
50.0	537	5.5	152	499	23.206	6.038	S950	140S32	2	45
53.0	505	3.6	162	505	17.276	6.411	S400	140S32	2	20
57.0	471	4.7	174	471	19.184	6.880	S660	140S32	2	26
63.0	423	2.7	193	347	17.199	7.667	S220	140S32	2	17
64.0	421	4.6	194	421	20.780	7.702	S950	140S32	2	45
68.0	392	5.8	209	354	32.492	8.272	S2100	140S32	2	77
70.0	384	4.2	213	346	17.645	8.436	S400	140S32	2	20
74.0	363	5.8	225	329	43.871	8.917	S3100	140S32	2	117
83.0	323	5.5	253	301	18.888	10.027	S660	140S32	2	26
87.0	308	2.0	220	279	16.661	10.514	S220	140S32	2	17
95.0	280	3.2	292	280	16.898	11.569	S400	140S32	2	20
106	253	4.7	324	253	17.916	12.832	S660	140S32	2	26
111	241	1.5	220	213	16.373	13.456	S220	140S32	2	17
116	231	4.4	354	231	17.663	14.037	S660	140S32	2	26
116	231	5.5	354	215	20.378	14.037	S950	140S32	2	45
121	220	1.4	220	196	16.283	14.720	S220	140S32	2	17
122	219	2.5	373	219	16.517	14.806	S400	140S32	2	20
134	200	2.3	400	200	16.404	16.197	S400	140S32	2	20
148	181	3.5	452	181	17.115	17.905	S660	140S32	2	26
148	181	4.6	452	181	19.042	17.905	S950	140S32	2	45
155	173	1.3	220	172	16.118	18.776	S220	140S32	2	17
170	157	2.1	400	157	16.192	20.659	S400	140S32	2	20
181	148	3.2	553	148	16.789	21.933	S660	140S32	2	26
181	148	4.5	553	148	18.274	21.933	S950	140S32	2	45
190	141	1.0	220	141	16.020	23.000	S220	140S32	2	17
209	128	1.7	400	128	16.070	25.308	S400	140S32	2	20
235	114	2.5	660	114	16.309	28.548	S660	140S32	2	26
235	114	3.6	720	114	17.463	28.548	S950	140S32	2	45
259	103	5.0	793	103	20.988	31.422	S2100	140S32	2	77
289	92.6	3.2	883	92.6	16.914	34.989	S950	140S32	2	45
293	91.2	2.2	660	91.2	16.142	35.511	S660	140S32	2	26
310	86.1	5.0	950	86.1	22.032	37.644	S3100	140S32	2	117
315	84.9	4.2	963	84.9	19.681	38.156	S2100	140S32	2	77
362	72.8	4.4	1106	72.7	20.379	44.515	S2100	140S32	3	78
377	70.9	4.2	1153	70.9	20.389	45.711	S3100	140S32	2	117
379	70.5	2.4	950	70.5	16.461	45.956	S950	140S32	2	45
387	69.0	4.2	1184	69.0	24.286	46.933	S4500	140S32	2	190
407	65.6	3.4	1246	65.6	18.236	49.378	S2100	140S32	2	77
455	57.9	1.8	950	57.9	16.761	55.982	S950	140S32	3	46
460	58.1	2.0	950	58.1	16.260	55.773	S950	140S32	2	45
470	56.9	3.5	1437	56.9	21.947	56.960	S4500	140S32	2	190
488	54.8	3.4	1492	54.8	18.659	59.156	S3100	140S32	2	117
494	54.1	2.8	1430	54.1	17.554	59.927	S2100	140S32	2	77
496	53.1	3.6	1517	53.1	18.772	61.049	S2100	140S32	3	78

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
582	45.2	1.6	950	45.2	16.434	71.644	S950	140S32	3	46
592	45.1	2.8	1714	45.1	17.841	71.793	S3100	140S32	2	117
594	45.0	2.8	1718	45.0	19.787	72.000	S4500	140S32	2	190
594	44.3	5.1	1817	44.3	19.094	73.138	S3100	140S32	3	118
625	42.8	2.3	1477	42.8	16.924	75.750	S2100	140S32	2	77
635	41.5	3.2	1941	41.5	17.846	78.128	S2100	140S32	3	78
637	41.3	1.5	950	41.3	16.334	78.375	S950	140S32	3	46
694	37.9	2.9	2050	37.9	17.604	85.468	S2100	140S32	3	78
760	34.6	4.0	2326	34.6	18.042	93.599	S3100	140S32	3	118
812	32.4	1.1	950	32.4	16.149	99.968	S950	140S32	3	46
832	31.6	3.6	2544	31.6	17.768	102.393	S3100	140S32	3	118
842	31.3	5.2	2575	31.3	19.699	103.619	S4500	140S32	3	193
886	29.7	2.3	2050	29.7	17.079	109.016	S2100	140S32	3	78
1031	25.5	4.3	3154	25.5	18.712	126.933	S4500	140S32	3	193
1061	24.8	2.9	3100	24.8	17.180	130.603	S3100	140S32	3	118
1085	24.3	1.8	2050	24.3	16.765	133.544	S2100	140S32	3	78
1300	20.3	2.3	3100	20.3	16.832	159.989	S3100	140S32	3	118
1342	19.6	3.3	4105	19.6	17.722	165.215	S4500	140S32	3	193
1412	18.6	1.4	2050	18.6	16.295	173.820	S2100	140S32	3	78
1645	16.0	2.7	4500	16.0	17.086	202.489	S4500	140S32	3	193
1692	15.6	1.8	3100	15.6	16.387	208.240	S3100	140S32	3	118
1756	15.0	1.1	2050	15.0	16.133	216.215	S2100	140S32	3	78
2104	12.5	1.4	3100	12.5	16.158	259.030	S3100	140S32	3	118
2160	12.2	2.0	4500	12.2	16.561	265.956	S4500	140S32	3	193
2622	10.0	1.7	4500	10.0	16.328	322.773	S4500	140S32	3	193
2867	9.0	1.1	3100	9.0	16.157	358.375	S3100	140S32	4	121
2902	8.9	1.5	4500	8.9	16.322	362.667	S4500	140S32	4	196
3555	7.3	1.2	4500	7.3	16.240	444.267	S4500	140S32	4	196



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

3.1 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
24.0	1186	4.2	94.0	872	17.560	3.339	S400	120M40	2	20
26.0	1082	1.7	63.0	766	13.963	3.661	S130	120M40	2	15
28.0	1031	4.2	108	759	14.996	3.840	S220	120M40	2	17
33.0	865	4.0	129	739	15.307	4.579	S400	120M40	2	20
36.0	789	1.5	76.0	597	13.287	5.021	S130	120M40	2	15
38.0	752	3.5	148	626	13.944	5.267	S220	120M40	2	17
42.0	676	3.3	165	611	14.261	5.860	S400	120M40	2	20
46.0	618	3.2	180	575	13.976	6.411	S400	120M40	2	20
46.0	616	1.4	87.0	517	12.973	6.425	S130	120M40	2	15
49.0	576	4.1	194	480	15.884	6.880	S660	120M40	2	25
50.0	563	1.3	92.0	488	12.888	7.029	S130	120M40	2	15
55.0	517	2.9	216	352	13.899	7.667	S220	120M40	2	17
55.0	514	4.1	217	431	17.480	7.702	S950	120M40	2	45
61.0	469	4.2	237	345	14.345	8.436	S400	120M40	2	20
68.0	421	1.3	125	261	13.430	9.411	S130	120M40	2	15
75.0	377	2.1	220	283	13.361	10.514	S220	120M40	2	17
83.0	342	3.5	326	285	13.598	11.569	S400	120M40	2	20
92.0	309	4.1	361	257	14.616	12.832	S660	120M40	2	25
93.0	307	1.0	130	197	13.004	12.907	S130	120M40	2	15
97.0	294	1.7	220	220	13.073	13.456	S220	120M40	2	17
101	282	3.9	395	241	14.363	14.037	S660	120M40	2	25
106	269	1.5	220	202	12.983	14.720	S220	120M40	2	17
106	268	2.7	400	233	13.217	14.806	S400	120M40	2	20
116	245	2.5	400	218	13.104	16.197	S400	120M40	2	20
129	221	3.3	504	202	13.815	17.905	S660	120M40	2	25
129	221	4.1	504	186	15.742	17.905	S950	120M40	2	45
135	211	1.3	220	177	12.818	18.776	S220	120M40	2	17
148	192	2.2	400	192	12.892	20.659	S400	120M40	2	20
157	181	3.2	617	181	13.489	21.933	S660	120M40	2	25
165	172	1.1	220	151	12.720	23.000	S220	120M40	2	17
182	157	1.8	400	157	12.770	25.308	S400	120M40	2	20
205	139	2.6	648	139	13.009	28.548	S660	120M40	2	25
205	139	3.2	803	139	14.163	28.548	S950	120M40	2	45
236	120	1.5	400	120	12.628	32.940	S400	120M40	2	20
251	113	3.1	845	113	13.614	34.989	S950	120M40	2	45
255	112	2.4	660	112	12.842	35.511	S660	120M40	2	25
294	96.6	1.2	400	96.6	12.564	40.974	S400	120M40	2	20
330	86.2	1.7	620	86.2	12.675	45.956	S660	120M40	2	25
330	86.2	2.4	869	86.2	13.161	45.956	S950	120M40	2	45
355	80.2	3.0	1179	80.2	14.936	49.378	S2100	120M40	2	77
396	70.7	2.0	950	68.3	13.461	55.982	S950	120M40	3	45
400	71.0	1.2	508	71.0	12.601	55.773	S660	120M40	2	25
400	71.0	2.0	877	71.0	12.960	55.773	S950	120M40	2	45
402	69.7	1.3	650	64.5	12.781	56.818	S660	120M40	3	26
425	66.9	3.0	1412	66.9	15.359	59.156	S3100	120M40	2	116
430	66.1	2.5	1192	66.1	14.254	59.927	S2100	120M40	2	77
506	56.2	1.3	736	56.2	12.761	70.500	S950	120M40	2	45
507	55.3	1.7	950	54.8	13.134	71.644	S950	120M40	3	45
514	54.5	1.2	660	54.5	12.664	72.713	S660	120M40	3	26
515	55.2	2.5	1428	55.2	14.541	71.793	S3100	120M40	2	116
544	52.3	2.0	1213	52.3	13.624	75.750	S2100	120M40	2	77

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
553	50.7	3.4	2050	50.7	14.546	78.128	S2100	120M40	3	78
554	50.5	1.6	950	50.1	13.034	78.375	S950	120M40	3	45
563	49.8	1.1	660	49.8	12.630	79.545	S660	120M40	3	26
604	46.3	3.1	2050	46.3	14.304	85.468	S2100	120M40	3	78
662	42.3	4.3	2594	42.3	14.742	93.599	S3100	120M40	3	117
707	39.6	1.2	950	39.6	12.849	99.968	S950	120M40	3	45
724	38.7	3.9	2838	38.7	14.468	102.393	S3100	120M40	3	117
733	38.2	5.2	2872	38.2	16.399	103.619	S4500	120M40	3	192
771	36.3	2.4	2050	36.3	13.779	109.016	S2100	120M40	3	78
866	32.3	1.0	950	32.3	12.741	122.461	S950	120M40	3	45
924	30.3	3.1	3100	30.3	13.880	130.603	S3100	120M40	3	117
944	29.7	2.0	2050	29.7	13.465	133.544	S2100	120M40	3	78
1131	24.8	2.5	3100	24.8	13.532	159.989	S3100	120M40	3	117
1168	24.0	3.5	4500	24.0	14.422	165.215	S4500	120M40	3	192
1229	22.8	1.5	2050	22.8	12.995	173.820	S2100	120M40	3	78
1432	19.6	2.9	4500	19.6	13.786	202.489	S4500	120M40	3	192
1473	19.0	1.9	3100	19.0	13.087	208.240	S3100	120M40	3	117
1529	18.3	1.2	2050	18.3	12.833	216.215	S2100	120M40	3	78
1832	15.3	1.5	3100	15.3	12.858	259.030	S3100	120M40	3	117
1881	14.9	2.2	4500	14.9	13.261	265.956	S4500	120M40	3	192
2283	12.3	1.8	4500	12.3	13.028	322.773	S4500	120M40	3	192
2371	11.8	1.2	3100	11.8	12.685	335.215	S3100	120M40	3	117
2496	11.0	1.1	3100	11.0	12.857	358.375	S3100	120M40	4	120
2526	10.9	1.6	4500	10.9	13.022	362.667	S4500	120M40	4	195
2885	9.7	1.4	4410	9.7	12.803	408.000	S4500	120M40	3	192
3095	8.9	1.3	4500	8.9	12.940	444.267	S4500	120M40	4	195
4028	6.8	1.0	4500	6.8	12.859	578.252	S4500	120M40	4	195



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

3.7 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
29.0	1186	4.1	143	869	23.360	3.339	S400	120L40	2	23
34.0	1031	3.8	164	746	20.796	3.840	S220	120L40	2	19
34.0	1010	5.1	167	654	27.001	3.920	S660	120L40	2	28
40.0	865	3.4	189	718	21.107	4.579	S400	120L40	2	23
46.0	752	2.9	181	602	19.744	5.267	S220	120L40	2	19
47.0	737	4.3	230	534	23.464	5.376	S660	120L40	2	28
47.0	735	4.6	230	518	27.448	5.391	S950	120L40	2	48
51.0	676	2.9	204	596	20.061	5.860	S400	120L40	2	23
53.0	656	4.2	258	474	25.706	6.038	S950	120L40	2	48
56.0	618	2.7	212	560	19.776	6.411	S400	120L40	2	23
60.0	576	3.6	294	467	21.684	6.880	S660	120L40	2	28
64.0	542	5.1	312	351	23.096	7.311	S660	120L40	2	28
67.0	517	2.4	217	337	19.699	7.667	S220	120L40	2	19
67.0	514	3.6	329	420	23.280	7.702	S950	120L40	2	48
72.0	479	4.5	353	337	34.992	8.272	S2100	120L40	2	80
74.0	469	3.7	360	338	20.145	8.436	S400	120L40	2	23
78.0	444	4.5	381	312	46.371	8.917	S3100	120L40	2	119
88.0	395	4.3	428	286	21.388	10.027	S660	120L40	2	28
92.0	377	1.7	220	260	19.161	10.514	S220	120L40	2	19
101	342	2.9	400	275	19.398	11.569	S400	120L40	2	23
112	309	3.6	548	250	20.416	12.832	S660	120L40	2	28
117	294	1.4	220	201	18.873	13.456	S220	120L40	2	19
123	282	3.4	579	235	20.163	14.037	S660	120L40	2	28
123	282	4.2	599	204	22.878	14.037	S950	120L40	2	48
129	269	1.2	220	186	18.783	14.720	S220	120L40	2	19
129	268	2.2	400	225	19.017	14.806	S400	120L40	2	23
141	245	2.1	400	210	18.904	16.197	S400	120L40	2	23
156	221	2.9	620	197	19.615	17.905	S660	120L40	2	28
156	221	3.6	764	181	21.542	17.905	S950	120L40	2	48
164	211	1.1	220	163	18.618	18.776	S220	120L40	2	19
165	209	5.1	808	151	29.703	18.917	S2100	120L40	2	80
180	192	1.8	400	188	18.692	20.659	S400	120L40	2	23
192	181	2.8	653	181	19.289	21.933	S660	120L40	2	28
192	181	3.5	811	160	20.774	21.933	S950	120L40	2	48
198	175	5.1	968	126	32.583	22.663	S3100	120L40	2	119
221	157	1.5	400	155	18.570	25.308	S400	120L40	2	23
249	139	2.2	660	139	18.809	28.548	S660	120L40	2	28
249	139	2.8	848	139	19.963	28.548	S950	120L40	2	48
274	126	3.8	1152	113	23.488	31.422	S2100	120L40	2	80
306	113	2.7	889	113	19.414	34.989	S950	120L40	2	48
310	112	1.9	660	112	18.642	35.511	S660	120L40	2	28
329	105	3.8	1381	94.2	24.532	37.644	S3100	120L40	2	119
333	104	3.3	1199	104	22.181	38.156	S2100	120L40	2	80
383	89.0	3.9	1872	70.8	22.879	44.515	S2100	120L40	3	80
399	86.6	3.3	1437	86.6	22.889	45.711	S3100	120L40	2	119
401	86.2	2.1	914	86.2	18.961	45.956	S950	120L40	2	48
410	84.4	3.3	1462	84.4	26.786	46.933	S4500	120L40	2	192
431	80.2	2.6	1246	80.2	20.736	49.378	S2100	120L40	2	80
459	74.3	5.5	2242	63.4	23.483	53.330	S3100	120L40	3	120
482	70.7	1.6	950	61.1	19.261	55.982	S950	120L40	3	48
487	71.0	1.7	925	71.0	18.760	55.773	S950	120L40	2	48

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, th}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
497	69.5	2.7	1481	69.5	24.447	56.960	S4500	120L40	2	192
517	66.9	2.6	1492	66.9	21.159	59.156	S3100	120L40	2	119
523	66.1	2.2	1262	66.1	20.054	59.927	S2100	120L40	2	80
525	64.9	3.2	2050	57.7	21.272	61.049	S2100	120L40	3	80
616	55.3	1.4	950	49.9	18.934	71.644	S950	120L40	3	48
624	54.6	5.7	3050	52.4	25.243	72.533	S4500	120L40	3	195
627	55.2	2.2	1512	55.2	20.341	71.793	S3100	120L40	2	119
629	55.0	2.2	1509	55.0	22.287	72.000	S4500	120L40	2	192
629	54.1	4.5	3075	51.5	21.594	73.138	S3100	120L40	3	120
661	52.3	1.8	1286	52.3	19.424	75.750	S2100	120L40	2	80
672	50.7	2.8	2050	50.7	20.346	78.128	S2100	120L40	3	80
674	50.5	1.3	950	46.0	18.834	78.375	S950	120L40	3	48
699	48.7	5.3	3416	47.9	23.949	81.237	S4500	120L40	3	195
735	46.3	2.5	2050	46.3	20.104	85.468	S2100	120L40	3	80
805	42.3	3.5	3100	42.3	20.542	93.599	S3100	120L40	3	120
860	39.6	1.0	950	38.3	18.649	99.968	S950	120L40	3	48
881	38.7	3.2	3100	38.7	20.268	102.393	S3100	120L40	3	120
891	38.2	4.5	4357	38.2	22.199	103.619	S4500	120L40	3	195
938	36.3	2.0	2050	36.3	19.579	109.016	S2100	120L40	3	80
1092	31.2	3.8	4500	31.2	21.212	126.933	S4500	120L40	3	195
1123	30.3	2.5	3100	30.3	19.680	130.603	S3100	120L40	3	120
1149	29.7	1.6	2050	29.7	19.265	133.544	S2100	120L40	3	80
1376	24.8	2.1	3100	24.8	19.332	159.989	S3100	120L40	3	120
1421	24.0	2.9	4500	24.0	20.222	165.215	S4500	120L40	3	195
1495	22.8	1.3	2050	22.8	18.795	173.820	S2100	120L40	3	80
1742	19.6	2.4	4500	19.6	19.586	202.489	S4500	120L40	3	195
1791	19.0	1.6	3100	19.0	18.887	208.240	S3100	120L40	3	120
1860	18.3	1.0	2050	18.3	18.633	216.215	S2100	120L40	3	80
2228	15.3	1.3	3100	15.3	18.658	259.030	S3100	120L40	3	120
2287	14.9	1.8	4500	14.9	19.061	265.956	S4500	120L40	3	195
2776	12.3	1.5	4500	12.3	18.828	322.773	S4500	120L40	3	195
3073	10.9	1.3	4500	10.9	18.822	362.667	S4500	120L40	4	198
3764	8.9	1.1	4500	8.9	18.740	444.267	S4500	120L40	4	198



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

4.8 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
45.0	970	3.5	173	841	35.260	3.339	S400	140M32	2	25
52.0	844	2.6	178	691	32.696	3.840	S220	140M32	2	22
53.0	827	4.4	203	634	38.901	3.920	S660	140M32	2	31
62.0	708	2.9	236	697	33.007	4.579	S400	140M32	2	25
72.0	615	2.0	181	556	31.644	5.267	S220	140M32	2	22
73.0	603	3.7	279	517	35.364	5.376	S660	140M32	2	31
73.0	601	3.9	280	501	39.348	5.391	S950	140M32	2	50
80.0	553	2.5	254	553	31.961	5.860	S400	140M32	2	25
82.0	537	3.6	313	459	37.606	6.038	S950	140M32	2	50
87.0	505	2.3	261	505	31.676	6.411	S400	140M32	2	25
93.0	471	3.1	357	453	33.584	6.880	S660	140M32	2	31
99.0	443	4.4	379	340	34.996	7.311	S660	140M32	2	31
104	423	1.6	217	290	31.599	7.667	S220	140M32	2	22
105	421	3.1	400	407	35.180	7.702	S950	140M32	2	50
112	392	3.9	429	326	46.892	8.272	S2100	140M32	2	82
115	384	2.6	380	313	32.045	8.436	S400	140M32	2	25
121	363	3.9	463	302	58.271	8.917	S3100	140M32	2	122
136	323	3.6	520	276	33.288	10.027	S660	140M32	2	31
143	308	1.2	220	214	31.061	10.514	S220	140M32	2	22
157	280	2.0	400	254	31.298	11.569	S400	140M32	2	25
174	253	2.9	660	240	32.316	12.832	S660	140M32	2	31
191	231	2.7	660	223	32.063	14.037	S660	140M32	2	31
191	231	3.6	729	198	34.778	14.037	S950	140M32	2	50
201	219	1.5	400	194	30.917	14.806	S400	140M32	2	25
220	200	1.4	400	178	30.804	16.197	S400	140M32	2	25
243	181	2.1	660	181	31.515	17.905	S660	140M32	2	31
243	181	3.0	929	175	33.442	17.905	S950	140M32	2	50
257	171	4.4	982	146	41.603	18.917	S2100	140M32	2	82
281	157	1.3	400	156	30.592	20.659	S400	140M32	2	25
298	148	2.0	660	148	31.189	21.933	S660	140M32	2	31
298	148	2.8	950	148	32.674	21.933	S950	140M32	2	50
308	143	4.4	1176	122	44.483	22.663	S3100	140M32	2	122
344	128	1.0	400	128	30.470	25.308	S400	140M32	2	25
388	114	1.5	660	114	30.709	28.548	S660	140M32	2	31
388	114	2.2	950	114	31.863	28.548	S950	140M32	2	50
427	103	3.3	1433	103	35.388	31.422	S2100	140M32	2	82
475	92.6	2.0	950	92.6	31.314	34.989	S950	140M32	2	50
482	91.2	1.3	660	91.2	30.542	35.511	S660	140M32	2	31
511	86.1	3.3	1717	86.1	36.432	37.644	S3100	140M32	2	122
518	84.9	2.8	1492	84.9	34.081	38.156	S2100	140M32	2	82
596	72.8	2.7	2050	65.2	34.779	44.515	S2100	140M32	3	83
621	70.9	2.8	1787	70.9	34.789	45.711	S3100	140M32	2	122
624	70.5	1.5	950	70.5	30.861	45.956	S950	140M32	2	50
638	69.0	2.8	1812	69.0	38.686	46.933	S4500	140M32	2	195
671	65.6	2.2	1543	65.6	32.636	49.378	S2100	140M32	2	82
714	60.8	3.8	2727	58.8	35.383	53.330	S3100	140M32	3	123
749	57.9	1.1	950	50.6	31.161	55.982	S950	140M32	3	51
758	58.1	1.2	950	58.1	30.660	55.773	S950	140M32	2	50
774	56.9	2.3	1846	56.9	36.347	56.960	S4500	140M32	2	195
804	54.8	2.2	1848	54.8	33.059	59.156	S3100	140M32	2	122
814	54.1	1.9	1564	54.1	31.954	59.927	S2100	140M32	2	82

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, th}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
817	53.1	2.2	2050	53.1	33.172	61.049	S2100	140M32	3	83
970	44.7	4.5	3709	44.7	37.143	72.533	S4500	140M32	3	198
975	45.1	1.9	1874	45.1	32.241	71.793	S3100	140M32	2	122
978	45.0	1.9	1893	45.0	34.187	72.000	S4500	140M32	2	195
979	44.3	3.1	3100	44.3	33.494	73.138	S3100	140M32	3	123
1029	42.8	1.5	1576	42.8	31.324	75.750	S2100	140M32	2	82
1045	41.5	1.9	2050	41.5	32.246	78.128	S2100	140M32	3	83
1087	39.9	4.0	4154	39.9	35.849	81.237	S4500	140M32	3	198
1144	37.9	1.8	2050	37.9	32.004	85.468	S2100	140M32	3	83
1252	34.6	2.4	3100	34.6	32.442	93.599	S3100	140M32	3	123
1370	31.6	2.2	3100	31.6	32.168	102.393	S3100	140M32	3	123
1386	31.3	3.2	4500	31.3	34.099	103.619	S4500	140M32	3	198
1459	29.7	1.4	2050	29.7	31.479	109.016	S2100	140M32	3	83
1698	25.5	2.6	4500	25.5	33.112	126.933	S4500	140M32	3	198
1747	24.8	1.7	3100	24.8	31.580	130.603	S3100	140M32	3	123
1787	24.3	1.1	2050	24.3	31.165	133.544	S2100	140M32	3	83
2141	20.3	1.4	3100	20.3	31.232	159.989	S3100	140M32	3	123
2210	19.6	2.0	4500	19.6	32.122	165.215	S4500	140M32	3	198
2709	16.0	1.6	4500	16.0	31.486	202.489	S4500	140M32	3	198
2786	15.6	1.1	3100	15.6	30.787	208.240	S3100	140M32	3	123
3558	12.2	1.2	4500	12.2	30.961	265.956	S4500	140M32	3	198
4319	10.0	1.0	4500	10.0	30.728	322.773	S4500	140M32	3	198



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

5 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
61.0	765	5.0	270	651	69.601	3.920	S660	190S30	2	36
68.0	685	5.1	302	576	73.917	4.380	S950	190S30	2	55
83.0	558	4.1	370	531	66.064	5.376	S660	190S30	2	36
84.0	557	4.4	371	515	70.048	5.391	S950	190S30	2	55
94.0	498	5.4	415	388	90.032	6.029	S2100	190S30	2	88
94.0	497	4.1	416	471	68.306	6.038	S950	190S30	2	55
101	462	5.4	448	360	111.453	6.499	S3100	190S30	2	127
107	437	5.0	473	366	83.362	6.870	S2100	190S30	2	88
107	436	3.5	467	436	64.284	6.880	S660	190S30	2	36
113	410	4.2	504	337	65.696	7.311	S660	190S30	2	36
115	405	5.0	510	339	99.859	7.406	S3100	190S30	2	127
120	390	3.4	519	390	65.880	7.702	S950	190S30	2	55
128	363	4.4	570	334	77.592	8.272	S2100	190S30	2	88
138	336	4.4	614	310	88.971	8.917	S3100	190S30	2	127
156	299	3.2	625	270	63.988	10.027	S660	190S30	2	36
158	295	4.8	701	245	68.544	10.183	S950	190S30	2	55
170	274	3.7	753	266	80.682	10.932	S3100	190S30	2	127
199	234	2.6	660	234	63.016	12.832	S660	190S30	2	36
214	218	5.4	950	170	80.074	13.787	S2100	190S30	2	88
218	214	2.4	660	214	62.763	14.037	S660	190S30	2	36
218	214	3.5	950	196	65.478	14.037	S950	190S30	2	55
244	191	5.0	1082	160	75.694	15.711	S2100	190S30	2	88
256	182	5.4	1138	142	85.496	16.517	S3100	190S30	2	127
278	168	1.9	660	168	62.215	17.905	S660	190S30	2	36
278	168	2.7	950	168	64.142	17.905	S950	190S30	2	55
292	159	5.7	1297	137	79.870	18.822	S3100	190S30	2	127
294	159	5.0	1303	150	72.303	18.917	S2100	190S30	2	88
340	137	1.8	660	137	61.889	21.933	S660	190S30	2	36
340	137	2.5	950	137	63.374	21.933	S950	190S30	2	55
352	132	5.0	1561	125	75.183	22.663	S3100	190S30	2	127
360	129	4.3	1598	129	69.592	23.193	S2100	190S30	2	88
431	108	4.3	1914	107	71.508	27.785	S3100	190S30	2	127
443	105	1.3	660	105	61.409	28.548	S660	190S30	2	36
443	105	1.9	950	105	62.563	28.548	S950	190S30	2	55
458	102	4.2	2033	101	79.241	29.511	S4500	190S30	2	200
488	95.5	3.7	1790	95.5	66.088	31.422	S2100	190S30	2	88
543	85.7	1.8	950	85.7	62.014	34.989	S950	190S30	2	55
563	82.7	3.9	2182	82.7	74.295	36.267	S4500	190S30	2	200
584	79.7	3.7	2144	79.7	67.132	37.644	S3100	190S30	2	127
592	78.6	3.1	1855	78.6	64.781	38.156	S2100	190S30	2	88
650	70.6	5.2	2885	67.6	76.802	42.520	S4500	190S30	3	203
681	67.4	2.4	2050	63.6	65.479	44.515	S2100	190S30	3	88
710	65.6	3.1	2222	65.6	65.489	45.711	S3100	190S30	2	127
729	63.9	3.1	2259	63.9	69.386	46.933	S4500	190S30	2	200
767	60.8	2.5	1921	60.8	63.336	49.378	S2100	190S30	2	88
815	56.3	3.4	3054	56.3	66.083	53.330	S3100	190S30	3	128
884	52.7	2.6	2288	52.7	67.047	56.960	S4500	190S30	2	200
901	50.9	4.5	3999	50.9	70.577	58.933	S4500	190S30	3	203
918	50.7	2.5	2302	50.7	63.759	59.156	S3100	190S30	2	127
930	50.1	2.1	1948	50.1	62.654	59.927	S2100	190S30	2	88
933	49.1	2.0	2050	49.1	63.872	61.049	S2100	190S30	3	88

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
1109	41.4	4.1	4500	41.4	67.843	72.533	S4500	190S30	3	203
1114	41.8	2.1	2333	41.8	62.941	71.793	S3100	190S30	2	127
1118	41.7	2.1	2326	41.7	64.887	72.000	S4500	190S30	2	200
1118	41.0	2.8	3100	41.0	64.194	73.138	S3100	190S30	3	128
1195	38.4	1.7	2050	38.4	62.946	78.128	S2100	190S30	3	88
1242	36.9	3.6	4500	36.9	66.549	81.237	S4500	190S30	3	203
1307	35.1	1.6	2050	35.1	62.704	85.468	S2100	190S30	3	88
1431	32.1	2.2	3100	32.1	63.142	93.599	S3100	190S30	3	128
1566	29.3	2.0	3100	29.3	62.868	102.393	S3100	190S30	3	128
1584	29.0	2.8	4500	29.0	64.799	103.619	S4500	190S30	3	203
1667	27.5	1.2	2050	27.5	62.179	109.016	S2100	190S30	3	88
1941	23.6	2.3	4500	23.6	63.812	126.933	S4500	190S30	3	203
1997	23.0	1.6	3100	23.0	62.280	130.603	S3100	190S30	3	128
2042	22.5	1.0	2050	22.5	61.865	133.544	S2100	190S30	3	88
2446	18.8	1.3	3100	18.8	61.932	159.989	S3100	190S30	3	128
2526	18.2	1.8	4500	18.2	62.822	165.215	S4500	190S30	3	203
3096	14.8	1.5	4500	14.8	62.186	202.489	S4500	190S30	3	203



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

5.9 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
56.0	970	2.8	203	804	49.760	3.339	S400	140L32	2	30
66.0	827	3.7	304	613	53.401	3.920	S660	140L32	2	36
74.0	740	3.8	340	542	57.717	4.380	S950	140L32	2	55
77.0	708	2.4	243	671	47.507	4.579	S400	140L32	2	30
91.0	603	3.1	363	500	49.864	5.376	S660	140L32	2	36
91.0	601	3.3	390	484	53.848	5.391	S950	140L32	2	55
99.0	553	2.0	258	553	46.461	5.860	S400	140L32	2	30
102	537	4.1	468	365	73.832	6.029	S2100	140L32	2	87
102	537	3.1	405	444	52.106	6.038	S950	140L32	2	55
108	505	1.9	261	505	46.176	6.411	S400	140L32	2	30
110	499	4.1	504	339	95.253	6.499	S3100	140L32	2	127
116	472	3.7	533	345	67.162	6.870	S2100	140L32	2	87
116	471	2.6	390	437	48.084	6.880	S660	140L32	2	36
123	443	3.7	567	329	49.496	7.311	S660	140L32	2	36
125	438	3.7	575	320	83.659	7.406	S3100	140L32	2	127
130	421	2.6	436	393	49.680	7.702	S950	140L32	2	55
140	392	3.3	592	315	61.392	8.272	S2100	140L32	2	87
142	384	2.1	380	298	46.545	8.436	S400	140L32	2	30
151	363	3.3	638	292	72.771	8.917	S3100	140L32	2	127
169	323	2.9	625	264	47.788	10.027	S660	140L32	2	36
172	318	3.8	790	233	52.344	10.183	S950	140L32	2	55
185	296	2.8	672	251	64.482	10.932	S3100	140L32	2	127
195	280	1.6	400	224	45.798	11.569	S400	140L32	2	30
217	253	2.4	660	230	46.816	12.832	S660	140L32	2	36
233	235	4.1	1070	160	63.874	13.787	S2100	140L32	2	87
237	231	2.2	660	213	46.563	14.037	S660	140L32	2	36
237	231	3.1	942	191	49.278	14.037	S950	140L32	2	55
250	219	1.2	400	176	45.417	14.806	S400	140L32	2	30
265	206	3.7	1219	151	59.494	15.711	S2100	140L32	2	87
273	200	1.1	400	163	45.304	16.197	S400	140L32	2	30
279	196	4.1	1282	133	69.296	16.517	S3100	140L32	2	127
302	181	1.7	660	170	46.015	17.905	S660	140L32	2	36
302	181	2.4	950	167	47.942	17.905	S950	140L32	2	55
309	177	4.6	1419	124	83.354	18.286	S4500	140L32	2	200
318	172	4.3	1461	129	63.670	18.822	S3100	140L32	2	127
319	171	3.7	1355	141	56.103	18.917	S2100	140L32	2	87
349	157	1.0	400	143	45.092	20.659	S400	140L32	2	30
370	148	1.6	660	148	45.689	21.933	S660	140L32	2	36
370	148	2.3	950	147	47.174	21.933	S950	140L32	2	55
383	143	3.7	1623	118	58.983	22.663	S3100	140L32	2	127
392	140	3.2	1427	122	53.392	23.193	S2100	140L32	2	87
469	117	3.2	1709	102	55.308	27.785	S3100	140L32	2	127
482	114	1.2	660	114	45.209	28.548	S660	140L32	2	36
482	114	1.7	950	114	46.363	28.548	S950	140L32	2	55
498	110	3.2	1795	95.5	63.041	29.511	S4500	140L32	2	200
530	103	2.8	1512	103	49.888	31.422	S2100	140L32	2	87
591	92.6	1.6	950	92.6	45.814	34.989	S950	140L32	2	55
612	89.3	2.9	1840	89.3	58.095	36.267	S4500	140L32	2	200
636	86.1	2.8	1812	86.1	50.932	37.644	S3100	140L32	2	127
644	84.9	2.4	1573	84.9	48.581	38.156	S2100	140L32	2	87
707	76.2	4.5	3251	65.5	60.602	42.520	S4500	140L32	3	203

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, th}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
740	72.8	2.1	2050	62.0	49.279	44.515	S2100	140L32	3	88
772	70.9	2.4	1885	70.9	49.289	45.711	S3100	140L32	2	127
792	69.0	2.4	1913	69.0	53.186	46.933	S4500	140L32	2	200
834	65.6	1.9	1634	65.6	47.136	49.378	S2100	140L32	2	87
887	60.8	3.0	3054	56.1	49.883	53.330	S3100	140L32	3	128
962	56.9	2.0	1951	56.9	50.847	56.960	S4500	140L32	2	200
980	55.0	4.0	4500	53.1	54.377	58.933	S4500	140L32	3	203
999	54.8	1.9	1957	54.8	47.559	59.156	S3100	140L32	2	127
1012	54.1	1.6	1657	54.1	46.454	59.927	S2100	140L32	2	87
1015	53.1	1.8	2050	48.7	47.672	61.049	S2100	140L32	3	88
1206	44.7	3.6	4500	44.7	51.643	72.533	S4500	140L32	3	203
1212	45.1	1.6	1985	45.1	46.741	71.793	S3100	140L32	2	127
1215	45.0	1.6	1991	45.0	48.687	72.000	S4500	140L32	2	200
1216	44.3	2.5	3100	44.3	47.994	73.138	S3100	140L32	3	128
1299	41.5	1.5	2050	40.7	46.746	78.128	S2100	140L32	3	88
1351	39.9	3.3	4500	39.9	50.349	81.237	S4500	140L32	3	203
1421	37.9	1.4	2050	37.1	46.504	85.468	S2100	140L32	3	88
1556	34.6	1.9	3100	34.6	46.942	93.599	S3100	140L32	3	128
1703	31.6	1.8	3100	31.6	46.668	102.393	S3100	140L32	3	128
1723	31.3	2.6	4500	31.3	48.599	103.619	S4500	140L32	3	203
1813	29.7	1.1	2050	29.7	45.979	109.016	S2100	140L32	3	88
2111	25.5	2.1	4500	25.5	47.612	126.933	S4500	140L32	3	203
2172	24.8	1.4	3100	24.8	46.080	130.603	S3100	140L32	3	128
2660	20.3	1.1	3100	20.3	45.732	159.989	S3100	140L32	3	128
2747	19.6	1.6	4500	19.6	46.622	165.215	S4500	140L32	3	203
3367	16.0	1.3	4500	16.0	45.986	202.489	S4500	140L32	3	203



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

7.5 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
91.0	765	3.6	417	610	125.801	3.920	S660	190M30	2	45
102	685	3.7	475	539	130.117	4.380	S950	190M30	2	64
125	558	3.0	478	498	122.264	5.376	S660	190M30	2	45
126	557	3.2	513	482	126.248	5.391	S950	190M30	2	64
140	498	4.0	702	364	146.232	6.029	S2100	190M30	2	96
141	497	3.0	534	442	124.506	6.038	S950	190M30	2	64
151	462	4.0	757	337	167.653	6.499	S3100	190M30	2	136
160	437	3.7	737	343	139.562	6.870	S2100	190M30	2	96
160	436	2.5	496	432	120.484	6.880	S660	190M30	2	45
170	410	2.8	593	308	121.896	7.311	S660	190M30	2	45
172	405	3.7	795	318	156.059	7.406	S3100	190M30	2	136
179	390	2.5	574	390	122.080	7.702	S950	190M30	2	64
193	363	3.2	779	313	133.792	8.272	S2100	190M30	2	96
208	336	3.2	839	290	145.171	8.917	S3100	190M30	2	136
233	299	2.1	625	247	120.188	10.027	S660	190M30	2	45
237	295	3.2	950	224	124.744	10.183	S950	190M30	2	64
255	274	2.8	886	250	136.882	10.932	S3100	190M30	2	136
299	234	1.8	660	206	119.216	12.832	S660	190M30	2	45
321	218	4.0	1605	159	136.274	13.787	S2100	190M30	2	96
327	214	1.6	660	186	118.963	14.037	S660	190M30	2	45
327	214	2.3	950	179	121.678	14.037	S950	190M30	2	64
366	191	3.7	1686	150	131.894	15.711	S2100	190M30	2	96
385	182	4.0	1923	133	141.696	16.517	S3100	190M30	2	136
417	168	1.3	660	148	118.415	17.905	S660	190M30	2	45
417	168	1.8	950	151	120.342	17.905	S950	190M30	2	64
426	164	4.5	2111	123	155.754	18.286	S4500	190M30	2	209
438	159	4.2	2020	129	136.070	18.822	S3100	190M30	2	136
441	159	3.6	1780	141	128.503	18.917	S2100	190M30	2	96
511	137	1.2	660	135	118.089	21.933	S660	190M30	2	45
511	137	1.7	950	132	119.574	21.933	S950	190M30	2	64
528	132	3.6	2133	118	131.383	22.663	S3100	190M30	2	136
540	129	3.1	1879	121	125.792	23.193	S2100	190M30	2	96
647	108	3.1	2251	101	127.708	27.785	S3100	190M30	2	136
665	105	1.3	950	105	118.763	28.548	S950	190M30	2	64
687	102	3.1	2351	95.0	135.441	29.511	S4500	190M30	2	209
732	95.5	2.7	1985	95.5	122.288	31.422	S2100	190M30	2	96
815	85.7	1.2	950	85.7	118.214	34.989	S950	190M30	2	64
844	82.7	2.9	2421	82.7	130.495	36.267	S4500	190M30	2	209
877	79.7	2.7	2378	79.7	123.332	37.644	S3100	190M30	2	136
888	78.6	2.3	2050	78.6	120.981	38.156	S2100	190M30	2	96
975	70.6	3.5	4291	61.8	133.002	42.520	S4500	190M30	3	212
1021	67.4	1.6	2050	53.8	121.679	44.515	S2100	190M30	3	97
1064	65.6	2.3	2461	65.6	121.689	45.711	S3100	190M30	2	136
1093	63.9	2.3	2504	63.9	125.586	46.933	S4500	190M30	2	209
1150	60.8	1.8	2050	60.8	119.536	49.378	S2100	190M30	2	96
1223	56.3	2.3	3054	52.4	122.283	53.330	S3100	190M30	3	137
1326	52.7	1.9	2542	52.7	123.247	56.960	S4500	190M30	2	209
1352	50.9	3.0	4500	49.8	126.777	58.933	S4500	190M30	3	212
1377	50.7	1.9	2554	50.7	119.959	59.156	S3100	190M30	2	136
1395	50.1	1.5	2050	50.1	118.854	59.927	S2100	190M30	2	96
1400	49.1	1.3	2050	41.5	120.072	61.049	S2100	190M30	3	97

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
1664	41.4	2.7	4500	41.4	124.043	72.533	S4500	190M30	3	212
1672	41.8	1.4	2408	41.8	119.141	71.793	S3100	190M30	2	136
1677	41.7	1.5	2585	41.7	121.087	72.000	S4500	190M30	2	209
1677	41.0	1.9	3100	41.0	120.394	73.138	S3100	190M30	3	137
1792	38.4	1.1	2050	34.9	119.146	78.128	S2100	190M30	3	97
1863	36.9	2.4	4500	36.9	122.749	81.237	S4500	190M30	3	212
1960	35.1	1.1	2050	32.3	118.904	85.468	S2100	190M30	3	97
2147	32.1	1.4	3100	32.1	119.342	93.599	S3100	190M30	3	137
2348	29.3	1.3	3100	29.3	119.068	102.393	S3100	190M30	3	137
2377	29.0	1.9	4500	29.0	120.999	103.619	S4500	190M30	3	212
2911	23.6	1.6	4500	23.6	120.012	126.933	S4500	190M30	3	212
2996	23.0	1.0	3100	23.0	118.480	130.603	S3100	190M30	3	137
3789	18.2	1.2	4500	18.2	119.022	165.215	S4500	190M30	3	212



Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors

9.2 kW

Inverter operation							Geared motor		Number of stages	
M ₂	n ₂	c	M _{2, max}	n _{2, th}	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
133	643	2.7	419	569	201.801	3.920	S660	190L25	2	57
149	575	2.9	513	511	206.117	4.380	S950	190L25	2	77
156	549	3.7	692	413	238.551	4.593	S2100	190L25	2	109
168	509	3.7	746	383	275.458	4.951	S3100	190L25	2	148
183	469	2.3	492	456	198.264	5.376	S660	190L25	2	57
183	467	2.6	554	454	202.248	5.391	S950	190L25	2	77
205	418	3.1	765	345	222.232	6.029	S2100	190L25	2	109
205	417	2.4	576	406	200.506	6.038	S950	190L25	2	77
221	388	3.1	825	320	243.653	6.499	S3100	190L25	2	148
233	367	2.9	798	325	215.562	6.870	S2100	190L25	2	109
234	366	1.8	496	356	196.484	6.880	S660	190L25	2	57
240	357	3.7	1053	269	278.966	7.056	S4500	190L25	2	221
248	345	2.0	593	286	197.896	7.311	S660	190L25	2	57
251	340	2.9	860	302	232.059	7.406	S3100	190L25	2	148
262	327	2.0	619	318	198.080	7.702	S950	190L25	2	77
281	305	2.5	842	296	209.792	8.272	S2100	190L25	2	109
303	283	2.5	908	275	221.171	8.917	S3100	190L25	2	148
340	251	1.5	625	211	196.188	10.027	S660	190L25	2	57
346	248	2.3	950	208	200.744	10.183	S950	190L25	2	77
357	240	3.7	1582	181	221.396	10.504	S2100	190L25	2	109
371	231	2.2	956	224	212.882	10.932	S3100	190L25	2	148
427	200	3.7	1895	151	230.737	12.584	S3100	190L25	2	148
436	196	1.3	660	173	195.216	12.832	S660	190L25	2	57
468	183	3.1	1750	151	212.274	13.787	S2100	190L25	2	109
477	180	1.2	660	159	194.963	14.037	S660	190L25	2	57
477	180	1.7	950	158	197.678	14.037	S950	190L25	2	77
487	176	3.7	2139	133	248.433	14.336	S4500	190L25	2	221
534	160	2.9	1825	142	207.894	15.711	S2100	190L25	2	109
561	153	3.1	2096	126	217.696	16.517	S3100	190L25	2	148
608	141	1.3	950	127	196.342	17.905	S950	190L25	2	77
621	138	3.5	2289	117	231.754	18.286	S4500	190L25	2	221
639	134	3.3	2186	122	212.070	18.822	S3100	190L25	2	148
642	133	2.9	1925	129	204.503	18.917	S2100	190L25	2	109
745	115	1.2	950	112	195.574	21.933	S950	190L25	2	77
761	113	3.0	2408	105	222.159	22.400	S4500	190L25	2	221
770	111	2.9	2307	108	207.383	22.663	S3100	190L25	2	148
788	109	2.5	2027	106	201.792	23.193	S2100	190L25	2	109
944	90.7	2.5	2429	88.1	203.708	27.785	S3100	190L25	2	148
1002	85.4	2.4	2545	83.0	211.441	29.511	S4500	190L25	2	221
1067	80.2	1.9	2050	77.9	198.288	31.422	S2100	190L25	2	109
1232	69.5	2.1	2614	67.5	206.495	36.267	S4500	190L25	2	221
1278	66.9	2.0	2582	65.0	199.332	37.644	S3100	190L25	2	148
1296	66.0	1.6	2050	64.2	196.981	38.156	S2100	190L25	2	109
1422	59.3	2.5	4291	57.2	209.002	42.520	S4500	190L25	3	224
1489	56.6	1.2	2050	45.6	197.679	44.515	S2100	190L25	3	109
1552	55.1	1.7	2679	53.6	197.689	45.711	S3100	190L25	2	148
1594	53.7	1.7	2728	52.2	201.586	46.933	S4500	190L25	2	221
1784	47.3	1.6	3054	45.5	198.283	53.330	S3100	190L25	3	149
1934	44.2	1.4	2763	43.0	199.247	56.960	S4500	190L25	2	221
1971	42.8	2.2	4500	41.5	202.777	58.933	S4500	190L25	3	224
2426	34.7	1.9	4500	33.8	200.043	72.533	S4500	190L25	3	224

Technical data

Selection tables

Inverter mains connection 400 V, Self-ventilated motors



Inverter operation							Geared motor		Number of stages	
M_2	n_2	c	$M_{2, \max}$	$n_{2, \text{th}}$	J	i	g500-	m850	z	m
Nm	rpm		Nm	rpm	kgcm ²					kg
2446	34.5	1.3	3100	33.5	196.394	73.138	S3100	190L25	3	149
2717	31.0	1.7	4500	30.1	198.749	81.237	S4500	190L25	3	224
3466	24.3	1.3	4500	23.6	196.999	103.619	S4500	190L25	3	224
4246	19.9	1.1	4500	19.3	196.012	126.933	S4500	190L25	3	224



Dimensions

Notes on the basic dimensions

Gearboxes	Without pre-stage	With pre-stage
g500-S130	2-stage	3-stage
g500-S220 ... S4500	2-/3-stage	4-stage

The ratio range of gearboxes with pre-stage is extended via an additional housing with gear stage between the gearbox and motor.

The basic dimensions are shown without pre-stage and are valid up to the following deviating dimensions for gearbox with pre-stage valid:

- Total length "L"
- Center distance "a" (gearbox output shaft – motor shaft)

Deviating dimensions: ▶ [Gearbox with pre-stage](#) [105](#)

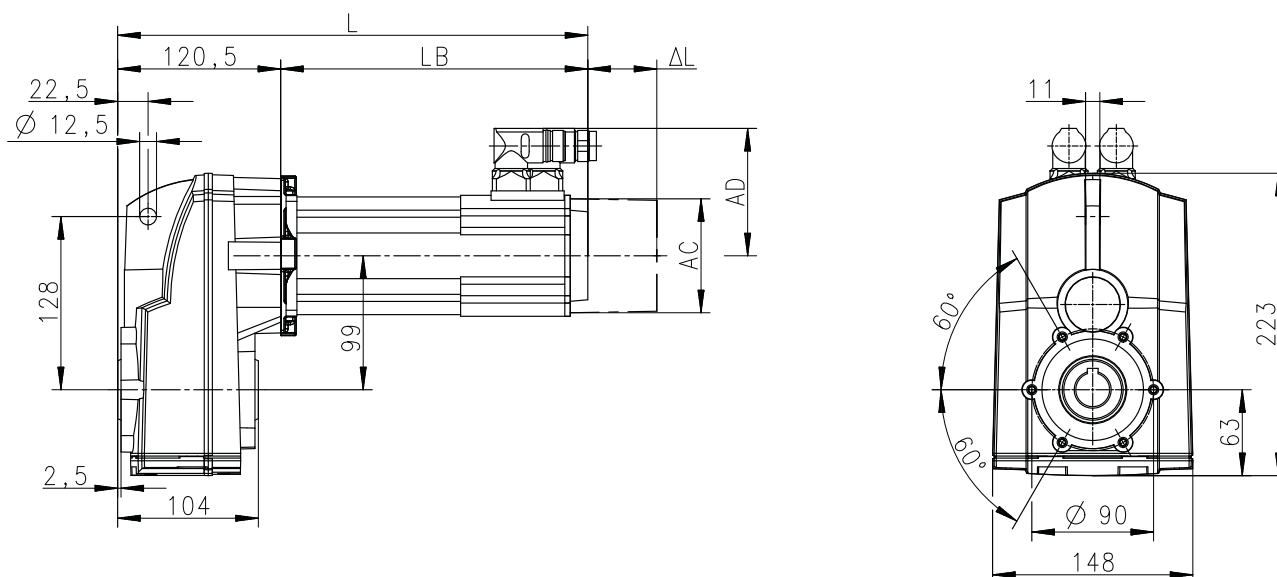
Example

g500-S130

Gearbox version: Hollow shaft without foot (HDR/HCR/HCK) ▶ [Designs](#) [12](#)

Explanation

Gearbox with motor



Motor		m850-		
		S120/S3960	S120/M3960	S120/L3960
Table content		Explanation		
Total length	L	Total length of the drive without brake		
Motor length	LB	Motor length without brake		
Length of motor options	Δ L	Additional length (with brake)		
Motor diameter	AC	Motor diameter		
Motor/connection distance	AD	Distance from motor center to connector end		

NOTICE

For gearboxes with hollow shaft and keyway (H□□), the hole fitting H7 is interrupted in the middle area of the hollow shaft length by a free rotation.

Ensure the double-ended control of the machine shaft in the hollow shaft.

- ▶ The specified min. length of the machine shaft must be reached.



Gearboxes	Min. length of the machine shaft
	mm
g500-S130	75
g500-S220	80
g500-S400	100
g500-S660	110
g500-S950	120
g500-S2100	135
g500-S3100	155
g500-S4500	190



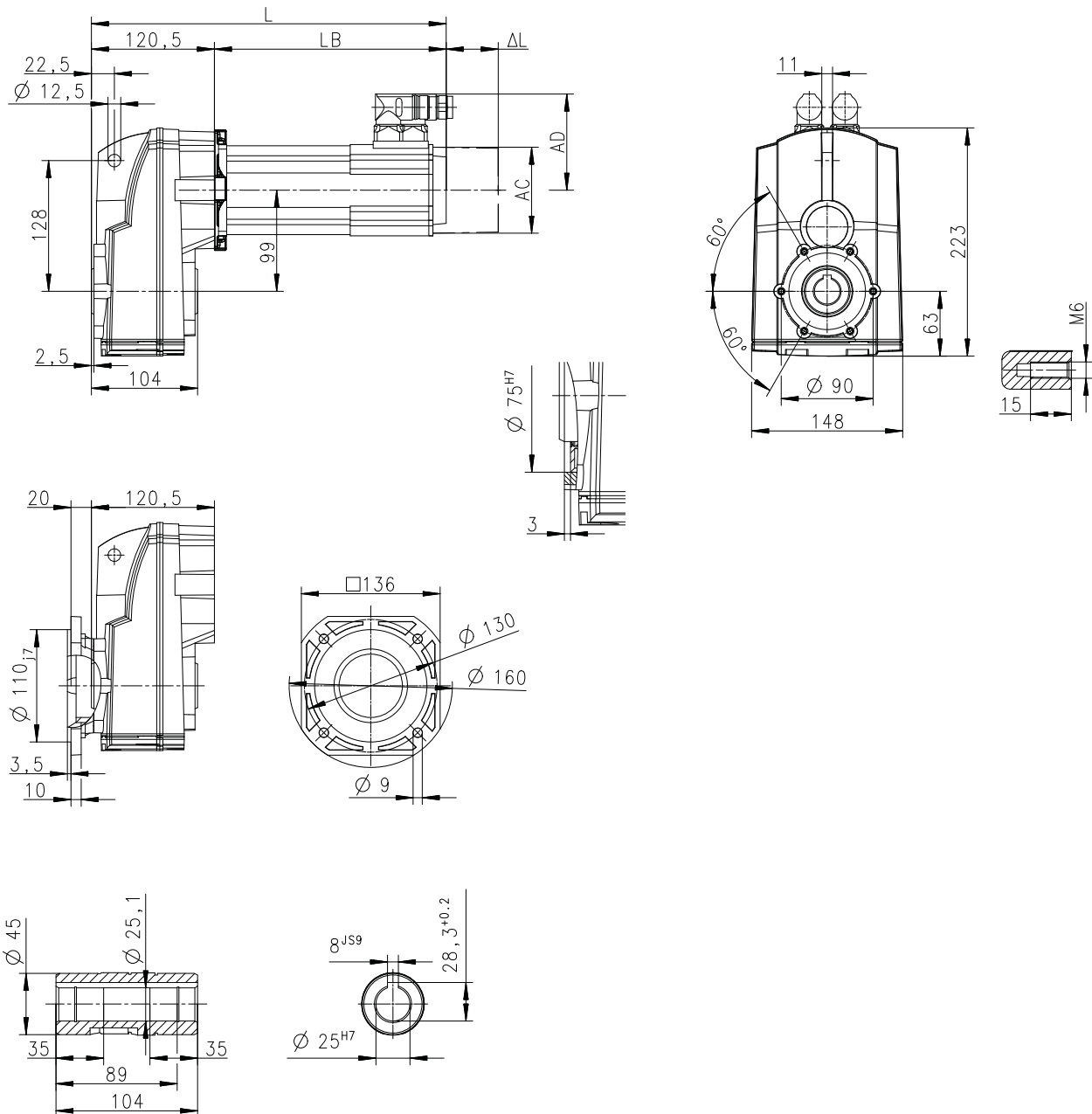
Technical data

Dimensions
Basic dimensions

Basic dimensions

g500-S130, 2-stage

Gearbox version: Hollow shaft without foot (HDR/HCR/HCK)



8800013-00

Motor			m850-	
			S120/S3960	S120/M3960
Total length	L	mm	302	340
Motor length	LB	mm	182	220
Length of motor options	ΔL	mm	46	46
Motor diameter	AC	mm	121	121
Motor/connection distance	AD	mm	102	102

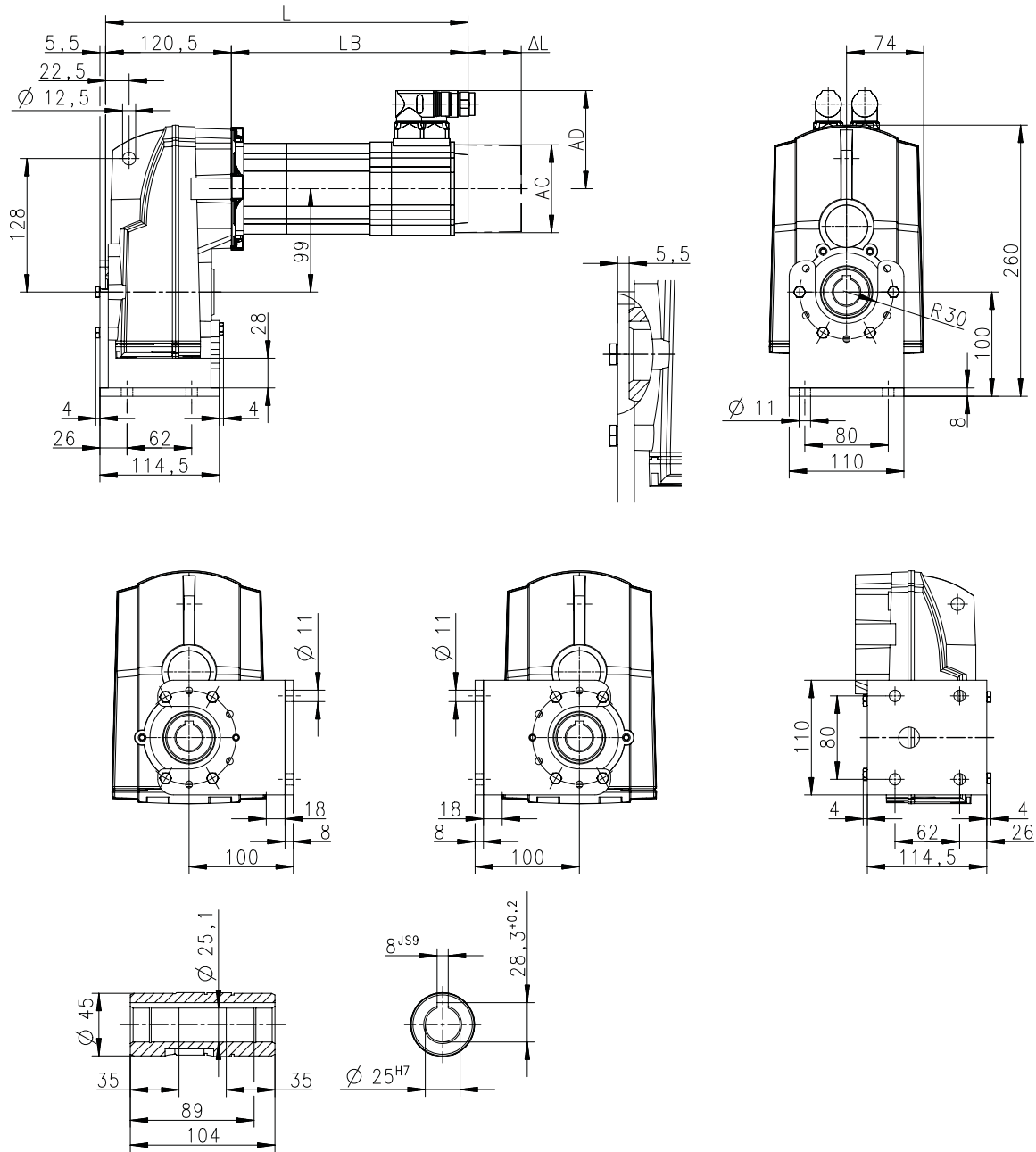
Technical data

Dimensions
Basic dimensions



g500-S130, 2-stage

Gearbox version: Hollow shaft with foot (HBR)



8800552-00

Motor			m850-	
			S120/S3960	S120/M3960
Total length	L	mm	302	340
Motor length	LB		182	220
Length of motor options	Δ L	mm	46	46
Motor diameter	AC	mm	121	121
Motor/connection distance	AD	mm	102	102

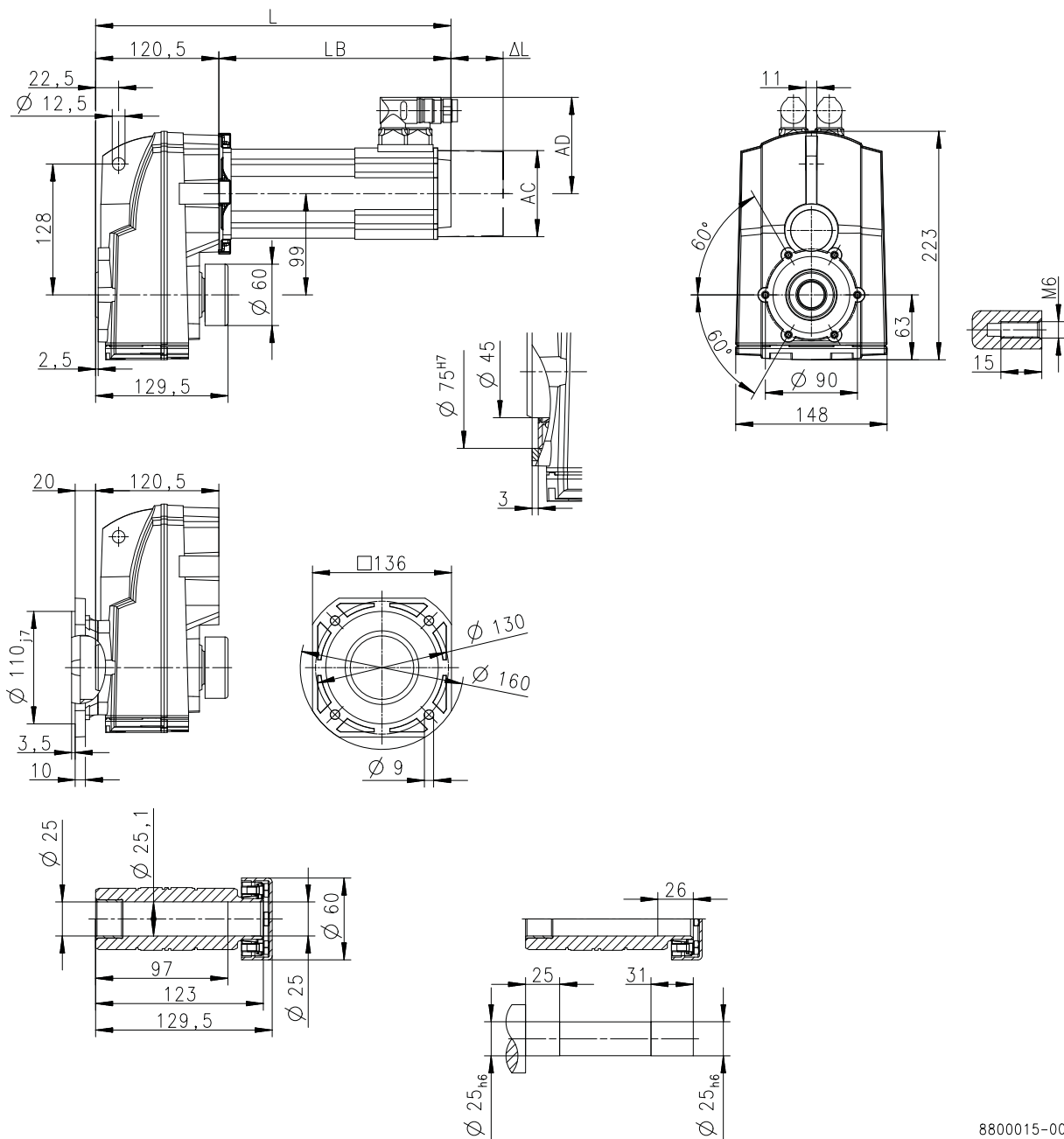


Technical data

Dimensions
Basic dimensions

g500-S130, 2-stage

Gearbox version: Hollow shaft with shrink disc, without foot (SDR/SCR/SCK)



8800015-00

Motor			m850-	
			S120/S3960	S120/M3960
Total length	L	mm	302	340
Motor length	LB		182	220
Length of motor options	Δ L	mm	46	46
Motor diameter	AC	mm	121	121
Motor/connection distance	AD	mm	102	102

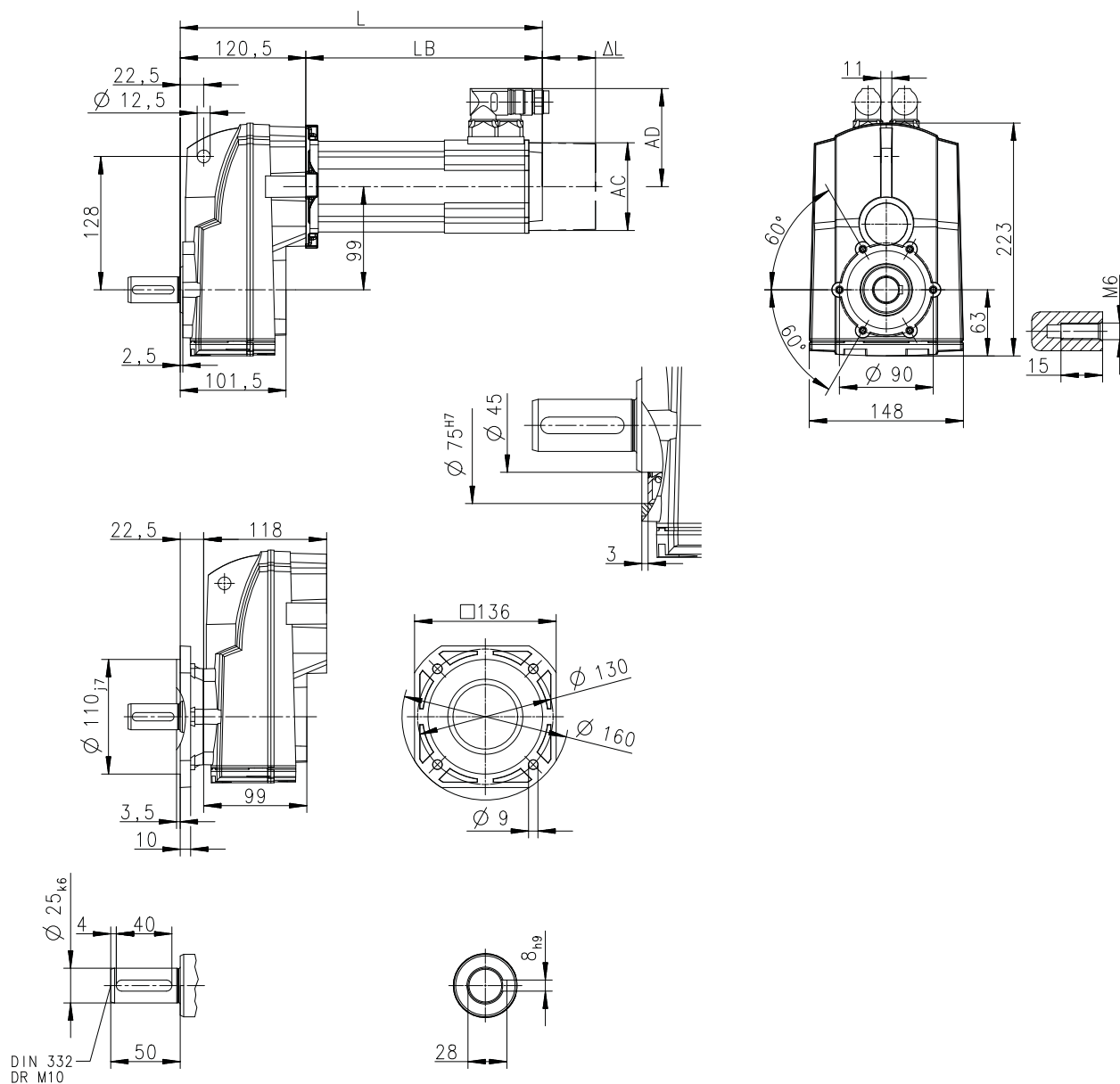
Technical data

Dimensions
Basic dimensions



g500-S130, 2-stage

Gearbox version: Solid shaft without foot (VDR/VCR/VCK)



8800014-00

Motor			m850-	
			S120/S3960	S120/M3960
Total length	L	mm	302	340
Motor length	LB		182	220
Length of motor options	ΔL	mm	46	46
Motor diameter	AC	mm	121	121
Motor/connection distance	AD	mm	102	102

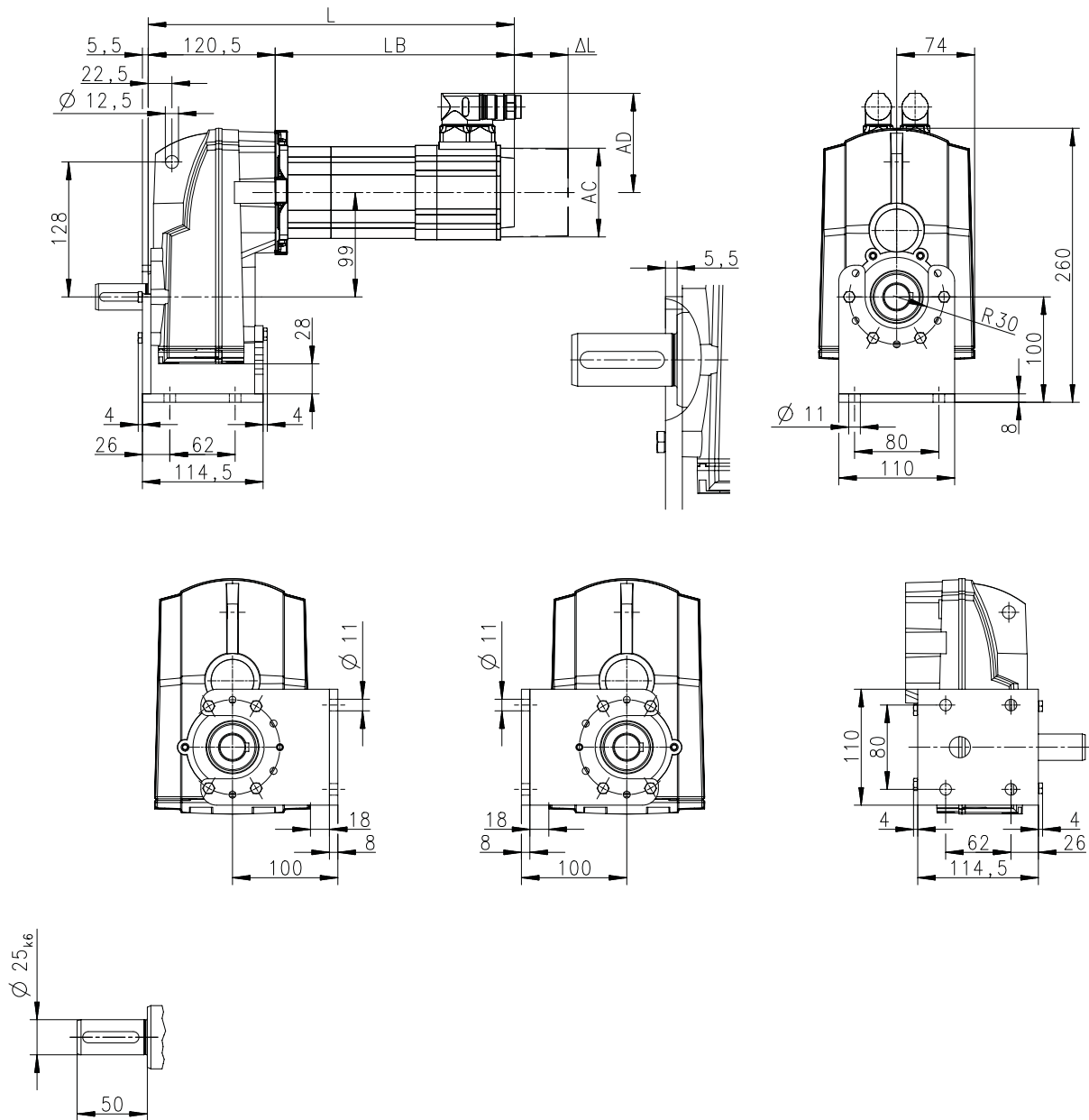


Technical data

Dimensions
Basic dimensions

g500-S130, 2-stage

Gearbox version: Solid shaft with foot (VBR)



8800016-00

Motor			m850-	
			S120/S3960	S120/M3960
Total length	L	mm	302	340
Motor length	LB		182	220
Length of motor options	ΔL	mm	46	46
Motor diameter	AC	mm	121	121
Motor/connection distance	AD	mm	102	102

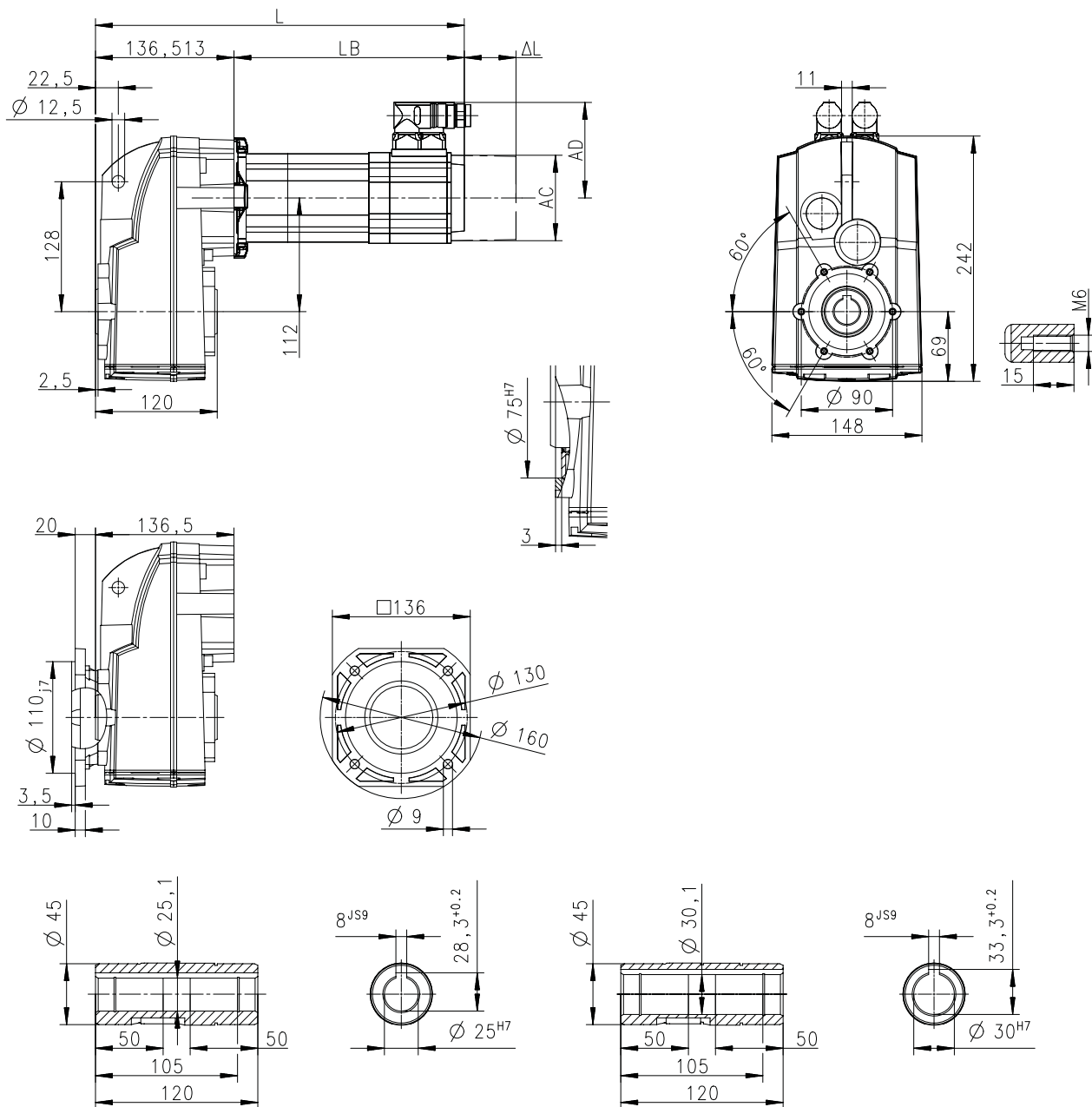
Technical data

Dimensions
Basic dimensions



g500-S220, 2-/3-stage

Gearbox version: Hollow shaft without foot (HDR/HCR/HCK)



8800029-01

Motor			m850-				
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240
Total length	L	mm	318	356	394	321	361
Motor length	LB		182	220	258	184	224
Length of motor options	ΔL	mm	46	46	46	53	53
Motor diameter	AC	mm	121	121	121	142	142
Motor/connection distance	AD	mm	102	102	102	114	114

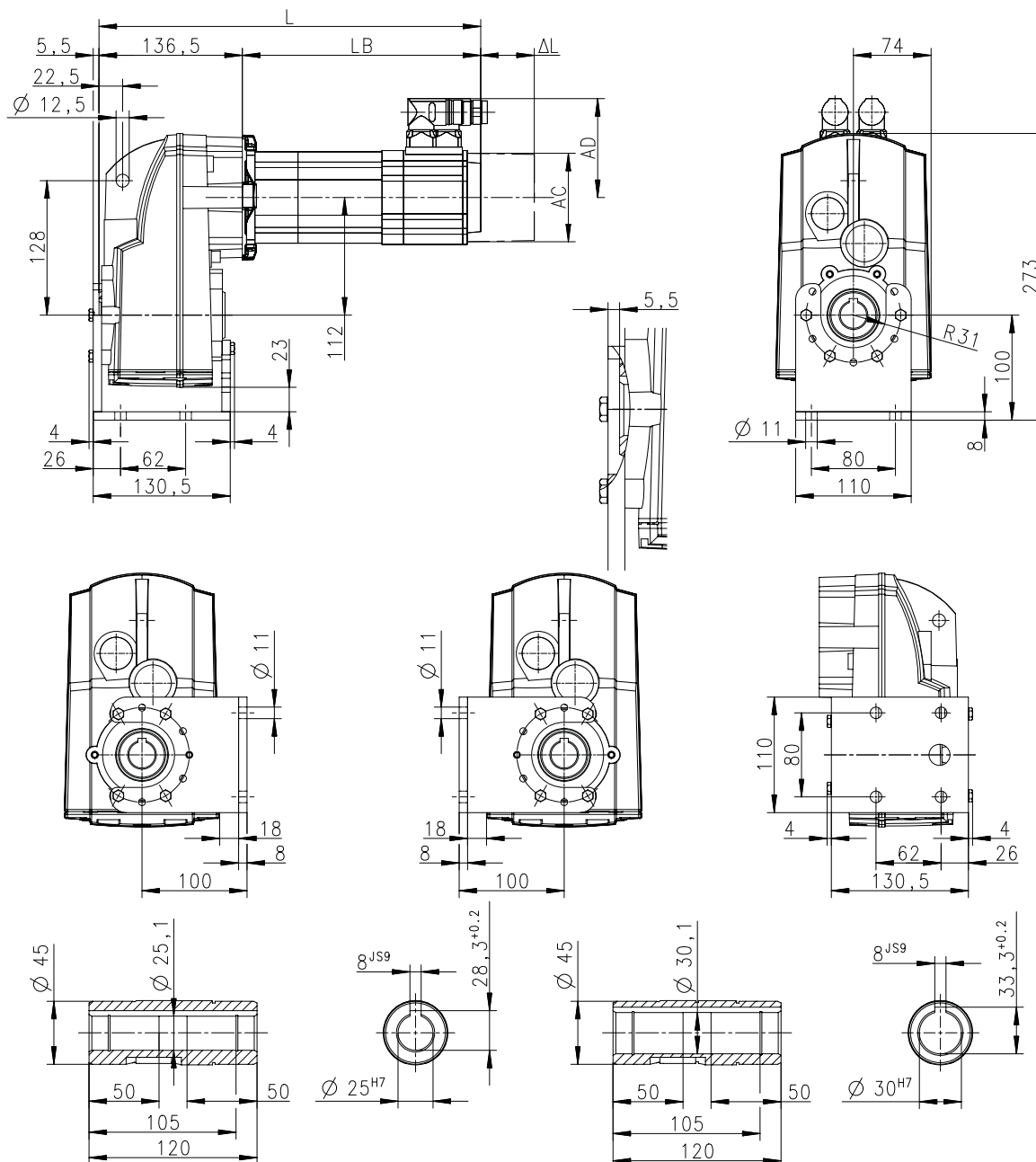


Technical data

Dimensions
Basic dimensions

g500-S220, 2-/3-stage

Gearbox version: Hollow shaft with foot (HBR)

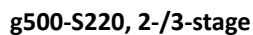


8800535-01

Motor			m850-				
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240
Total length	L	mm	318	356	394	321	361
Motor length	LB		182	220	258	184	224
Length of motor options	Δ L	mm	46	46	46	53	53
Motor diameter	AC	mm	121	121	121	142	142
Motor/connection distance	AD	mm	102	102	102	114	114

Dimensions

Basic dimensions

[illegible]

Motor			m850-				
			\$120/\$3960	\$120/M3960	\$120/L3960	\$140/\$3240	\$140/M3240
Total length	L	mm	318	356	394	321	361
Motor length	LB		182	220	258	184	224
Length of motor options	Δ L	mm	46	46	46	53	53
Motor diameter	AC	mm	121	121	121	142	142
Motor/connection distance	AD	mm	102	102	102	114	114

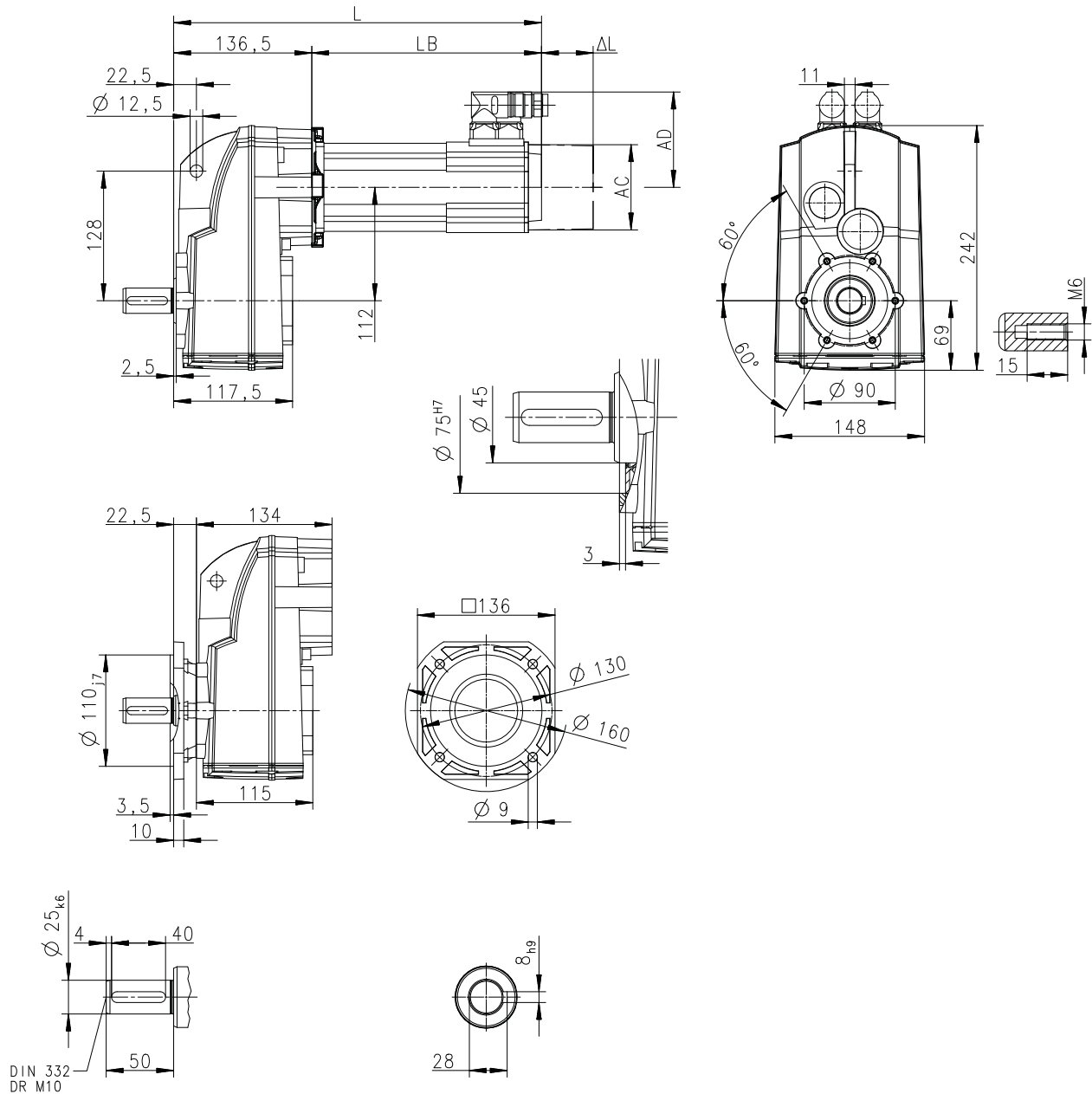


Technical data

Dimensions
Basic dimensions

g500-S220, 2-/3-stage

Gearbox version: Solid shaft without foot (VDR/VCR/VCK)



8800030-00

Motor			m850-				
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240
Total length	L	mm	318	356	394	321	361
Motor length	LB		182	220	258	184	224
Length of motor options	ΔL	mm	46	46	46	53	53
Motor diameter	AC	mm	121	121	121	142	142
Motor/connection distance	AD	mm	102	102	102	114	114

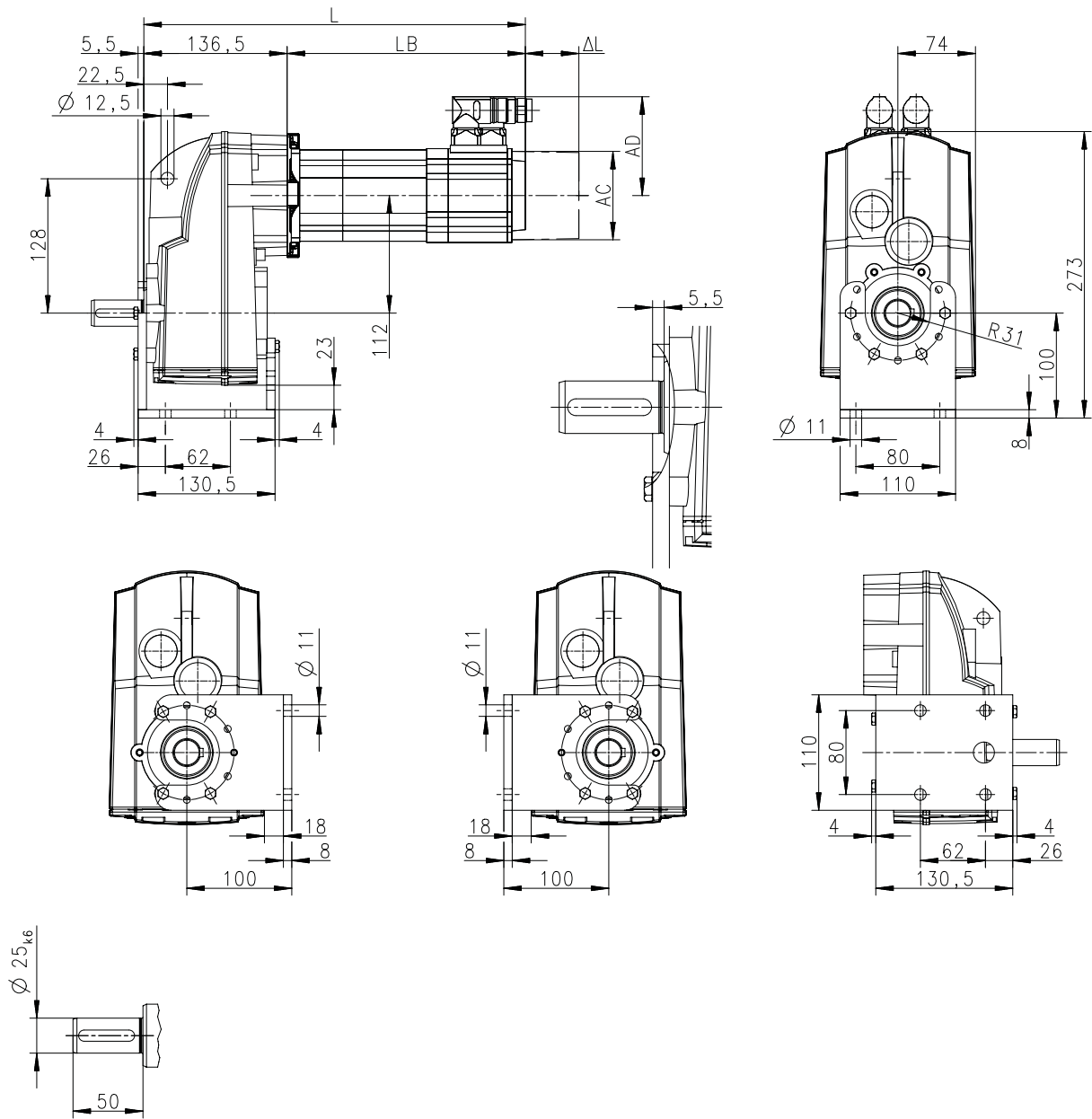
Technical data

Dimensions
Basic dimensions



g500-S220, 2-/3-stage

Gearbox version: Solid shaft with foot (VBR)



8800032-00

Motor			m850-				
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240
Total length	L	mm	318	356	394	321	361
Motor length	LB		182	220	258	184	224
Length of motor options	Δ L	mm	46	46	46	53	53
Motor diameter	AC	mm	121	121	121	142	142
Motor/connection distance	AD	mm	102	102	102	114	114

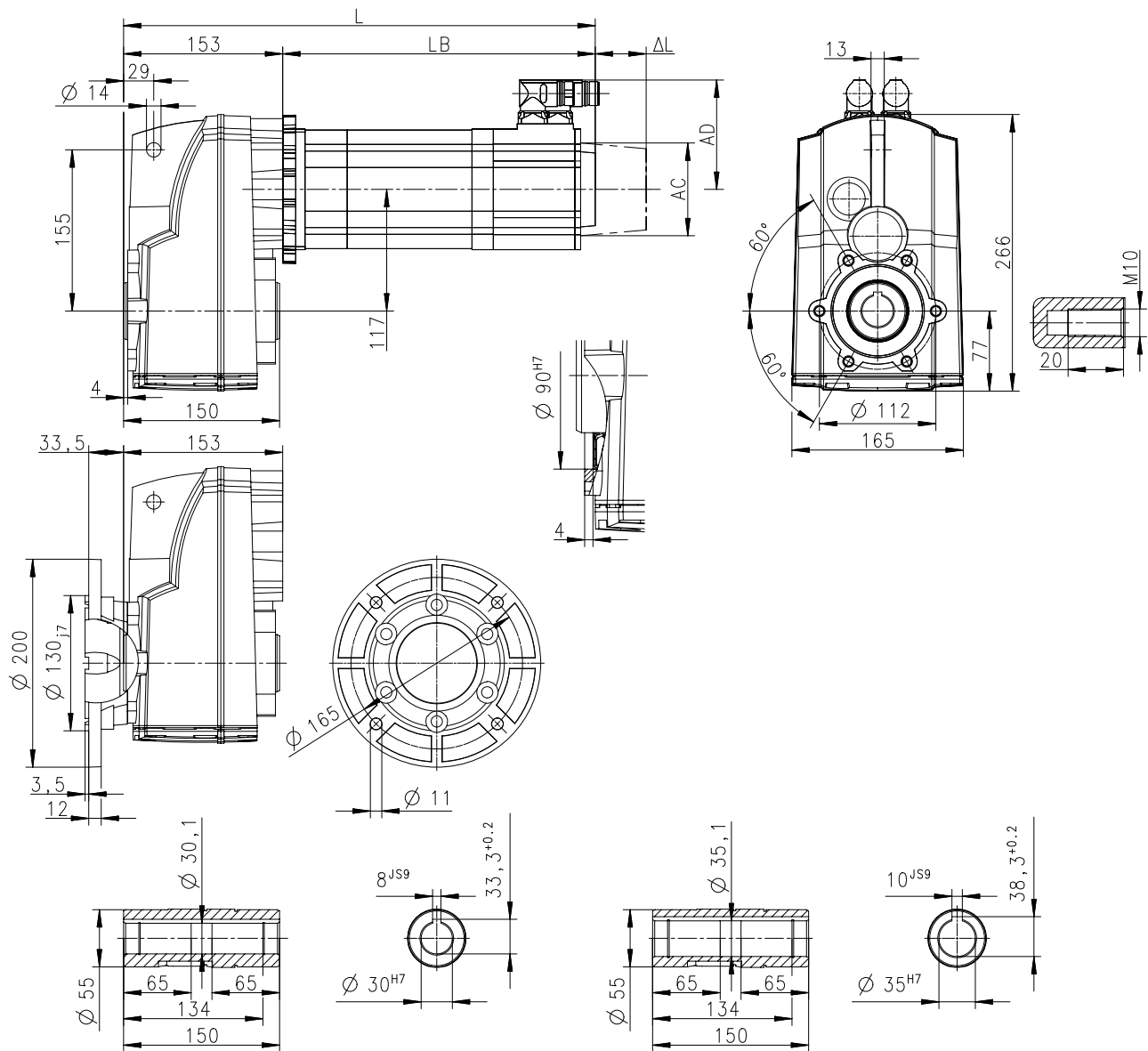


Technical data

Dimensions
Basic dimensions

g500-S400, 2-/3-stage

Gearbox version: Hollow shaft without foot (HDR/HCR/HCK)



8800045-01

Motor			m850-					
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240	S140/L3240
Total length	L	mm	335	373	411	337	377	417
Motor length	LB		182	220	258	184	224	264
Length of motor options	ΔL	mm	46	46	46	53	53	53
Motor diameter	AC	mm	121	121	121	142	142	142
Motor/connection distance	AD	mm	102	102	102	114	114	135

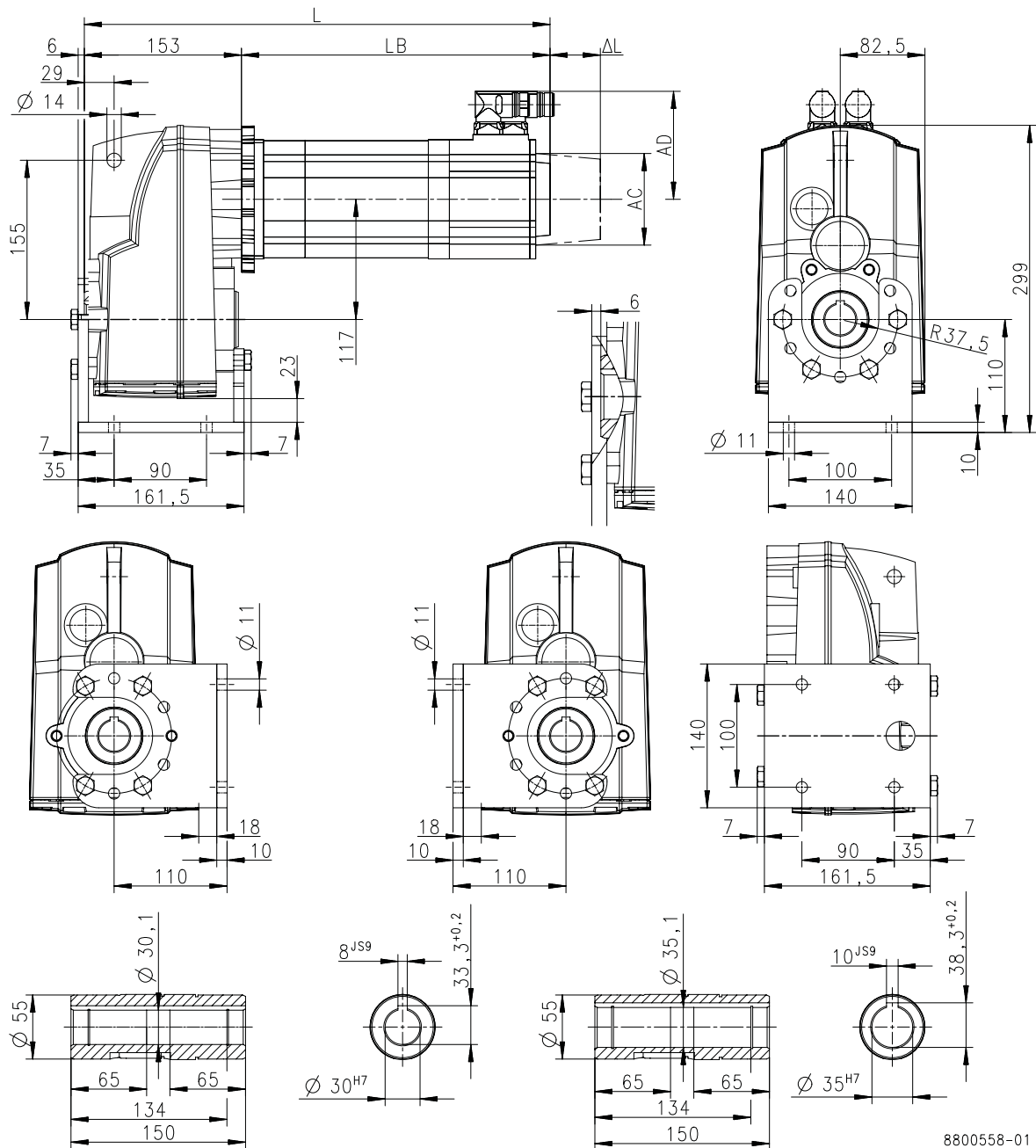
Technical data

Dimensions
Basic dimensions



g500-S400, 2-/3-stage

Gearbox version: Hollow shaft with foot (HBR)



8800558-01

Motor			m850-					
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240	S140/L3240
Total length	L	mm	335	373	411	337	377	417
Motor length	LB		182	220	258	184	224	264
Length of motor options	Δ L	mm	46	46	46	53	53	53
Motor diameter	AC	mm	121	121	121	142	142	142
Motor/connection distance	AD	mm	102	102	102	114	114	135

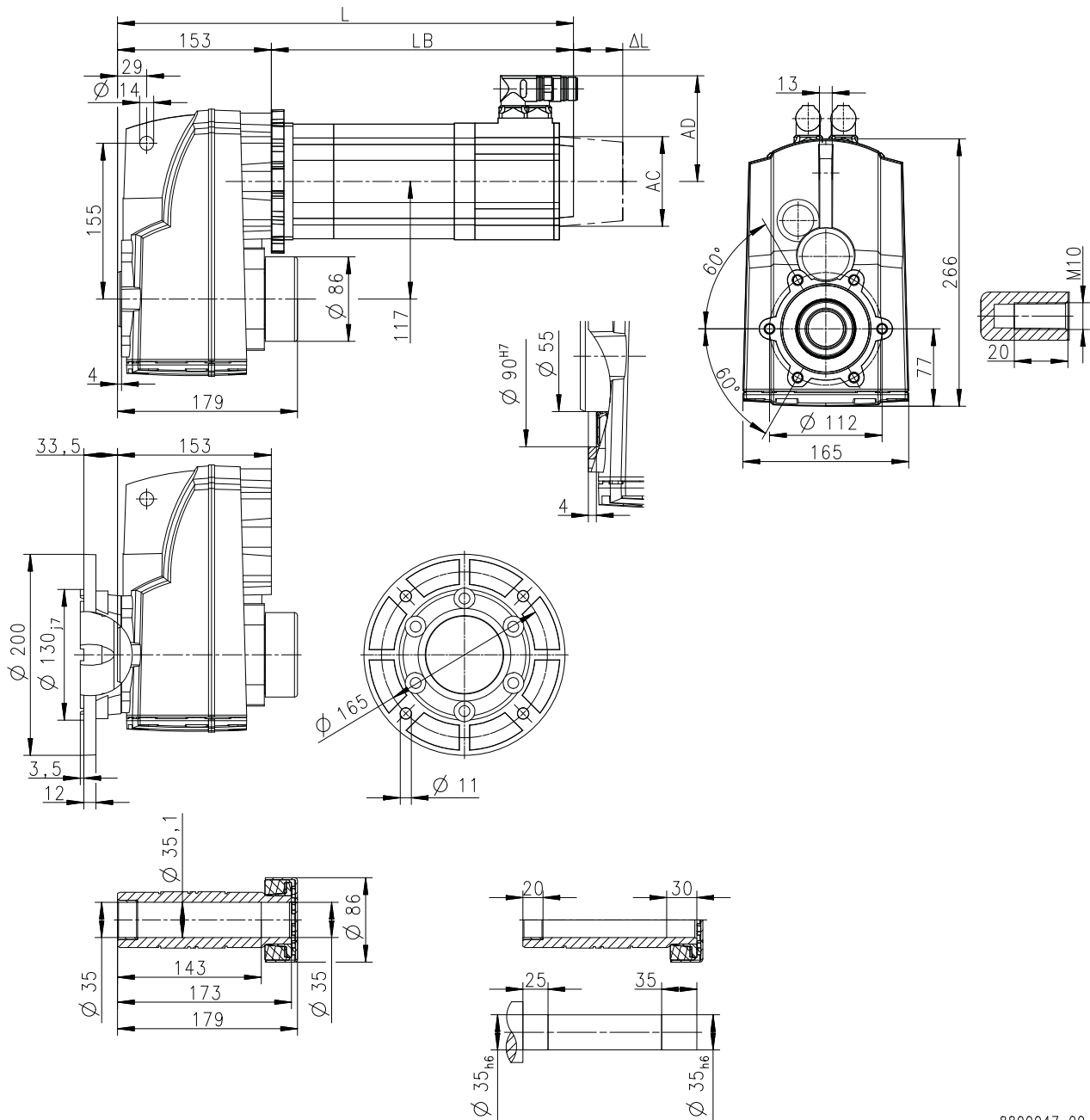


Technical data

Dimensions
Basic dimensions

g500-S400, 2-/3-stage

Gearbox version: Hollow shaft with shrink disc, without foot (SDR/SCR/SCK)



8800047-00

Motor			m850-					
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240	S140/L3240
Total length	L	mm	335	373	411	337	377	417
Motor length	LB		182	220	258	184	224	264
Length of motor options	ΔL	mm	46	46	46	53	53	53
Motor diameter	AC	mm	121	121	121	142	142	142
Motor/connection distance	AD	mm	102	102	102	114	114	135

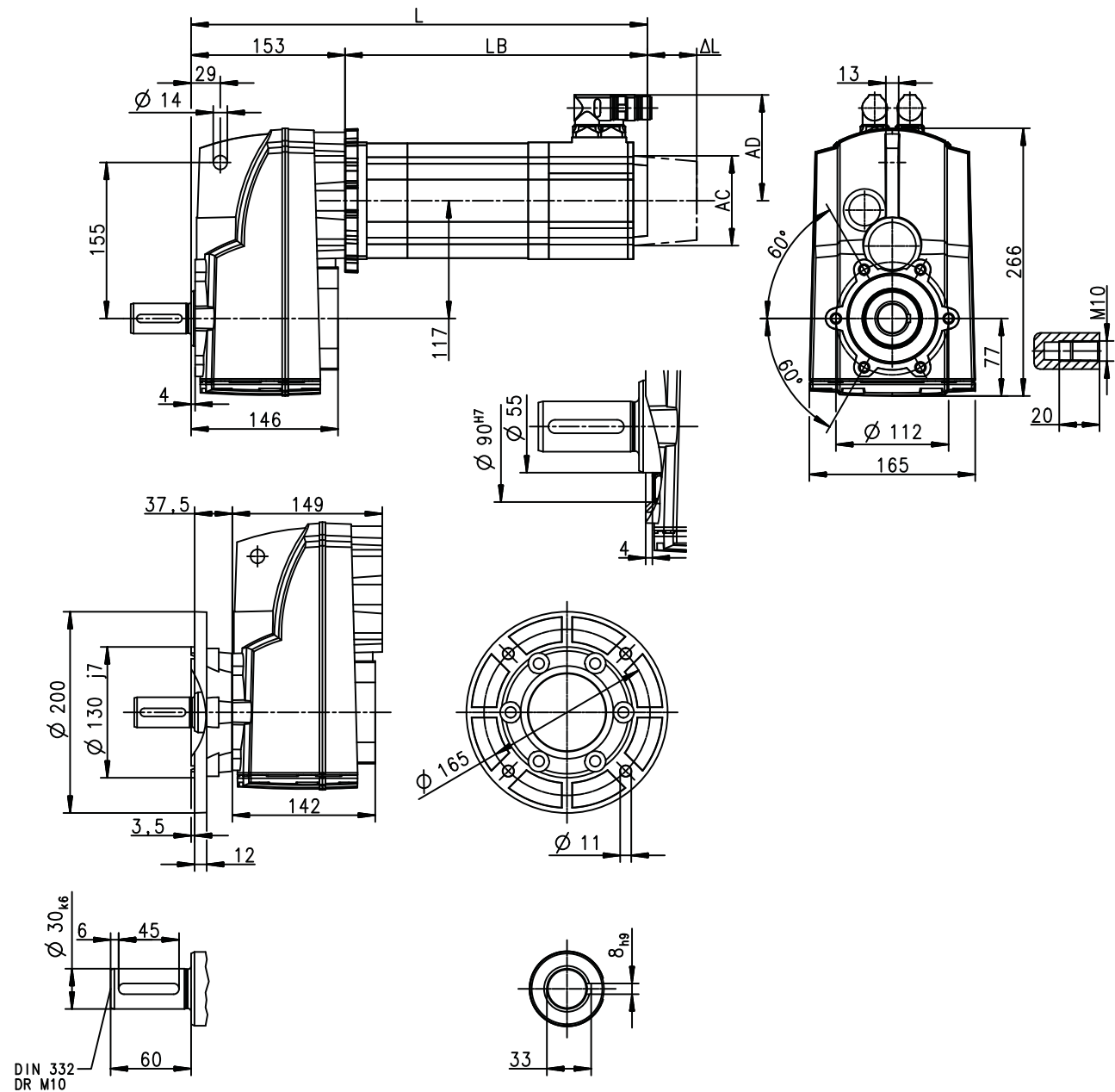
Technical data

Dimensions
Basic dimensions



g500-S400, 2-/3-stage

Gearbox design: Solid shaft without foot (VDR/VCR/VCK)



8800046-01

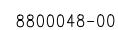
Motor			m850-					
			S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240	S140/L3240
Total length	L	mm	335	373	411	337	377	417
Motor length	LB		182	220	258	184	224	264
Length of motor options	ΔL	mm	46	46	46	53	53	53
Motor diameter	AC	mm	121	121	121	142	142	142
Motor/connection distance	AD	mm	102	102	102	114	114	135



Dimensions

Basic dimensions

Gearbox version: Solid shaft with foot (VBR)

87

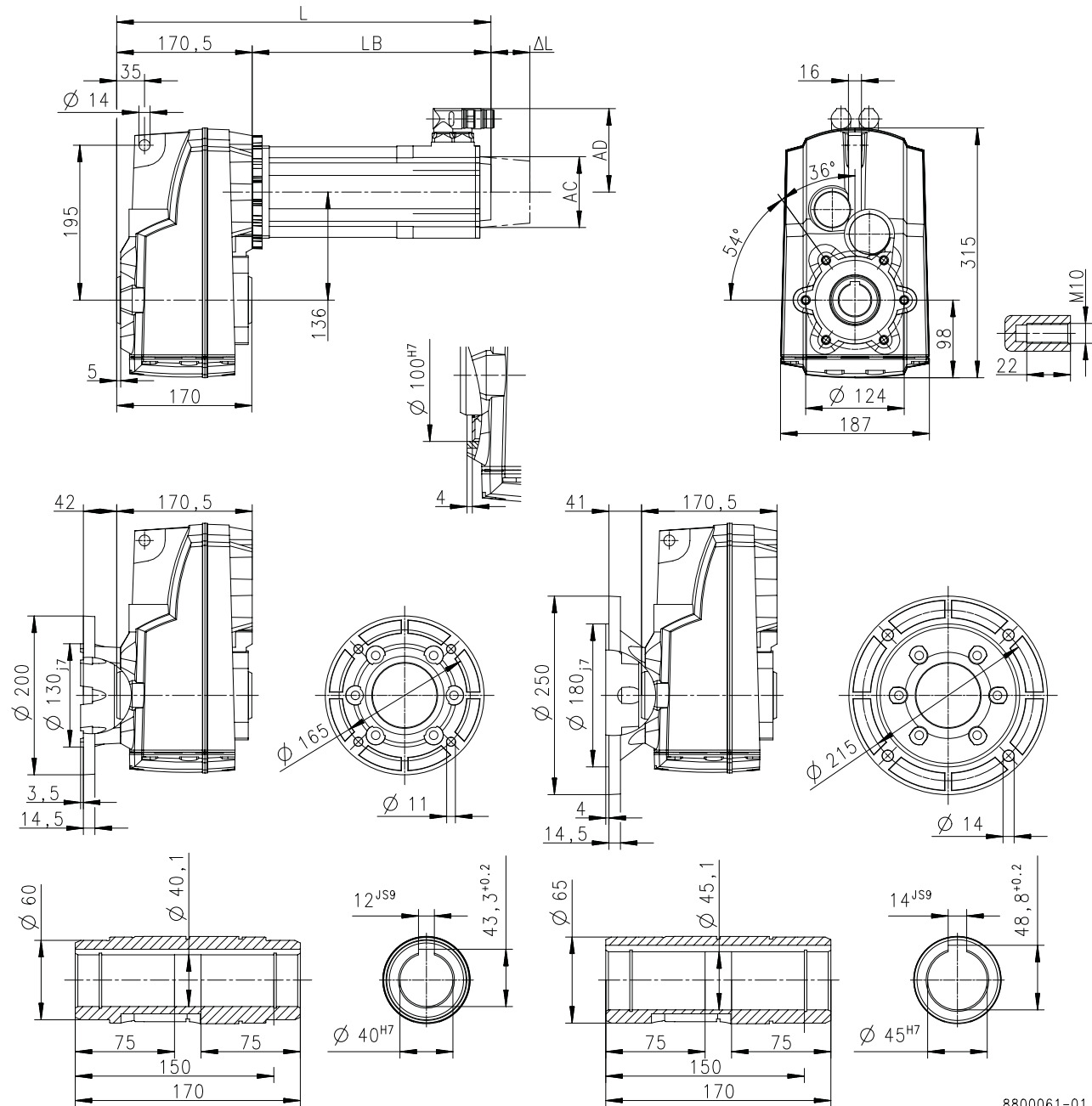
Technical data

Dimensions
Basic dimensions



g500-S660, 2-/3-stage

Gearbox version: Hollow shaft without foot (HDR/HCR/HCK)



8800061-01

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	352	390	428	355	395	435	396	444	508
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

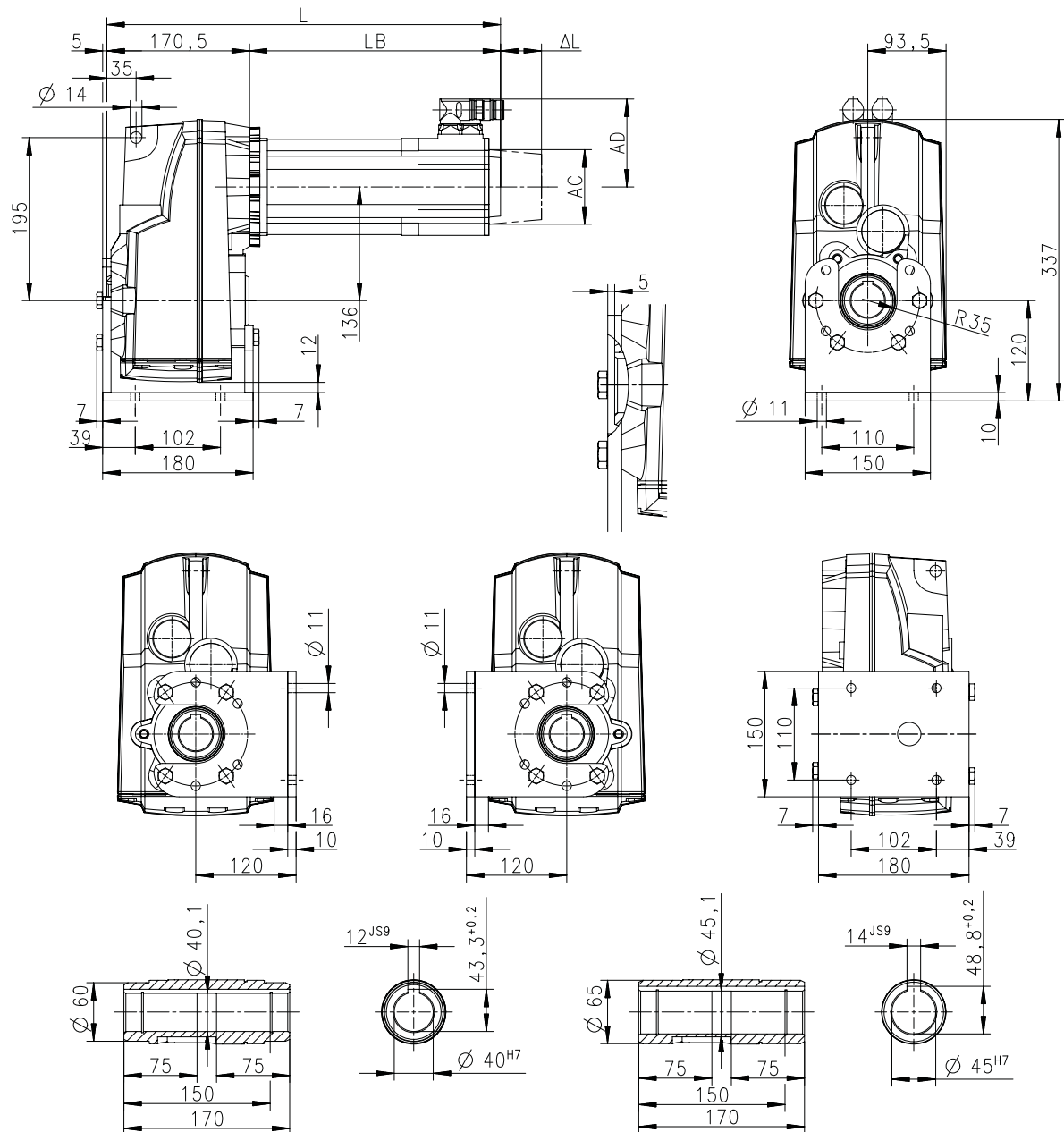


Technical data

Dimensions
Basic dimensions

g500-S660, 2-/3-stage

Gearbox version: Hollow shaft with foot (HBR)



8800561-01

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	352	390	428	355	395	435	396	444	508
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Technical data

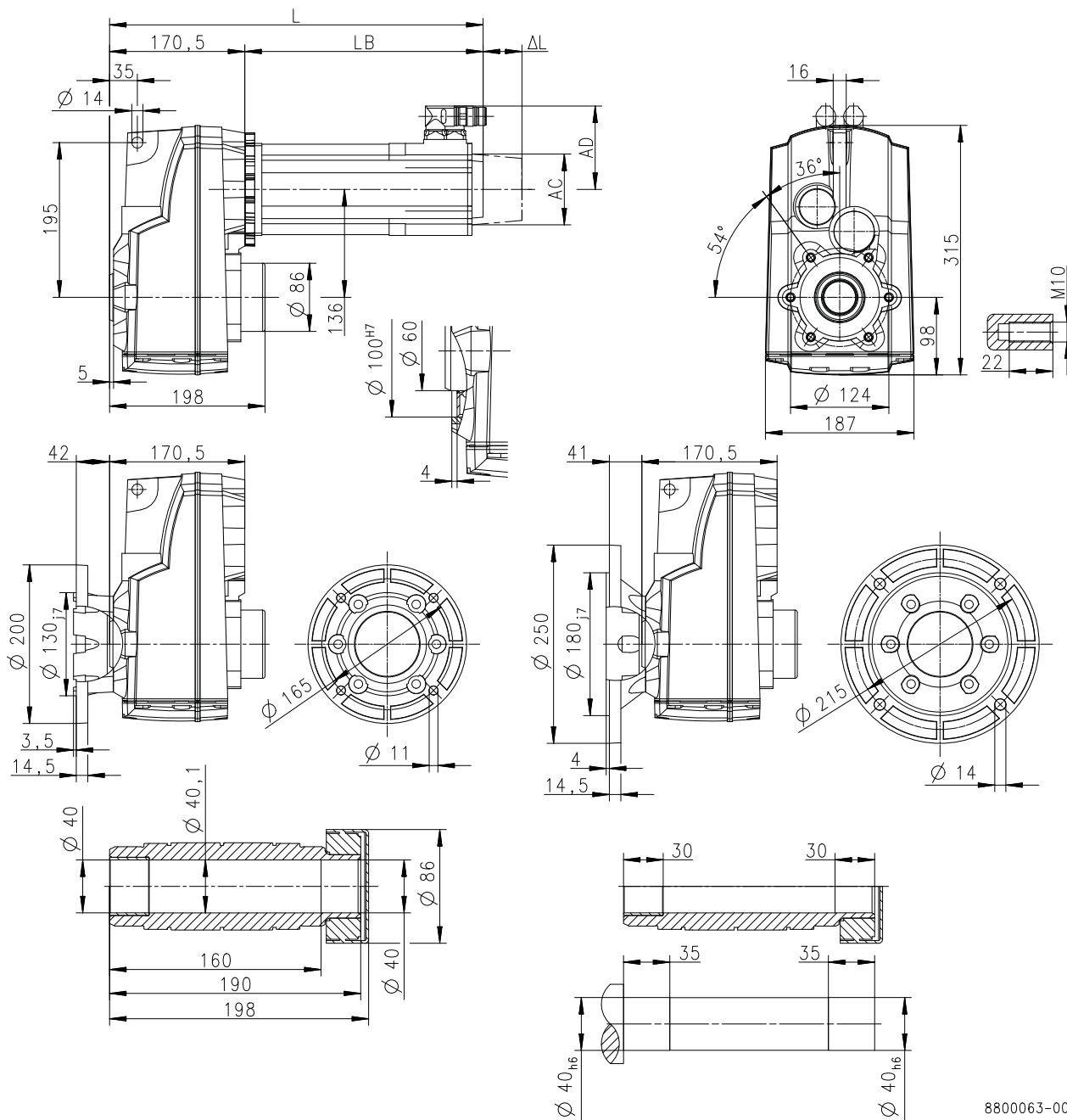
Dimensions

Basic dimensions



g500-S660, 2-/3-stage

Gearbox version: Hollow shaft with shrink disc, without foot (SDR/SCR/SCK)



8800063-00

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	352	390	428	355	395	435	396	444	508
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	ΔL	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

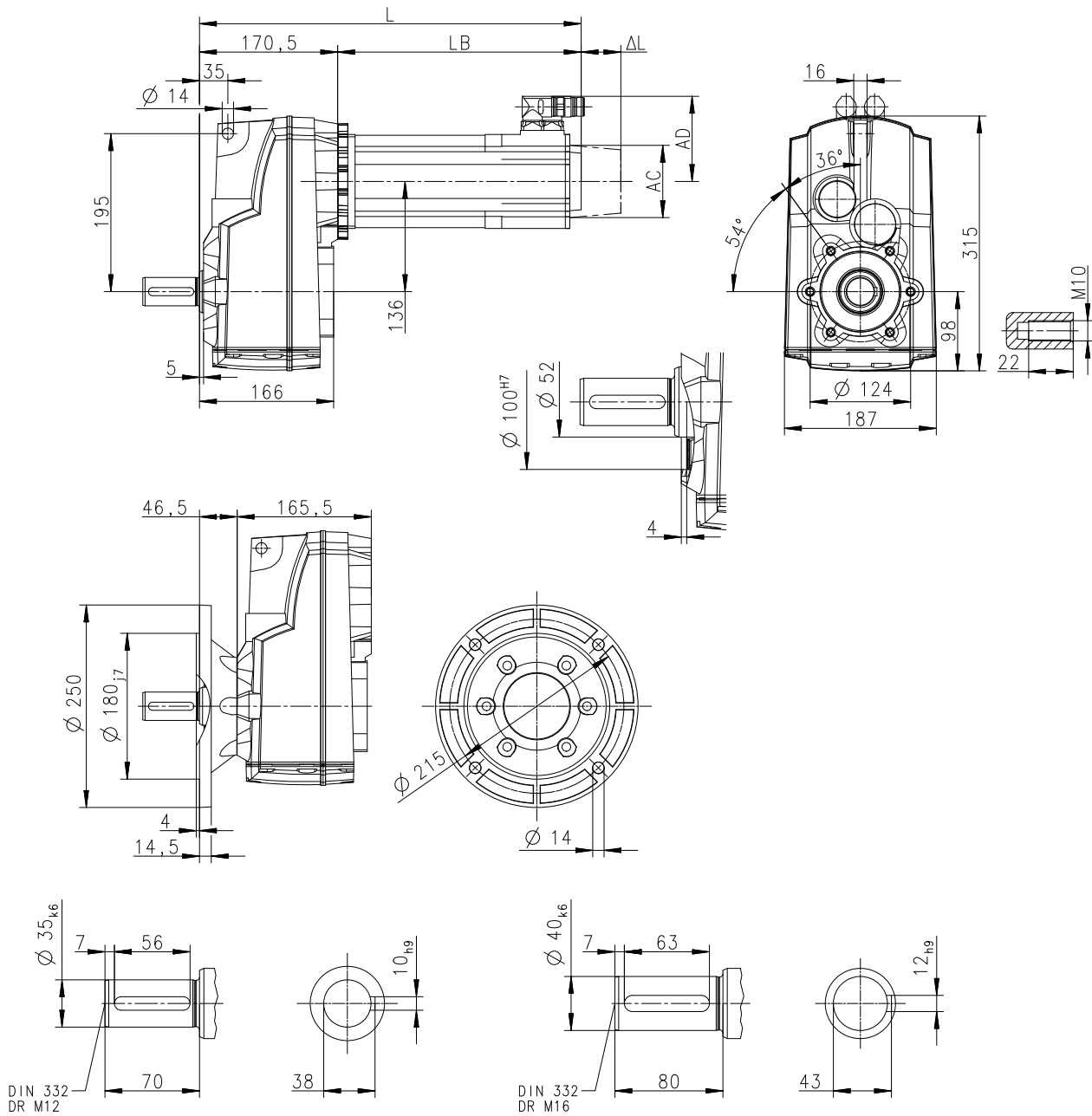


Technical data

Dimensions
Basic dimensions

g500-S660, 2-/3-stage

Gearbox version: Solid shaft without foot (VDR/VCR/VCK)



8800062-00

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	352	390	428	355	395	435	396	444	508
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	ΔL	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

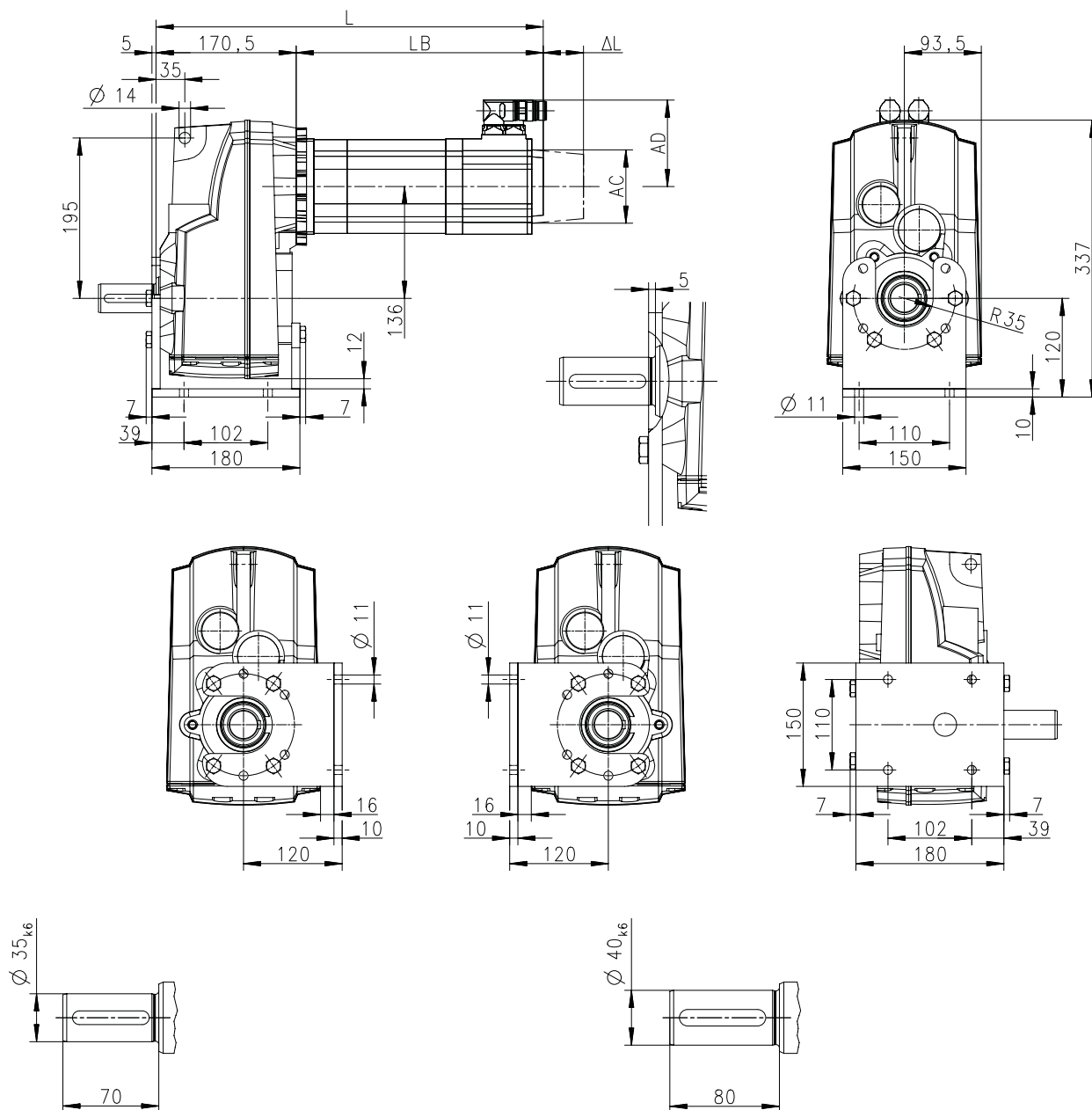
Technical data

Dimensions
Basic dimensions



g500-S660, 2-/3-stage

Gearbox version: Solid shaft with foot (VBR)



8800064-00

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	352	390	428	355	395	435	396	444	508
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

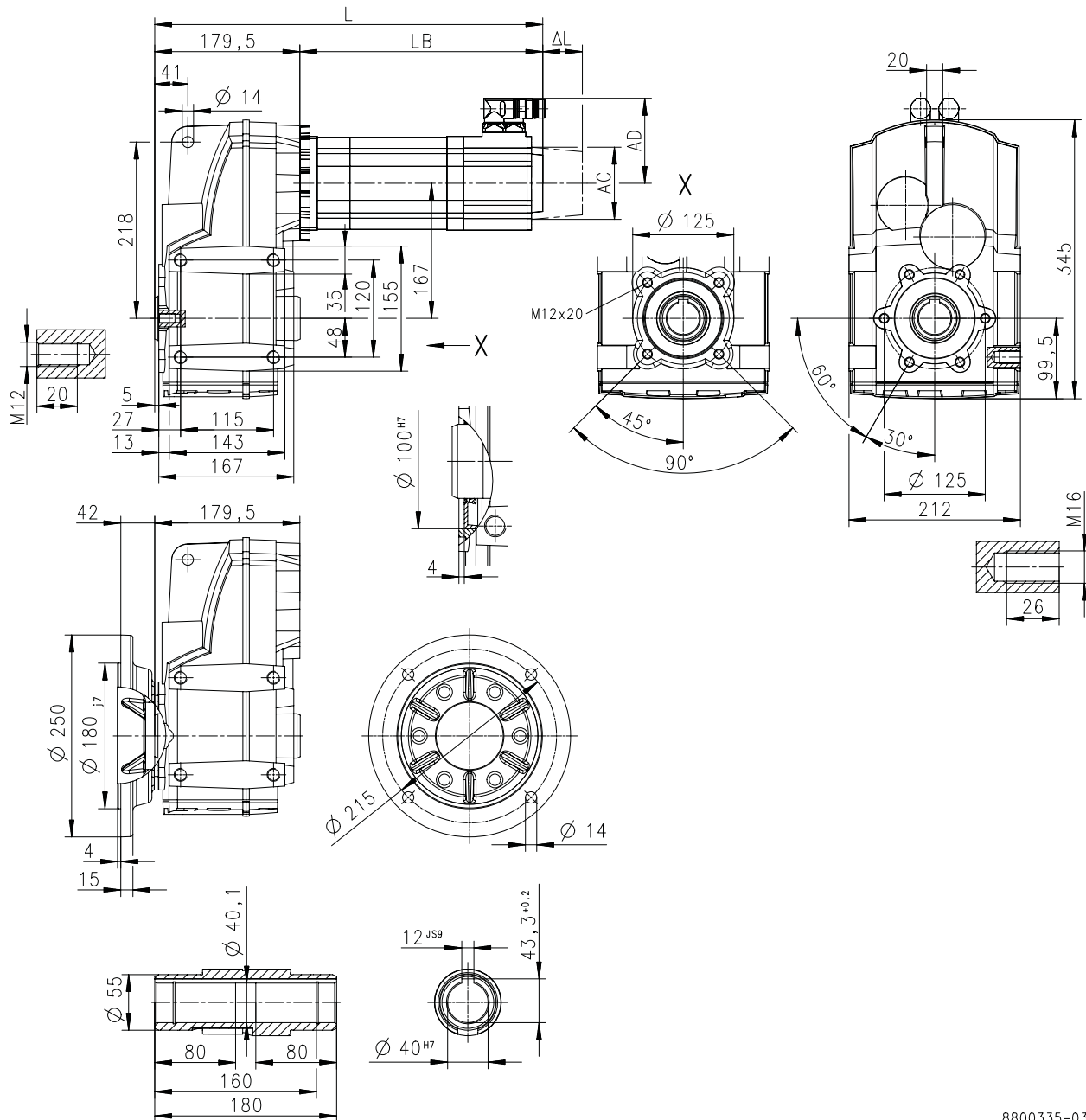


Technical data

Dimensions
Basic dimensions

g500-S950, 2-/3-stage

Gearbox version: Hollow shaft with foot (HAR/HBR/HAK)



8800335-03

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	361	399	437	364	404	444	405	453	517
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Technical data

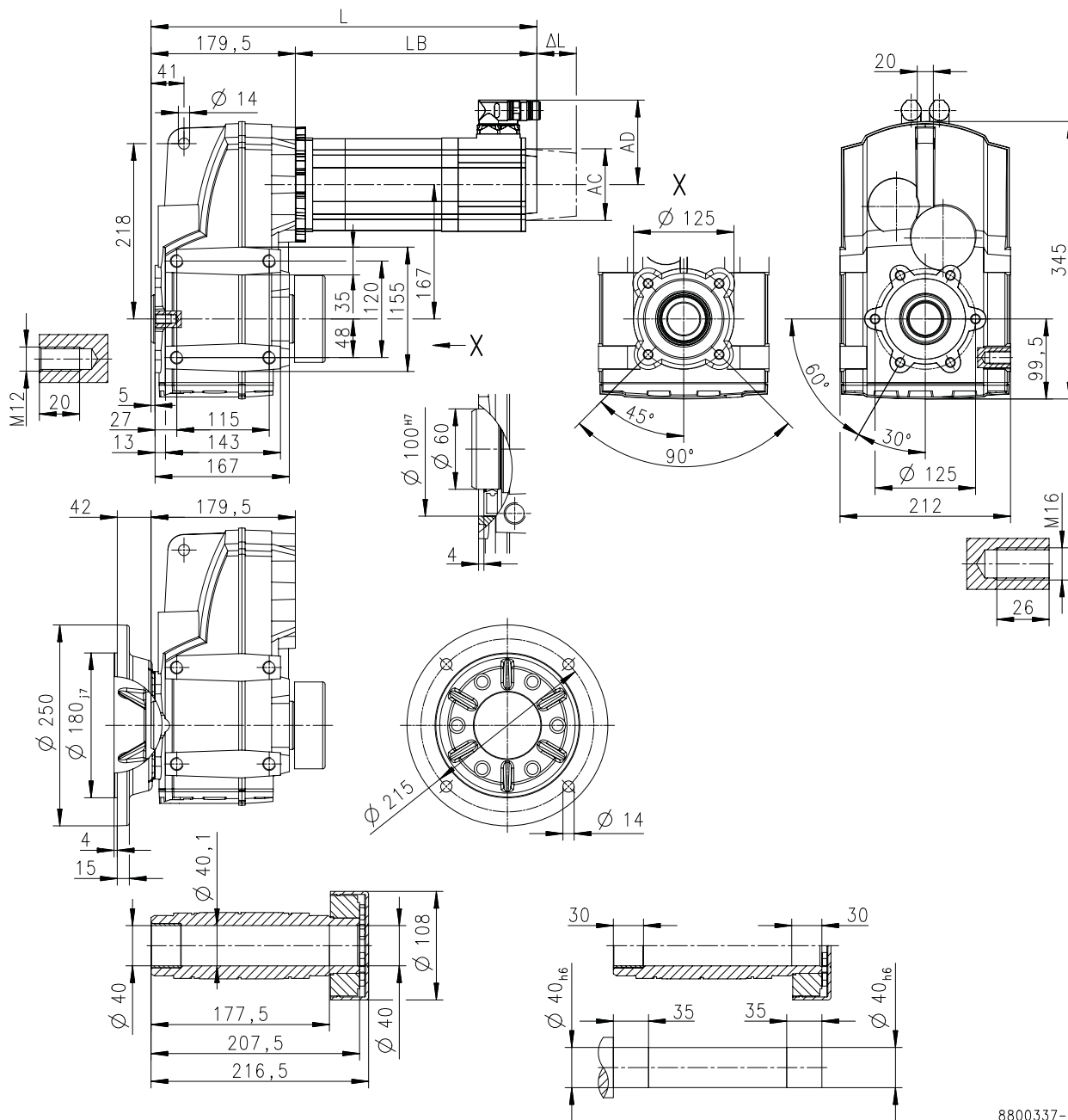
Dimensions

Basic dimensions



g500-S950, 2-/3-stage

Gearbox version: Hollow shaft with shrink disc, with foot (SAR/SBR/SAK)



8800337-02

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	361	399	437	364	404	444	405	453	517
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Technical data

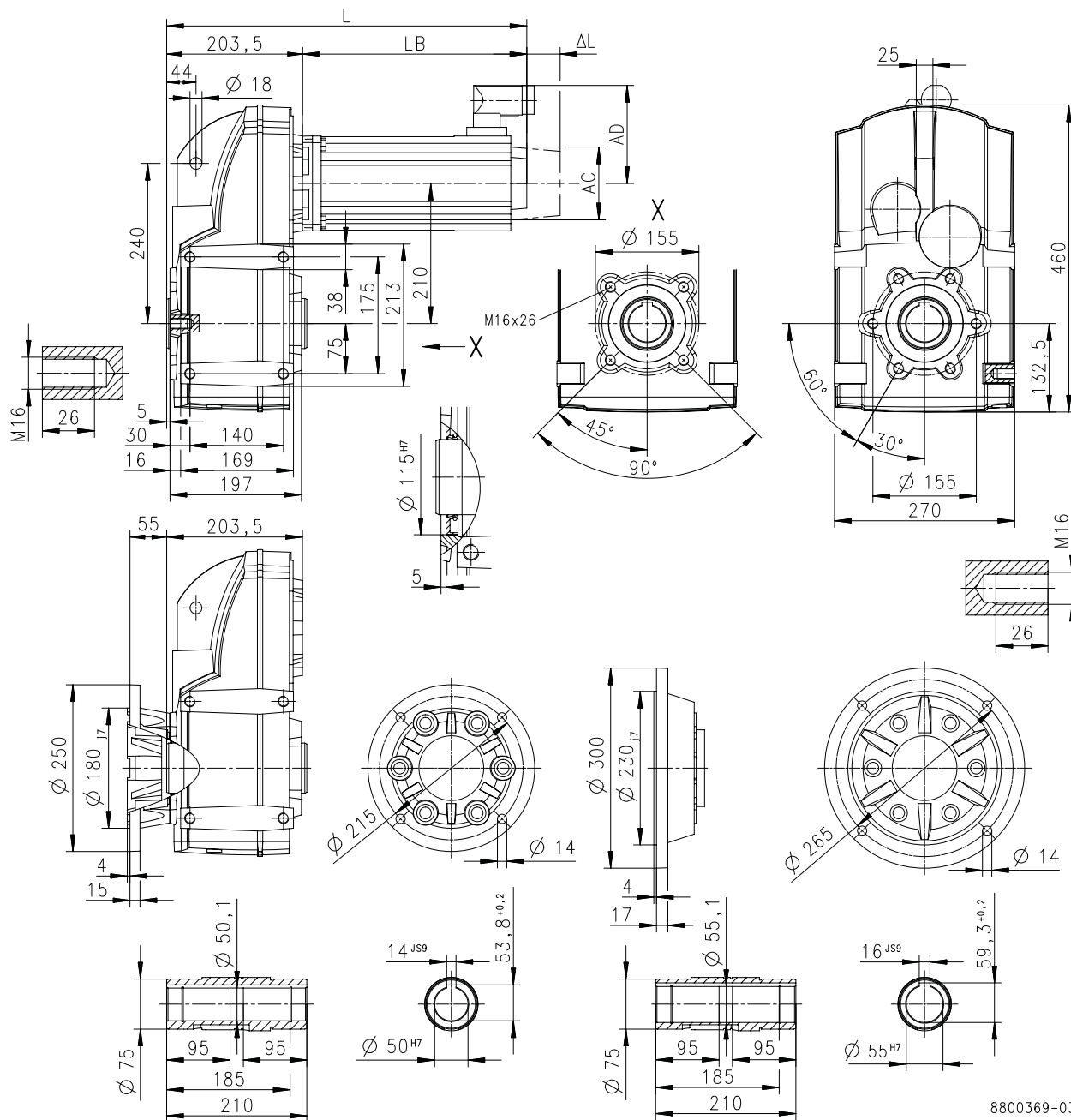
Dimensions

Basic dimensions



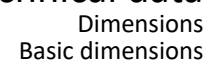
g500-S2100, 2-/3-stage

Gearbox version: Hollow shaft with foot (HAR/HBR/HAK)



8800369-03

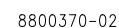
Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	385	423	461	388	428	468	429	477	541
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

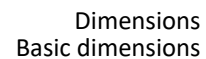


Gearbox version: Hollow shaft with shrink disc, with foot (SAR/SBR/SAK)

8800371-02

Gearbox version: Solid shaft with foot (VAR/VBR/VAK)

98

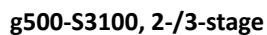


Gearbox version: Hollow shaft with foot (HAR/HBR/HAK)

8800381-02

Dimensions

Basic dimensions

[illegible]

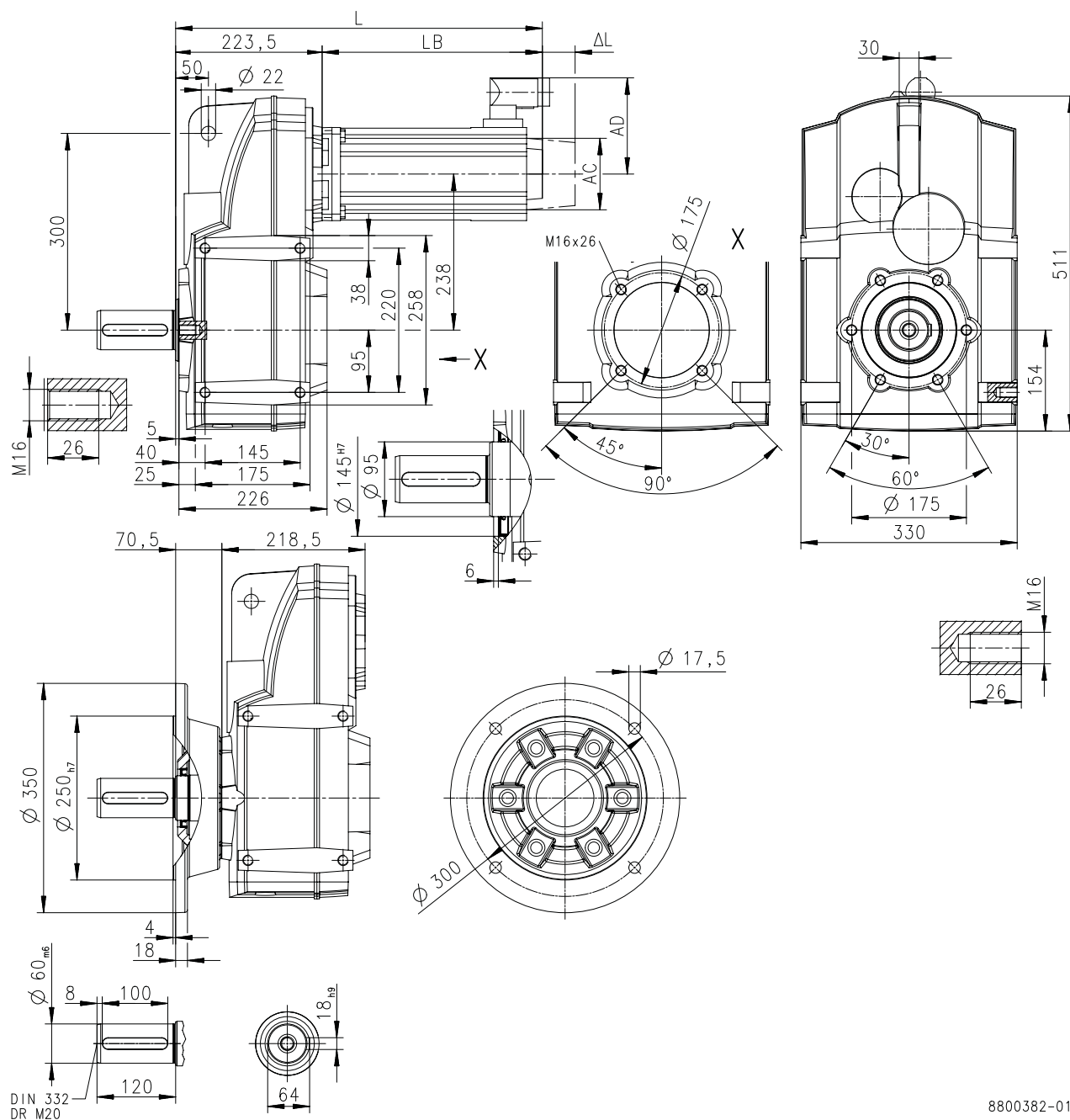
Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	405	443	481	408	448	488	449	497	561
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Technical data

Basic dimensions

g500-S3100, 2-/3-stage

Gearbox version: Solid shaft with foot (VAR/VBR/VAK)



8800382-01

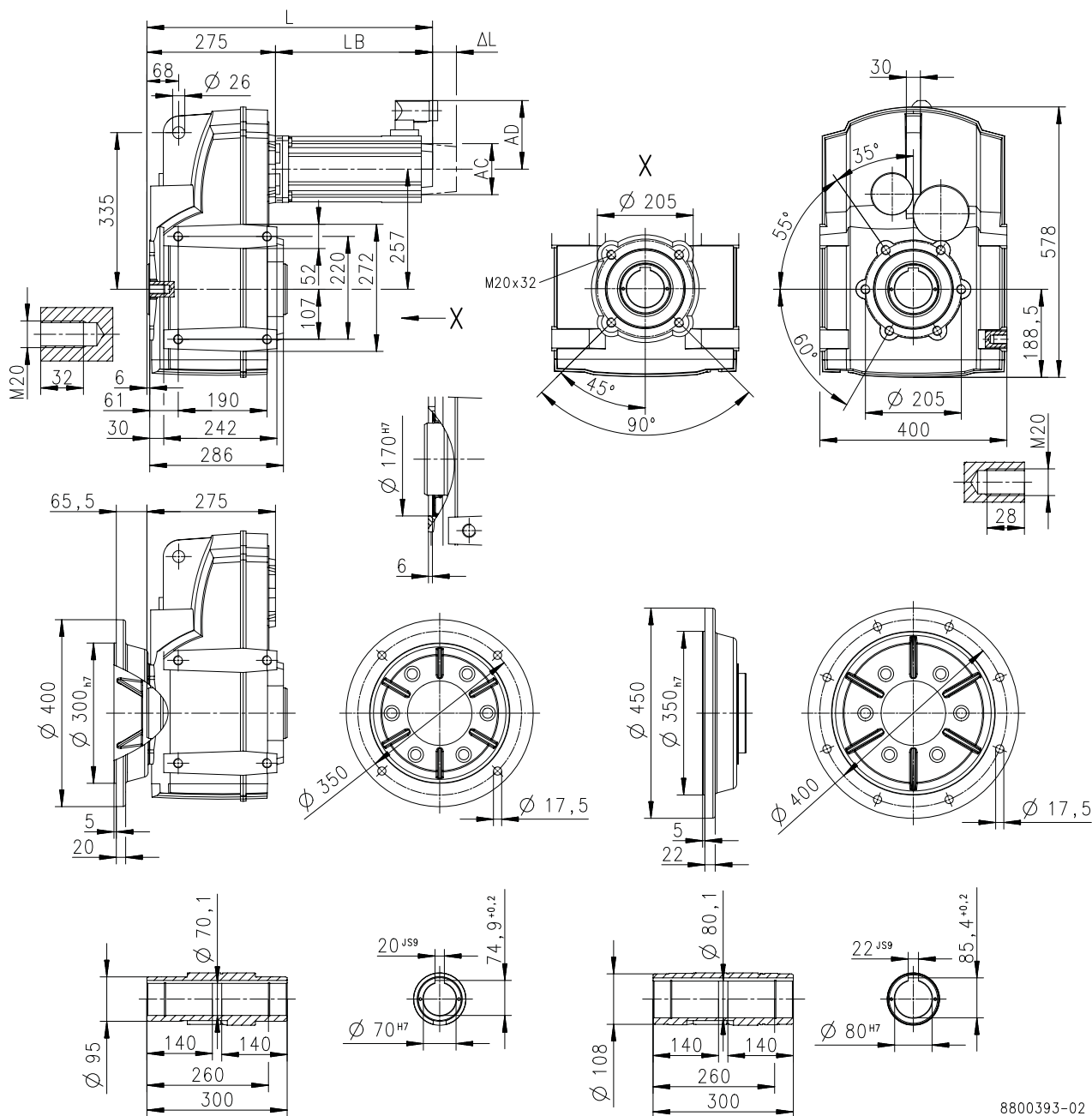
Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	405	443	481	408	448	488	449	497	561
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Dimensions

Basic dimensions



Gearbox version: Hollow shaft with foot (HAR/HBR/HAK)



8800393-02

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	457	495	533	459	499	539	500	548	612
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

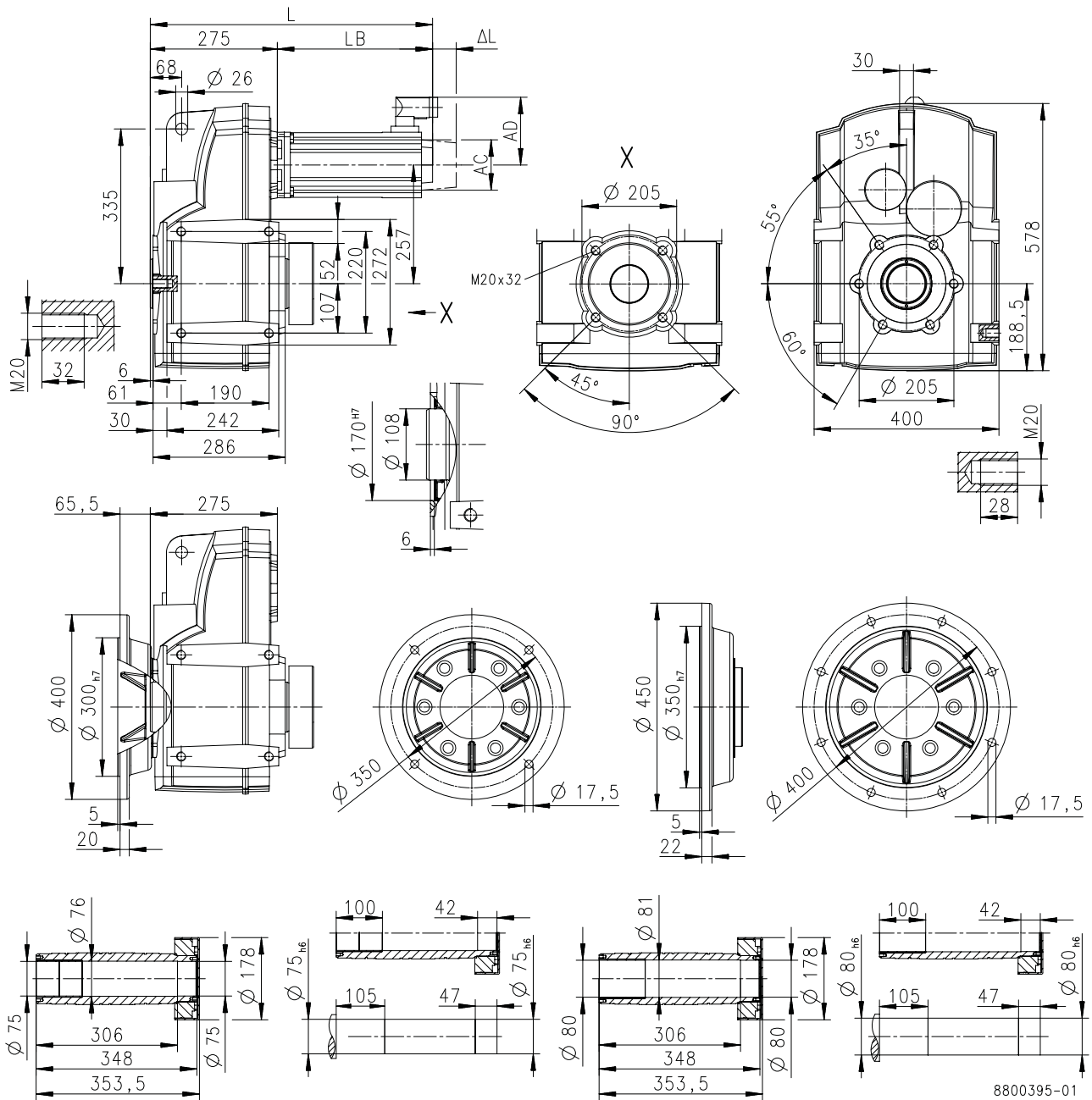


Technical data

Dimensions
Basic dimensions

g500-S4500, 2-/3-stage

Gearbox version: Hollow shaft with shrink disc, with foot (SAR/SBR/SAK)



8800395-01

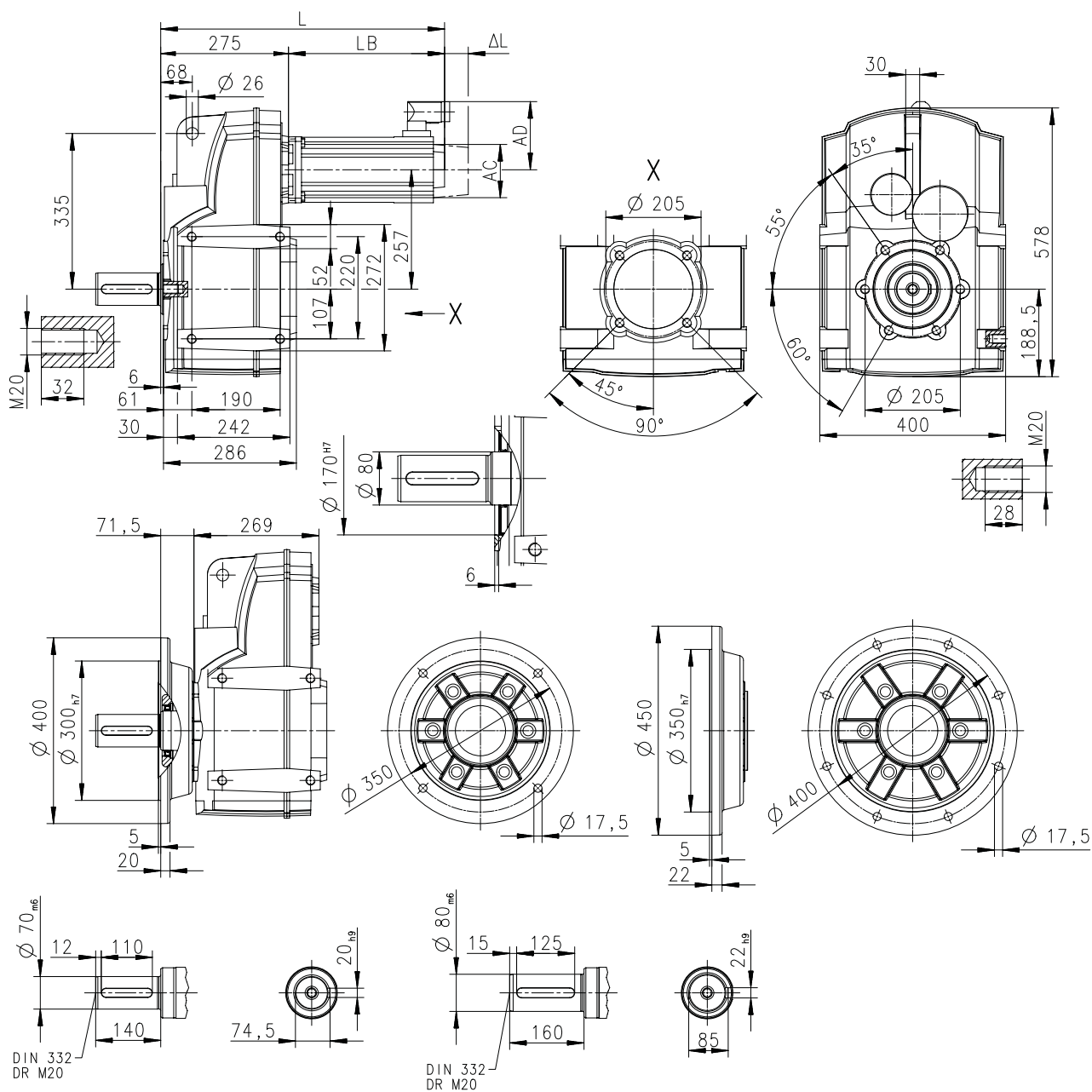
Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	457	495	533	459	499	539	500	548	612
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158

Dimensions

Basic dimensions



Gearbox version: Solid shaft with foot (VAR/VBR/VAK)



8800394-01

Motor			m850-								
			S120/ S3960	S120/ M3960	S120/ L3960	S140/ S3240	S140/ M3240	S140/ L3240	S190/ S3000	S190/ M3000	S190/ L2520
Total length	L	mm	457	495	533	459	499	539	500	548	612
Motor length	LB		182	220	258	184	224	264	225	273	337
Length of motor options	Δ L	mm	46	46	46	53	53	53	68	68	68
Motor diameter	AC	mm	121	121	121	142	142	142	190	190	190
Motor/connection distance	AD	mm	102	102	102	114	114	135	137	158	158



Technical data

Dimensions
Gearbox with pre-stage

Gearbox with pre-stage

g500-S130, 3-stage

g500-S220 ... S4500, 4-stage

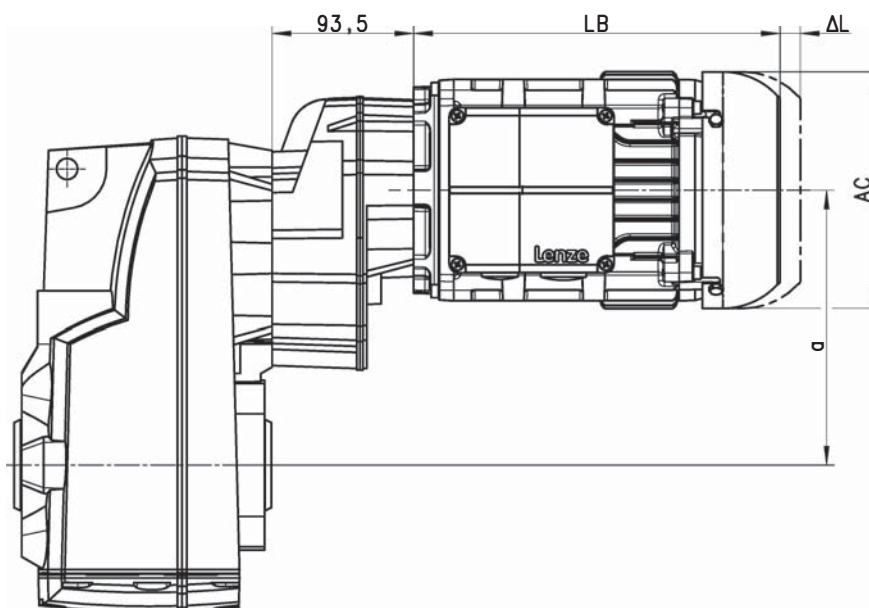


The geared motor dimensions can be found in the basic dimensions, except the total length "L" and the center distance "a".

► [Basic dimensions](#) 73

The total length "L" in the basic dimensions is extended by the 93.5 mm of the pre-stage.

Pay attention to the altered center distance "a" between the gearbox and motor shaft.



8801278-00

Gearboxes			S130	S220	S400	S660	S950	S2100	S3100	S4500
			3-stage	4-stage						
Center distance	a	mm	144	157	162	181	212	255	283	302

Additional lengths

Motors

Motor			m850-		
			S120/S3960 S120/M3960 S120/L3960	S140/S3240 S140/M3240 S140/L3240	S190/S3000 S190/M3000 S190/L2520
Spring-applied holding brake	Δ L	mm	46	53	68

Technical data

Weights
Basic weights



Weights

Basic weights



The basic weights are listed in the selection tables.

Weights with lubricant for mounting position M1, all data approximate values.
The exact values can be found in the delivery documents

► [Selection tables](#)  52

Observe ► [Additional weights](#)  106!

Additional weights

Gearboxes

Gearboxes			g500-S130	g500-S220	g500-S400	g500-S660
Solid shaft	m	kg	0.5	0.5	1.7	2.5
Shrink disc	m	kg	0.2	0.4	0.6	0.6
Foot	m	kg	1.7	1.8	3.3	4.3
Flange	m	kg	0.4	0.4	0.9	1.7
Torque plate						
Rubber buffers	m	kg	0.1	0.1	0.1	0.1
Shaft cover						
Shrink disc cover	m	kg	0.1	0.1	0.1	0.1

Gearboxes			g500-S950	g500-S2100	g500-S3100	g500-S4500
Solid shaft	m	kg	3.0	5.5	8.4	19.0
Shrink disc	m	kg	1.2	1.7	2.3	4.3
Foot	m	kg		-	-	-
Flange	m	kg	6.0	11.5	15.0	29.0
Torque plate						
Rubber buffers	m	kg	0.1	0.5	0.5	0.5
Shaft cover						
Shrink disc cover	m	kg	0.1	0.2	0.3	0.4

Motors

Motor			m850-		
			S120/S3960 S120/M3960 S120/L3960	S140/S3240 S140/M3240 S140/L3240	S190/S3000 S190/M3000 S190/L2520
Spring-applied holding brake	m	kg	2.0	3.0	6.7



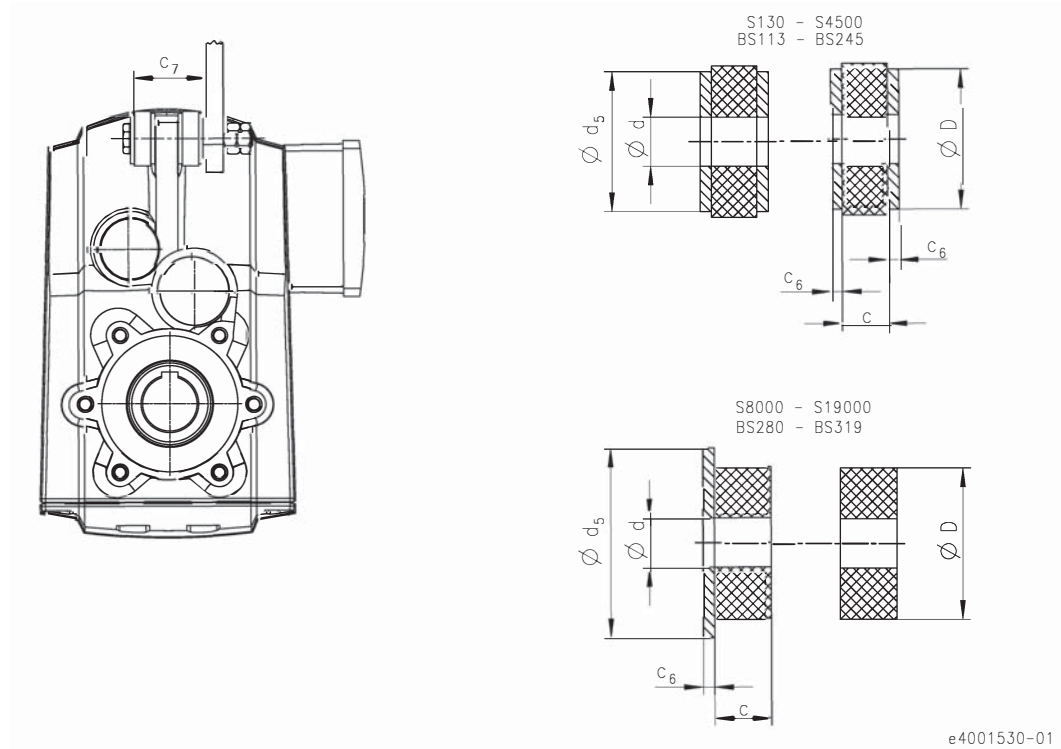
Product extensions

Torque plates

Torque support is usually provided by means of the foot or flange.

The integrated torque plate is another simple possibility. In this case, torque support is provided only via one point and is suitable for shaft-mounted gearboxes, among other things. Moreover, suitable rubber buffers ensure stress-free installation and absorb any slight impacts.

Rubber buffer for torque plate



Gearboxes	Dimensions					
	d	D	d ₅	c	c ₆	c ₇
	mm	mm	mm	mm	mm	mm
g500-S130	11.0	30.0	30	12.0	2.50	45.0
g500-S220	11.0	30.0	30	12.0	2.50	45.0
g500-S400	13.0	40,0	37	12.0	3.00	49.0
g500-S660	13.0	40,0	37	12.0	3.00	52.0
g500-S950	13.0	40,0	37	12.0	3.00	56.0
g500-S2100	17.0	50.0	50	24.0	3.00	85.0
g500-S3100	21.0	60.0	60	24.0	4.00	94.0
g500-S4500	26.0	72.0	72	24.0	5.00	98.0

Product extensions

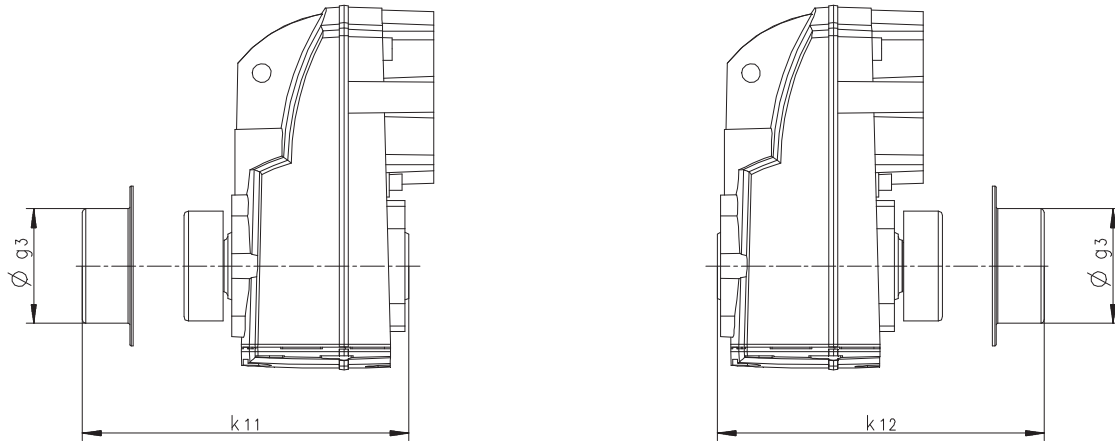
Shaft covers



Shaft covers

The shrink disc cover is provided for the shrink disc to be protected from contact.

Shrink disc cover



Gearboxes	Dimensions		
	G_3	k_{11}	k_{12}
	mm	mm	mm
g500-S130	63.0	132	132
g500-S220	76.0	152	152
g500-S400	90.0	182	182
g500-S660	90.0	200	202
g500-S950	110	219	219
g500-S2100	127	252	252
g500-S3100	155	290	290
g500-S4500	188	355	357



Motor connection

Connection via ICN connector

The electrical connection to the servo motors as a standard is established via ICN connectors.

The connection is made via two plug connectors, one for power and brake and one for feedback and temperature monitoring. Alternatively, Lenze offers One Cable Technology (OCT).

The connectors can be rotated by 270 ° and are provided with a bayonet catch. Since the catch of the connector is also compatible with conventional box nuts, existing mating connectors with a screw plug can continue to be used without any problems.



In order to provide for a quick and error-free connection of Lenze motors to Lenze inverters, we recommend using prefabricated Lenze system cables.

One Cable Technology (OCT)

With the aid of the open motor feedback protocol HIPERFACE DSL® and the digital absolute value encoders, the motor supports the future-oriented One Cable Technology (OCT).

Advantages

- All necessary wiring is done in only one connector.
- The use of hybrid cables allows for combined servo and feedback cables.
- This intelligently minimizes connecting cables, cable variants, and connection costs.
- The motor temperature is transmitted digitally together with the encoder signal. An additional connection for a motor temperature sensor is not required.
- Speed-dependent safety functions can be implemented by using the safety-rated absolute value encoder.



Pre-assembled hybrid cables for single-cable technology (OCT) can be found at the end of this chapter.

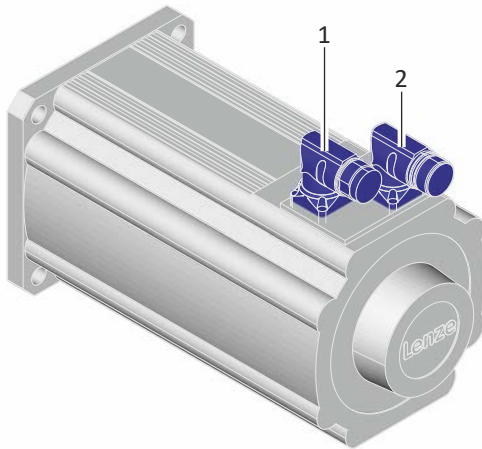
Product extensions

Motor connection
Connection via ICN connector

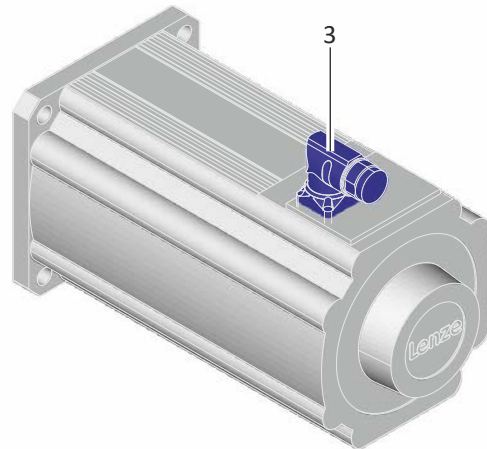


Position of the connections

Standard connection



One Cable Technology (OCT)



Position	Meaning	Position	Meaning
1	ICN-M23 connector, 6-pole ICN-M40 connector, 8-pole • Power connection • Brake connection • PE connection	3	For One Cable Technology (OCT) ICN-M23 connector, hybrid ICN-M40 connector, hybrid • Power connection • Brake connection • PE connection • Connection of digital absolute value encoder • Connection of temperature monitoring
2	ICN-M23 connector • Feedback connection • Connection of temperature monitoring		

Motor/ICN connector assignment

Standard connection: Power and brake					
One Cable Technology (OCT): Power connection, brake, feedback and temperature monitoring					
Motor	Connector	Motor	Connector	Motor	Connector
m850-S120/S3960	ICN-M23	m850-S140/S3240	ICN-M23	m850-S190/S3000	ICN-M23
m850-S120/M3960	ICN-M23	m850-S140/M3240	ICN-M23	m850-S190/M3000	ICN-M40
m850-S120/L3960	ICN-M23	m850-S140/L3240	ICN-M40	m850-S190/L2520	ICN-M40



Product extensions

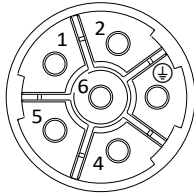
Motor connection
Connection via ICN connector

Standard connection

Connection of power and brake

ICN-M23 connector assignment

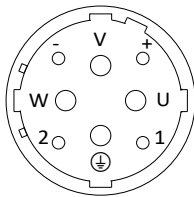
6-pole



ICN M23 6-pole		
Contact	Name	Meaning
PE	PE	PE conductor
1	BD1	DC +/-AC brake
2	BD2	DC -/AC brake
4	U	Power phase U
5	V	Power phase V
6	W	Power phase W

ICN-M40 connector assignment

8-pole



ICN M40 8-pole		
Contact	Name	Meaning
+	BD1	Holding brake +
-	BD2	Holding brake -
PE	PE	PE conductor
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
1		Not assigned
2		Not assigned

Product extensions

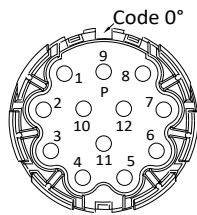
Motor connection
Connection via ICN connector



Feedback and temperature monitoring connection

ICN-M23 connector assignment

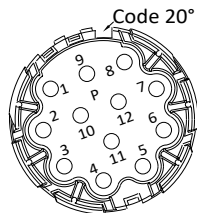
Resolver



ICN M23 for resolvers		
Contact	Name	Meaning
1	+Ref	Transformer windings
2	-Ref	Transformer windings
3	+VCC ETS	Supply: Electronic nameplate (Only for motors and inverters that support this function)
4	+COS	Cosine stator windings
5	-COS	Cosine stator windings
6	+SIN	Sine stator windings
7	-SIN	Sine stator windings
8		Not assigned
9		Not assigned
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000

ICN-M23 connector assignment

Incremental and SinCos absolute value encoder Hiperface©



ICN M23 for incremental and SinCos absolute value encoder Hiperface		
Contact	Name	Meaning
1	B	Track B / +SIN
2	A ⁻	Track A inverse /-COS
3	A	Track A / + COS
4	+UB	Supply +
5	GND	Mass
6	Z ⁻	Zero track inverse /-RS485
7	Z	Zero track / + RS485
8		Not assigned
9	B ⁻	Track B inverse/-SIN
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000



Product extensions

Motor connection
Connection via ICN connector

Motor/connector assignment

NOTICE

When making your selection, the motor data and permissible currents of the cables according to the system cable system manual must be observed.

Power terminal connectors

Motor code		m850-				
		S120/S3960	S120/M3960	S120/L3960	S140/S3240	S140/M3240
Plug		ICN-M23 6-pole				
Motor cable	mm ²	1.0/1.5/2.5				
Screw plug						
Order code		EWS0001				
Coding in the system cable type code		M01				
Bayonet lock						
Order code		EWS1001				
Coding in the system cable type code		M04				

Motor code		m850-				
		S140/L3240		S190/S3000	S190/M3000	S190/L2520
Plug		ICN-M40 8-pole		ICN-M23 6-pole	ICN-M40 8-pole	
Motor cable	mm ²	2.5/4.0	6.0/10/16	1.0/1.5/2.5	6.0/10/16	
Screw plug						
Order code		EWS0012	EWS0013	EWS0001	EWS0013	
Coding in the system cable type code		M02	M03	M01	M03	
Bayonet lock						
Order code		EWS1012	EWS1013	EWS1001	EWS1013	
Coding in the system cable type code		M05	M06	M04	M06	

Feedback connectors

Feedback	Resolver	SinCos absolute value Hiperface
Plug	ICN-M23	ICN-M23
Screw plug		
Order code	EWS0006	EWS0010
Coding in the system cable type code	F01	F02
Bayonet lock		
Order code	EWS1006	EWS1010
Coding in the system cable type code	F05	F06

Product extensions

Motor connection
Connection via ICN connector

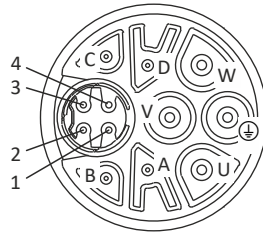


One Cable Technology (OCT)

Connection of power, brake, feedback and temperature monitoring

ICN-M23 connector assignment, hybrid

For One Cable Technology (OCT) with digital absolute value encoder



ICN M23 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Contact	Name	Meaning
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
PE	PE	PE
A	BD1	Holding brake +
B	BD2	Holding brake -
C	+	Optional temperature monitoring: PTC +
D	-	Optional temperature monitoring: PTC -
1		Not assigned
2	+	VCC/data +
3	-	GND/data -
4		Not assigned

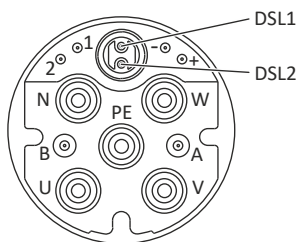


Product extensions

Motor connection
Connection via ICN connector

ICN-M40 connector assignment, hybrid

For One Cable Technology (OCT) with digital absolute value encoder



ICN M40 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Contact	Name	Meaning
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
A	BD1	Holding brake +
B	BD2	Holding brake -
PE	PE	PE
N		Not assigned
DSL1	+	VCC/data +
DSL2	-	GND/data -
+		Not assigned
-		Not assigned
1	+	Optional temperature monitoring: PTC +
2	-	Optional temperature monitoring: PTC -

Product extensions

Motor connection
Connection via ICN connector



Hybrid cables for One Cable Technology (OCT)

Connector with bayonet lock	ICN-M23 Hybrid
Order code for hybrid cable 1.5 mm ²	
Cable length 2.0 m	EYP0080A0020M11A00
Cable length 3.5 m	EYP0080A0035M11A00
Cable length 5.0 m	EYP0080A0050M11A00
Cable length 7.5 m	EYP0080A0075M11A00
Cable length 10 m	EYP0080A0100M11A00
Cable length 15 m	EYP0080A0150M11A00
Cable length 20 m	EYP0080A0200M11A00
Cable length 50 m	EYP0080A0500M11A00
Cable length 100 m	EYP0080A1000M11A00
Order code for hybrid cable 2.5 mm ²	
Cable length 2.0 m	EYP0081A0020M11A00
Cable length 3.5 m	EYP0081A0035M11A00
Cable length 5.0 m	EYP0081A0050M11A00
Cable length 7.5 m	EYP0081A0075M11A00
Cable length 10 m	EYP0081A0100M11A00
Cable length 15 m	EYP0081A0150M11A00
Cable length 20 m	EYP0081A0200M11A00
Connector with bayonet lock	ICN-M40 Hybrid
Order code for hybrid cable 4.0 mm ²	
Cable length 2.0 m	EYP0085A0020M12A00
Cable length 3.5 m	EYP0085A0035M12A00
Cable length 5.0 m	EYP0085A0050M12A00
Cable length 7.5 m	EYP0085A0075M12A00
Cable length 10 m	EYP0085A0100M12A00
Cable length 15 m	EYP0085A0150M12A00
Cable length 20 m	EYP0085A0200M12A00
Cable length 50 m	EYP0085A0500M12A00
Cable length 100 m	EYP0085A1000M12A00
Order code for hybrid cable 6.0 mm ²	
Cable length 2.0 m	EYP0086A0020M12A00
Cable length 3.5 m	EYP0086A0035M12A00
Cable length 5.0 m	EYP0086A0050M12A00
Cable length 7.5 m	EYP0086A0075M12A00
Cable length 10 m	EYP0086A0100M12A00
Cable length 15 m	EYP0086A0150M12A00
Cable length 20 m	EYP0086A0200M12A00
Cable length 50 m	EYP0086A0500M12A00
Cable length 100 m	EYP0086A1000M12A00



Brakes

⚠ CAUTION!

They may not be used as safety elements (particularly with hoist axes) without additional measures being implemented.

The brakes used are not fail-safe brakes in the sense that prospective disruptive factors, e.g. oil ingress, can lead to a reduction in torque!

- ▶ The brakes must only be used as holding brakes for holding the axes at a standstill or in the deenergised state.
- ▶ The brake must not be used as a service brake.

⚠ CAUTION!

If no suitable voltage (incorrect value, incorrect polarity) is applied to the brake, the brake will be applied and can be overheated and destroyed by the motor continuing to rotate.

Motor supply cables

If long motor supply cables are used, pay attention to the ohmic voltage drop along the cable and compensate for it with a higher voltage at the input end of the cable.

The following applies to Lenz system cables:

$U[V] = U_B[V] + 0.08 \frac{[V]}{[A] \times [m]} \times I_{Lg}[m] \times I_B[A]$	U	V	Resulting supply voltage
	U_B	V	Rated voltage of the brake
	I_{Lg}	m	Cable length
	I_B	A	Rated current of the brake

NOTICE

- ▶ The brakes become active when the supply voltage has been switched off (closed-circuit principle).
- ▶ When using the brakes purely as holding brakes, virtually no wear occurs on the friction surfaces.
- ▶ The friction surfaces must always be free from oil and grease because even small amounts of grease or oil will considerably reduce the braking torque.

NOTICE

In case of travel axes, the compliance of the permissible ratio of mass inertia load/brake motor (J_L/J_{MB}) ensures that the permissible maximum switching energy of the brake will not be exceeded and at least the values given for the emergency stop functions from the given speed (see rated data) are applied.

For hoist axes, the load torque resulting from the weight acts additionally. In this case, the specifications for (J_L/J_{MB}) do not apply.

Product extensions

Brakes



To simplify matters, the friction energy per switching cycle can be calculated using the formula below and must not exceed the limit value for emergency stops, which depends on the switching rate:

$Q = \frac{1}{2} \times J_{ges} \times \left(2\pi \times \frac{\Delta n}{60} \right)^2 \times \frac{M_N}{M_N - M_L}$	Q	J	Friction energy
	J_{total}	kgm ²	Total mass inertia (motor + load)
	Δn	rpm	Differential speed
	M_N	Nm	Rated torque of the brake
	M_L	nM	Load torque



The shortest operating times of the brakes are achieved by DC switching of the voltage and an external suppressor circuit (varistor or spark suppressor).

Without suppressor circuit, the operating times may increase. A varistor/ spark suppressor limits the breaking voltage peaks. It must be ensured that the power limit of the suppressor circuit is not exceeded. This limit depends on the brake current, brake voltage, disengagement time and the switching operations per time unit.

Furthermore the suppressor circuit is necessary for interference suppression and for increasing the service life of the relay contacts (external, is not integrated into the motor).



It is not possible to readjust the brake.



Spring-applied brakes

Rated data

NOTICE

Engagement and disengagement times apply to rated voltage ($\pm 0\%$) and suppressor circuit of the brakes with a varistor with DC switching. Without a suppressor circuit, the times may be longer.

The currents are the maximum values when the brake is cold (value used for dimensioning the current supply). The values for a motor at operating temperature are considerably lower.

Requirements with regard to the DC 24 V brake: smoothed DC voltage, ripple $\leq 1\%$.

Maximum switching energy for each emergency stop with $n = 3000$ rpm for a maximum of 3-6 emergency stops per hour.

Motor			m850-S120/ S3960	m850-S120/ M3960	m850-S120/ L3960	m850-S140/ S3240	m850-S140/ M3240	m850-S140/ L3240
Supply voltage range	V _{in}	V	21.6 ... 26.4					
Supply voltage	V _{rated}	V	24					
Bemessungsdrehmoment								
At 20 °C	M _{rated}	Nm	20			34		
At 120 °C	M _{rated}	Nm	18			32		
Rated current	I _{rated}	A	1.2			1.4		
Engagement time t1	t ₁	ms	30			50		
Disengagement time t2	t ₂	ms	110			150		
Friction energy	Q _E	kJ	3.1					
Weight	m	kg	2.0			3.0		
Massenträgheitsmoment								
Brake	J	kgcm ²	0.75			2.01		
Brake motor	J _{MB}	kgcm ²	7.5	13.3	19.2	18.1	32.5	46.9
Load/brake motor ratio	J _L /J _{MB}		74	47	32	34	19	13

Motor			m850-S190/S3000	m850-S190/M3000	m850-S190/L2520
Supply voltage range	V _{in}	V	21.6 ... 26.4		
Supply voltage	V _{rated}	V	24		
Bemessungsdrehmoment					
At 20 °C	M _{rated}	Nm	102		
At 120 °C	M _{rated}	Nm	100		
Rated current	I _{rated}	A	2.1		
Engagement time t1	t ₁	ms	40		
Disengagement time t2	t ₂	ms	230		
Friction energy	Q _E	kJ	5.7		
Weight	m	kg	6.70		
Massenträgheitsmoment					
Brake	J	kgcm ²	10.42		
Brake motor	J _{MB}	kgcm ²	72.6	128.9	204.3
Load/brake motor ratio	J _L /J _{MB}		15	8	5



Feedback

For speed control with a servo inverter, the servo motor can be equipped with the following feedback systems:

Inverter	Feedback without functional safety		
	Resolver	Absolute value encoder	Digital absolute value encoder for OCT
i950 servo inverter	RS0	AM128-8V-H	AM20-8V-D
i700 servo inverter	RS0	AM128-8V-H	-
8400 TopLine inverter drives	RS0	AM128-8V-H	-
9400 HighLine servo drives	RS0	AM128-8V-H	-

Inverter	Feedback with functional safety		
	Resolver	Absolute value encoder	Digital absolute value encoder for OCT
i950 servo inverter	RV03	AM128-8V-K2	AM20-8V-D2
9400 HighLine servo drives	RV03	AM128-8V-K2	-

Feedbacks in the environment of functional safety

Motors can perform speed-dependent safety functions for safe speed and/or safe relative position monitoring in a drive system by Lenze inverters or Controllers. In case of inverters, these functions are implemented by integrable safety modules and in case of Controllers by the additionally required Safety Controller.

When planning systems/installations of this kind, always observe the following:

- When using just one single feedback system in the environment of these safety applications, the applicable safety engineering standard EN 61800-5-2 (adjustable speed electrical power drive systems - Part: 5-2: Safety requirements - Functional) stipulates special requirements for the connection between feedback system and motor shaft.
- This is due to the fact that two-channel safety systems at this point in the mechanical system are actually designed as single-channel systems. If this mechanical connection is designed with considerable overdimensioning, the standard permits exclusion of the fault "encoder-shaft breakage" or "encoder-shaft slip". As such, the permissible angular acceleration limit values must not be exceeded for the individual drive solutions.

You can find the limit values in the corresponding feedback data of the individual motor ranges.

Speed-dependent safety functions

Examples of speed-dependent safety functions:

- Safe stop 1 (SS1)
- Safe operational stop (SOS)
- Safely limited speed (SLS)
- Safe maximum speed (SMS)
- Safe direction (SDI)
- Operation mode selector (OMS) with confirmation (ES)
- Safe speed monitor (SSM)
- Safely limited increment (SLI)



Resolver

The stator-supplied, 2-pole resolver with two stator windings shifted by 90 degrees and a rotor winding with a transformer winding can record both the speed and the rotor position, just like a single-turn absolute value encoder. The rotor position can be determined within one mechanical motor revolution after a voltage failure.

Feedback type			Resolver	
Feedback			RS0	RV03
Speed-dependent safety functions			No	Yes
Design			Mounting	
Resolution - angle		'	0.8	0.8
Min. accuracy		'	-10	-10
Max. accuracy		'	10	10
Absolute positioning			1 revolution	1 revolution
Max. speed	$n_{\max}$	rpm	8000	8000
Max. DC input voltage	$V_{\text{in,max}}$	V	10	10
Max. input frequency	$f_{\text{in,max}}$	kHz	4	4
Ratio stator/rotor			0.3	0.3
Min ratio tolerance		%	-5	-5
Max ratio tolerance		%	5	5
Rotor impedance	Z_{ro}	Ω	51+j90	51+j90
Stator impedance	Z_{so}	Ω	102+j150	102+j150
Impedance	Z_{rs}	Ω	44+j76	44+j76
Min. insulation resistance at DC 500 V	R_{min}	M Ω	10	10
Number of pole pairs			1	1
Max. angle error Min		'	-10	-10
Max. angle error Max		'	10	10

Speed-dependent safety functions

Feedback			RV03
Max. permissible angular acceleration	α	rad/s ²	19000
Functional safety			
IEC 61508			SIL3
EN 13849-1			Up to Performance Level e

Product extensions

Feedback
Absolute value encoder



Absolute value encoder

Absolute value encoders can detect the speed, the rotor position, and the machine position with a very high resolution. They are used for the positioning of dynamic applications and do not require homing.



With the aid of the open feedback protocol HIPERFACE DSL® and in connection with the digital absolute value encoder AM20-8V-D, the motor supports the future-oriented One Cable Technology (OCT).

Feedback type			Digital absolute value encoder		SinCos absolute value encoder	
Feedback			AM20-8V-D	AM20-8V-D2	AM128-8V-H	AM128-8V-K2
Speed-dependent safety functions			No	Yes	No	Yes
Design			Mounting	Mounting	Mounting	Mounting
Encoder type			Multi-turn	Multi-turn	Multi-turn	Multi-turn
Resolution		bit	20	20	-	-
Pulses			-	-	128	128
Output signals			Digital	Digital	SinCos 1 Vss	SinCos 1 Vss
Interfaces			Hiperface	Hiperface	Hiperface	Hiperface
Absolute revolution			4096	4096	4096	4096
Resolution - angle			0.02	0.02	0.4	0.4
Min. accuracy		'	-	-	-1.3	-1.3
Max. accuracy		'	-	-	1.3	1.3
Fehlergrenze Positionswert						
System accuracy			1.7	1.7	-	-
Integral nonlinearity			1	1	-	-
Min. DC input voltage	$V_{in,min}$	V	-	-	7	7
Max. DC input voltage	$V_{in,max}$	V	-	-	12	12
Max. current consumption	I_{max}	A	0.15	0.15	0.06	0.06
Limit frequency	f_{max}	kHz	-	-	200	200

Speed-dependent safety functions

Feedback			AM20-8V-D2	AM128-8V-K2
Max. permissible angular acceleration	α	rad/s ²	240000	240000
Functional safety				
IEC 61508			SIL2	
EN 13849-1			Up to Performance Level d	



Temperature monitoring

Thermal detectors PT1000

The thermal detector used continuously monitors the motor temperature. The temperature information is transferred to the inverter using the system cable of the feedback system. **This is not a full motor protection!**

This makes it possible to determine the motor temperature in the permissible operating range with great accuracy.

The thermal sensors used continuously monitor the motor temperature. The temperature information is transferred to the inverter using the system cable of the feedback system. **This is not a full motor protection!**

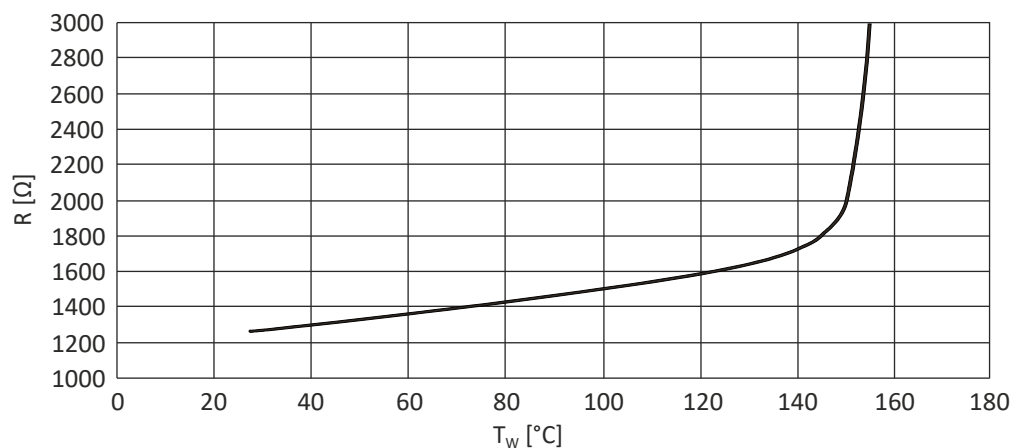
The motors are monitored via three thermal sensors connected in series (1x PT1000 + 2x PTC 150 °C). This makes it possible to determine the motor temperature in the permissible operating range and at the same time execute the overtemperature response configured in the inverter in one of the winding strands.



The three thermal sensors connected in series are identified on the nameplate by the short designation "PT1k+2PTC".



When supplying the thermal sensors with a measurement current of 1 mA, the connection between the temperature and the resistance measured applies.



R Resistance
 T_w Winding temperature



Product codes

Gearbox product code

Example		G	50	B	S	113	M	H	D	R	2	C	1B
Product type	Gearbox	G											
Product family			50										
Version				B									
Gearbox type	Shaft-mounted helical gearbox				S								
Output torque	130 Nm					113							
	220 Nm					122							
	400 Nm					140							
	660 Nm					166							
	950 Nm					195							
	2100 Nm					221							
	3100 Nm					231							
	4500 Nm					245							
	8000 Nm					280							
	14000 Nm					314							
	19000 Nm					319							
Type of construction	Geared motor						M						
	Gearbox						N						
Shaft design	Solid shaft with featherkey							V					
	Hollow shaft with keyway							H					
	Hollow shaft with shrink disc							S					
Housing type	Foot mounting + centering								A				
	Foot mounting								B				
	With centering								C				
	Threaded pitch circle								D				
Flange mounting	Without flange									R			
	Flange with through holes									K			
Number of stages	2-stage										2		
	3-stage										3		
	4-stage										4		
Motor mounting	Integrated motor											C	
	IEC adapter with jaw coupling											N	
	IEC adapter with plug-in hollow shaft											T	
	NEMA adapter with jaw coupling											H	
	NEMA adapter with plug-in hollow shaft											A	
	Servo motor adapter with plug-in hollow shaft											B	
	Servo motor adapter with jaw coupling											S	
Drive size												E	
												D	
												G	
													1A ... □H 08 ... 82



Product code of m850 synchronous servo motor

Example		M	8	5	A	S	120	S	25	5	S	0	R	C	C	0
Meaning	Variant	Product code														
Portfolio segment		M														
Product family	8		8													
Product level	5			5												
Product generation	1				A											
Product type	Synchronous servo motor					S										
Flange height	120						120									
	140						140									
	190						190									
Motor length	Short							S								
	Medium							M								
	Long							L								
Speed	25 x 100 rpm								25							
	30 x 100 rpm								30							
	32 x 100 rpm								32							
	40 x 100 rpm								40							
Degree of protection	IP5x								5							
	IP6x								6							
Cooling	No cooling									S						
Brake attachment	No brake											0				
	Spring-applied brake											F				
	Permanent magnet brake											P				
Encoder mounting	Resolver												R			
	Absolute value encoder												A			
	Digital absolute value encoder												D			
	Hiperface DSL®															
Product approval	CE													C		
	CE; cULus													L		
Manufacturer	Lenze														C	
Internal key																0

Motor data

Rated data

Inverter mains connection 400 V, Self-ventilated motors



Motor data

Rated data

Inverter mains connection 400 V, Self-ventilated motors

Motor			m850-S120/ S3960	m850-S120/ M3960	m850-S120/ L3960	m850-S140/ S3240	m850-S140/ M3240	m850-S140/ L3240
Standstill torque	M_0	Nm	6.50	11.0	15.0	11.0	21.0	28.0
Rated torque	M_{rated}	Nm	4.80	7.40	9.00	8.50	14.0	17.4
Max. torque	M_{max}	Nm	14.5	29.0	44.0	26.0	53.5	80.0
Rated speed	n_{rated}	rpm	3960	3960	3960	3240	3240	3240
Max. speed	n_{max}	rpm	6000	6000	6000	6000	6000	6000
Rated power	P_{rated}	kW	2	3.1	3.7	2.9	4.8	5.9
Standstill current	I_0	A	5.50	8.80	12.1	7.40	14.0	18.0
Rated current	I_{rated}	A	4.30	6.40	7.80	6.30	10.0	12.2
Max. current	I_{max}	A	15.0	28.0	42.0	23.0	45.5	66.0
Rated voltage	V_{rated}	V	330	330	320	340	330	330
Rated frequency	f_{rated}	Hz	330	330	330	270	270	270
Moment of inertia	J	kgcm ²	6.50	12.4	18.2	15.7	30.1	44.6
Efficiency	η		0.902	0.914	0.914	0.879	0.915	0.926
Torque constant	$K_{t0\ 150}$ °C	Nm/A	1.18	1.25	1.24	1.49	1.50	1.56
Voltage constant	$K_{E\ LL\ 150}$ °C	V/ (1000/ min)	68.99	73.1	72.93	86.81	88.36	90.67
Stator terminal resistance	$R_{UV\ 20}$ °C	Ω	2.24	1.02	0.63	1.436	0.562	0.366
Stator terminal resistance	$R_{UV\ 150}$ °C	Ω	3.376	1.537	0.949	2.164	0.847	0.552
Stator inductance	L	mH	11.5	6.73	4.58	9.90	5.22	3.76
Weight	m	kg	6.5	9.25	12.0	9.50	14.5	19.5



Motor data

Rated data
Inverter mains connection 400 V, Self-ventilated motors

Motor			m850-S190/S3000	m850-S190/M3000	m850-S190/L2520
Standstill torque	M_0	Nm	27.0	46.0	67.0
Rated torque	M_{rated}	Nm	16.0	24.0	35.0
Max. torque	M_{max}	Nm	71.0	120	200
Rated speed	n_{rated}	rpm	3000	3000	2520
Max. speed	n_{max}	rpm	4500	4500	4500
Rated power	P_{rated}	kW	5	7.5	9.2
Standstill current	I_0	A	16.0	26.8	30.8
Rated current	I_{rated}	A	10.3	15.4	17.7
Max. current	I_{max}	A	64.0	87.0	112
Rated voltage	V_{rated}	V	340	330	345
Rated frequency	f_{rated}	Hz	250	250	210
Moment of inertia	J	kgcm ²	60.8	117	193
Efficiency	η		0.905	0.919	0.929
Torque constant	$K_{t_{0\ 150}}$ °C	Nm/A	1.69	1.72	2.18
Voltage constant	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	99.24	101.13	124.86
Stator terminal resistance	$R_{UV\ 20}$ °C	Ω	0.452	0.196	0.16
Stator terminal resistance	$R_{UV\ 150}$ °C	Ω	0.681	0.295	0.241
Stator inductance	L	mH	5.46	2.90	2.76
Weight	m	kg	19.8	28.5	41.0



Torque characteristics



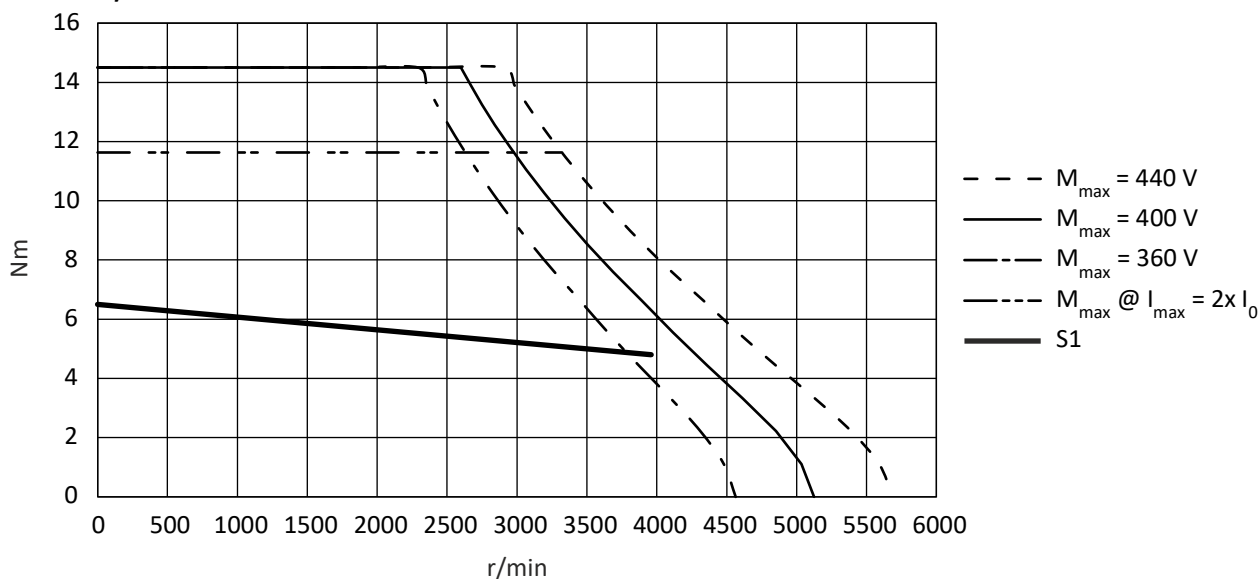
The torque/speed characteristic for your motor/inverter combination can be found on the Internet:

<http://www.lenze.com> → Product Finder → M-n characteristics

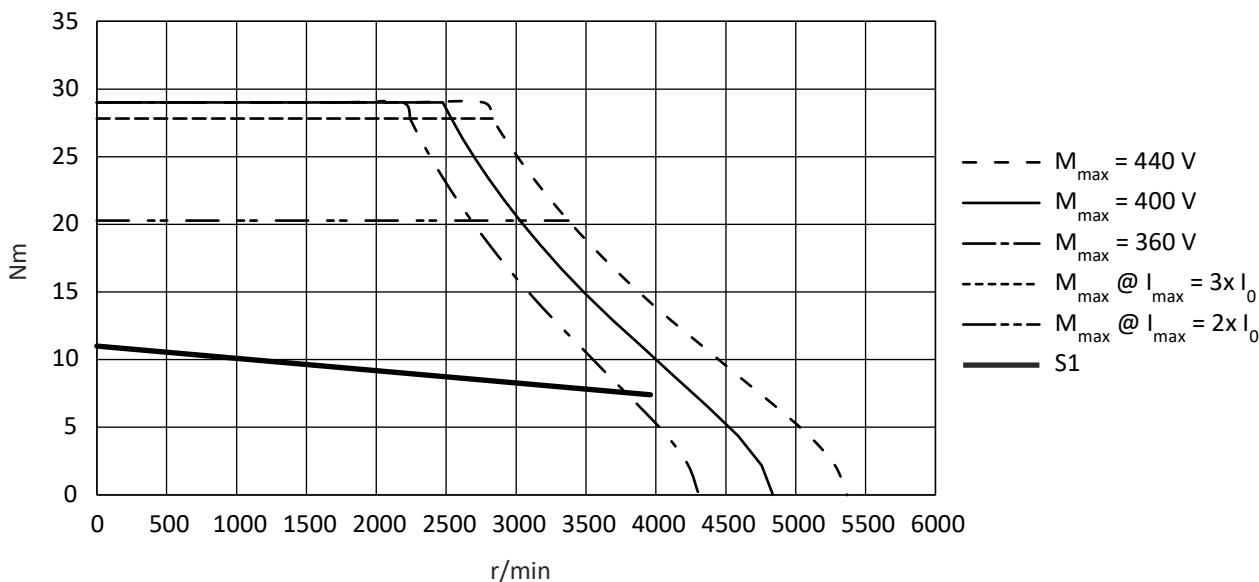


The following data apply to a mains voltage 3 x 400 V of the inverter.

m850-S120/S3960



m850-S120/M3960

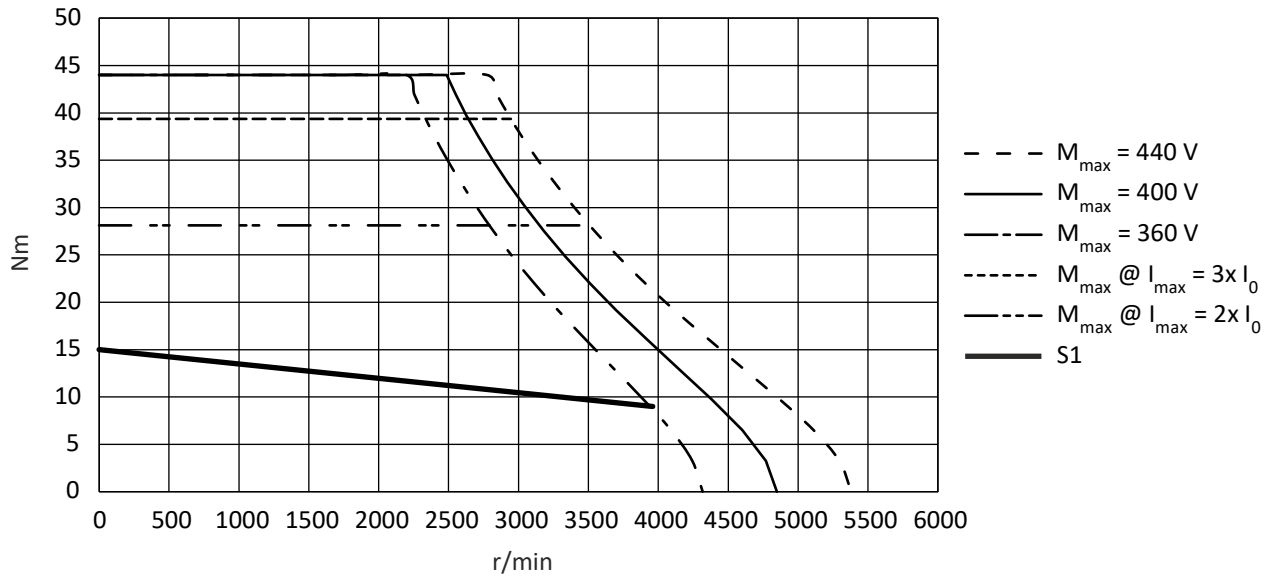




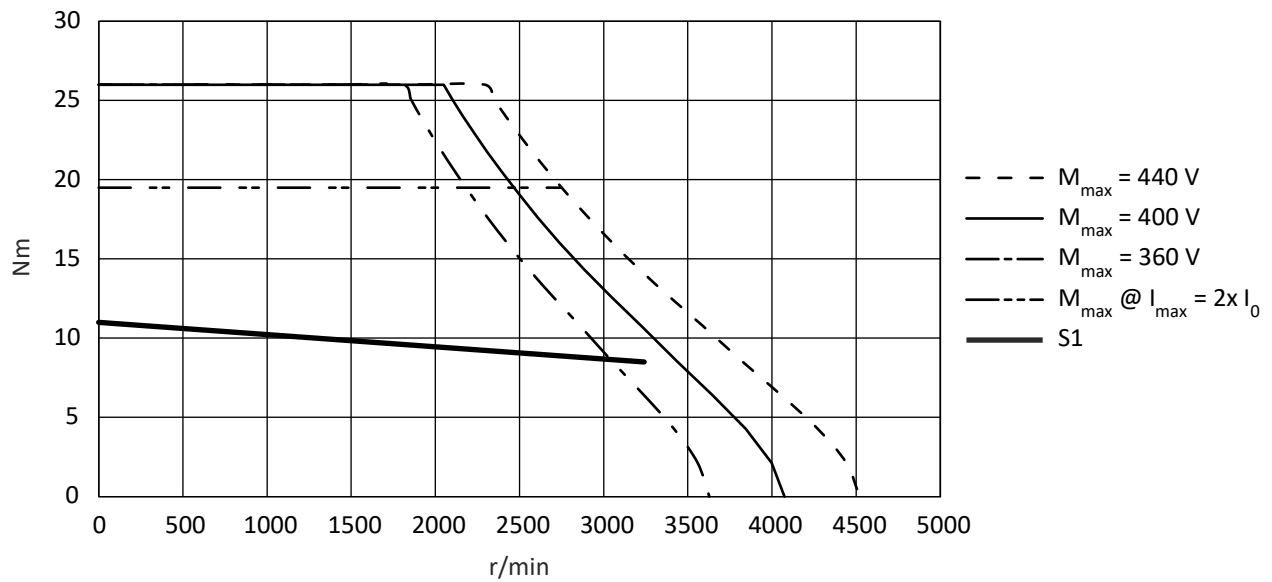
Motor data

Torque characteristics

m850-S120/L3960

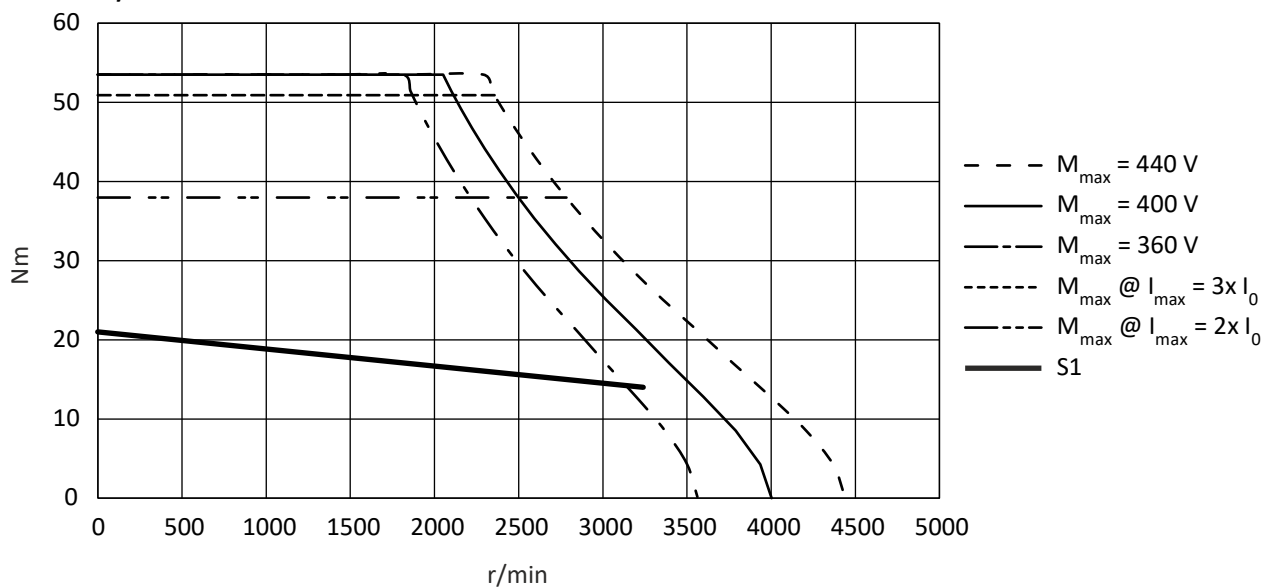


m850-S140/S3240

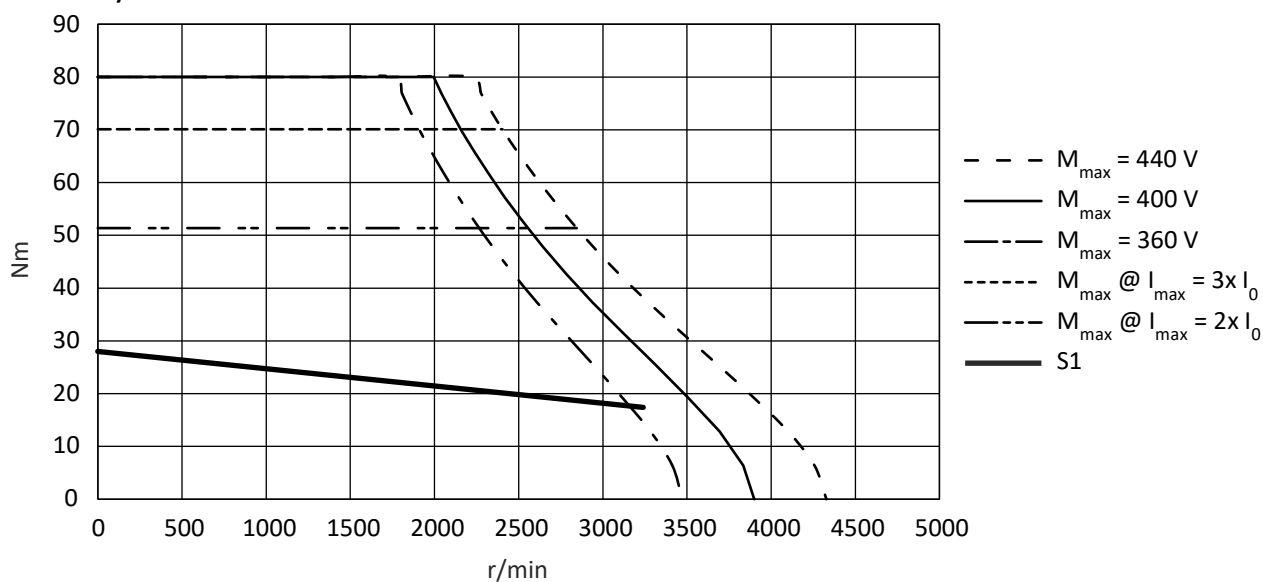




m850-S140/M3240



m850-S140/L3240

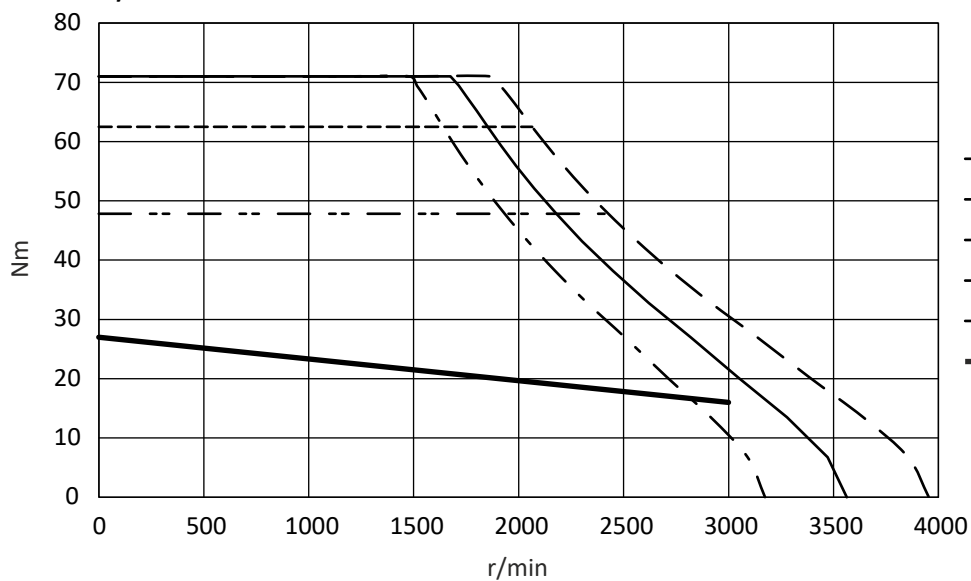




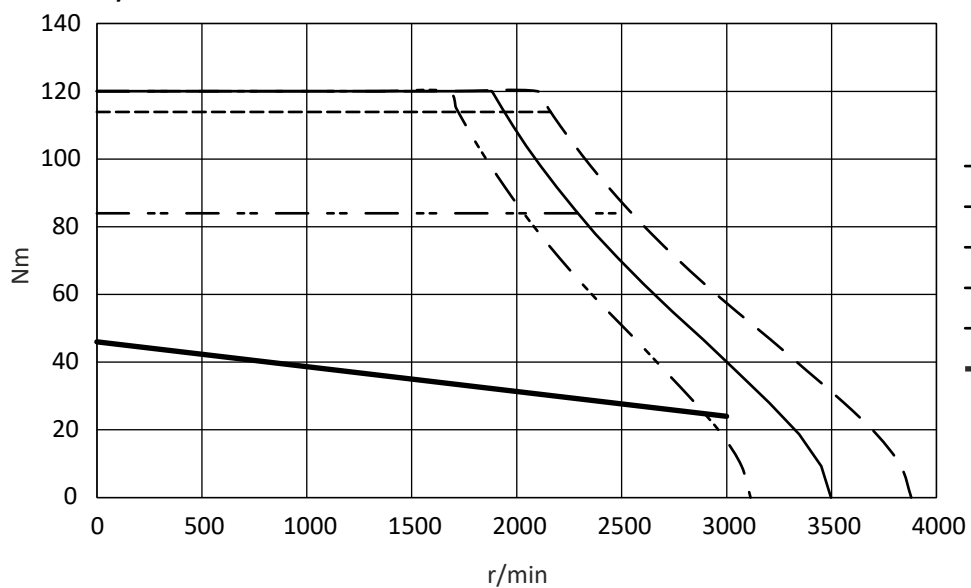
Motor data

Torque characteristics

m850-S190/S3000

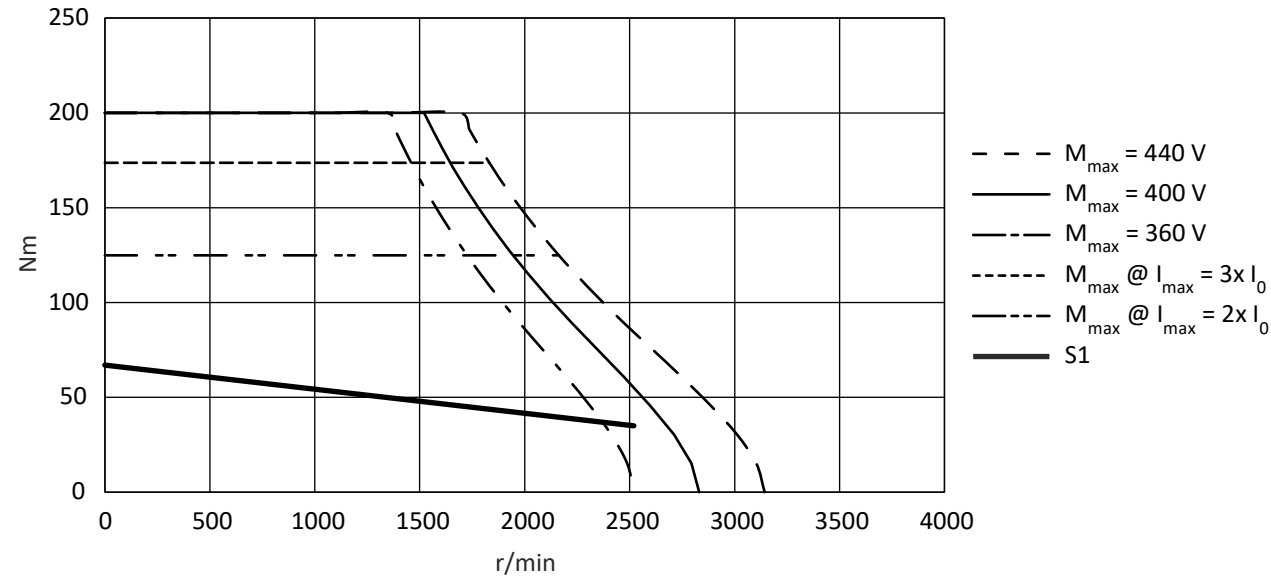


m850-S190/M3000





m850-S190/L2520





Environmental notes and recycling

Lenze has been certified to the worldwide environmental management standard for many years (DIN EN ISO 14001). As part of our environmental policy and the associated climate responsibility, please note the following information on hazardous ingredients and the recycling of Lenze products and their packaging:



Lenze products are partly subject to the EU Directive on the restriction of certain hazardous substances in electrical and electronic equipment 2011/65/EU: RoHS Directive [UKCA: S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012] . This is documented accordingly in the EU declaration of conformity and with the CE mark.



The crossed-out wheeled bin symbol is located on the equipment. This information indicates that used electrical and electronic products must not be disposed of with normal household waste.

The EU Directive 2012/19/EU: Directive on waste electrical and electronic equipment (WEEE) [UKCA: S.I. 2013/3113 - The Waste Electrical and Electronic Equipment Regulations 2013] , which has been transposed into national law by the respective EU member states, applies to the disposal of equipment. As a customer, you have the option of disposing of the electrical and electronic equipment that you have purchased from us and that is subject to WEEE via the Lenze branch in your country.

Lenze addresses in Europe: <https://www.lenze.com/en-de/company/global-presence>

Some Lenze products contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC: Battery Directive [UKCA: S.I. 2009/890 - The Waste Batteries and Accumulators Regulations 2009] . Any batteries/rechargeable batteries included are designed to last the life of the product and do not need to be replaced or otherwise removed by the end user.



Lenze products are usually sold with cardboard or plastic packaging. This packaging complies with EU Directive 94/62/EC: Directive on packaging and packaging waste [UKCA: S.I. 1997/648 - The Producer Responsibility Obligations (Packaging Waste) Regulations 1997] . The required disposal route is indicated by material-specific labels with the "recycling triangle". Example: "21 - other cardboard"

REACH

Lenze products are subject to REGULATION (EC) No 1907/2006: REACH Regulation [UKCA: S.I. 2008/2852 - The REACH Enforcement Regulations 2008] . When used as intended, exposure of substances to humans, animals and the environment is excluded.

Lenze products are industrial electrical and electronic products and are disposed of professionally. Both the mechanical and electrical components such as electric motors, gearboxes or inverters contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the highest possible level of recyclability is therefore important and sensible from an economic and ecological point of view.

- Coordinate professional disposal with your waste disposal company.
- Separate mechanical and electrical components, packaging, hazardous waste (e.g. gear oils) and batteries/rechargeable batteries wherever possible.
- Dispose of the separated waste in an environmentally sound and proper manner (no household waste or municipal bulky waste).

What?	Material	Disposal instructions
Pallets	Wood	Return to manufacturers, freight forwarders or reusable materials collection system
Packaging material	Paper, cardboard, pasteboard, plastics	Collect and dispose of separately
Products		
Electronic devices	Metal, plastics, circuit boards, heatsinks	As electronic waste give to professional disposer for recycling
Gearbox	Oil	Drain oil and dispose of separately
	Casting, steel, aluminium	Dispose as metal scrap
Motors	Casting, copper, rotors, magnets, potting compound	As engine scrap give to professional disposer for recycling
Dry-cell batteries/rechargeable batteries		As used batteries give to professional disposer for recycling



Further information on Lenze's environmental and climate responsibility and on the topic of energy efficiency can be found on the Internet:

www.Lenze.com → search word: "Sustainability"



Appendix

Good to know

Operating modes of the motor

In continuous operation a motor reaches its permissible temperature limit if it outputs the rated power dimensioned for continuous operation. However, if the motor is only subjected to load for a short time, the power output by the motor may be greater without the motor reaching its permissible temperature limit. This behaviour is referred to as overload capacity.

Depending on the duration of the load and the resulting temperature rise, the required motor can be selected reduced by the overload capacity.

Operating modes S1 ... S10 as specified by EN 60034-1 describe the basic stress of an electrical machine.

The most important operating modes

Continuous operation S1	Short-time operation S2
Operation with a constant load until the motor reaches the thermal steady state. The motor may be actuated continuously with its rated power.	Operation with constant load; however, the motor does not reach the thermal steady state. During the following standstill, the motor winding cools down to the ambient temperature again. The increase in power depends on the load duration.



Intermittent operation S3	Non-intermittent periodic operation S6
Sequence of identical duty cycles comprising operation with a constant load and subsequent standstill. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/downtime ratio.	Sequence of identical duty cycles comprising operation with a constant load and subsequent no-load operation. The motor cools down during the no-load phase. Start-up and braking processes do not have an impact on the winding temperature. The steady-state is not reached. The guide values apply to a cycle duration of 10 minutes. The power increase depends on the cycle duration and on the load period/idle time ratio.
P Power t Time t_L Idle time θ Temperature	P_v Power loss t_B Load period t_S Cycle duration

Enclosures

The protection class indicates the suitability of a product for specific ambient conditions with regard to humidity as well as the protection against contact and the ingress of foreign particles. The protection classes are classified in the EN 60034-5/ EN IEC 60529.

The first code number after the code letters IP indicates the protection against the ingress of foreign particles and dust. The second code number refers to the protection against the ingress of humidity.

Code number 1	Degree of protection	Code number 2	Degree of protection
0	No protection	0	No protection
1	Protection against the ingress of foreign particles $d > 50$ mm. No protection in case of deliberate access.	1	Protection against vertically dripping water (dripping water).
2	Protection against medium-sized foreign particles, $d > 12$ mm, keeping away fingers or the like.	2	Protection against diagonally falling water (dripping water), 15° compared to normal service position.
3	Protection against small foreign particles $d > 2.5$ mm. Keeping away tools, wires or the like.	3	Protection against spraying water, up to 60° from vertical.
4	Protection against granular foreign particles, $d > 1$ mm, keeping away tools, wire or the like.	4	Protection against spraying water from all directions.
5	Protection against dust deposits (dust-protected), complete protection against contact.	5	Protection against water jets from all directions.
6	Protection against the ingress of dust (dust-proof), complete protection against contact.	6	Protection against choppy seas or heavy water jets (flood protection).

Lenze SE
Postfach 101352 · 31763 Hameln
Hans-Lenze-Straße 1 · 31855 Aerzen
GERMANY
Hannover HRB 204803
Phone +49 5154 82-0
Fax +49 5154 82-2800
sales.de@lenze.com
www.Lenze.com