Geared motors for electric overhead conveyors

BM 01 E

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1 Geared motors for more efficient electric overhead conveyors

Bauer geared motors have been used in material handling for more than 20 years to drive electric overhead conveyors. The new BM (Bauer Monorail) series from Danfoss Bauer benefits from many years of experience in this demanding area. The size of drive required for the electric overhead conveyor (EHB) depends on the loads conveyed, the conveyor speed and the run of rail, i.e. if the rail has to negotiate any ascents or descents. Gross weights of 100 to 8000 kg can currently be conveyed by EHBs. The new overhead conveyor gear unit program offers four gear unit sizes with torques of approximately 50 to 680 Nm and permissible lateral forces of 4400 to 25000 N.

As a special feature, EHB gear units boast a mechanical clutch integrated into the gear unit to cut the power transmission. This enables the carriages to be moved by hand in the event of a malfunction or dragged using special drag conveyors within working or inclined sections of the rail. When the clutch is disengaged, no attempt need be made to overcome the backwards-acting torque of the gear unit.

1.1 Broad speed range required

An overhead rail is generally used for a conveyor system operated to fulfil its conveying duty at a given maximum speed. Speeds commonly used in the past have been between 20 and 90 m/min. However, applications running at 180 m/min have already been implemented. Positioning speeds are required to obtain a controlled approach to the target position, this calls for speeds between 3 m/min and 10 m/min depending on the particular application. Futhermore, defined rates of acceleration and deceleration have to be observed. The maximum permissible acceleration is defined by the frictional grip between the wheel and the rail – the running wheel must not be allowed to slip. Nowadays, drives are mostly run off frequency inverters so that the very slow speeds of approximately 1 m/min to 6 m/min standard in the working stretches can be achieved in spite of the high travelling speed and without the use of drag conveyors. Futhermore, the inverter always gives the best possible rates of acceleration and deceleration, whether at no load or full load and offers greater flexibility in terms of the maximum speed. Pole-changing motors with speed ratios of 4:1 or 6:1 can be used for simpler applications. The varying rates of acceleration caused by different load scenarios (with conveyed goods/without conveyed goods) can be evened out to a certain degree by using a heavy cast-iron fan.

1.2 Frame size gradation

A gradation in the frame sizes was the first stage in the development process. The gear unit size allocated to the particular weight class must provide the necessary torques and permissible lateral force loads on the output shaft. The majority of customers do not want a fine gradation in the frame sizes for reasons of standardization. VDI code of practice 3643 (C1 standard) must be observed in the case of small gear units designed for low loads. In addition, the distance from the centre of the output shaft to the lower edge of the gear unit (shaft height) on all gear unit sizes must correspond to the running wheel diameters in standard use.

1.3 Gear unit design

The next stage was to decide on which gear ratios to use. Angular gear is the only option since the drive should sit as tightly as possible against the carriage assembly. The linear speeds demanded can, by and large, be achieved with one-stage or two-stage reduction ratios. The table below lists the benefits and drawbacks of six different angular gear designs currently available on the market.

Comparison of gear unit designs:

	Principle	Level of efficiency	Suitability as a propulsion drive	Price	Speed range	Customer acceptance
1	Worm-gear	-	-	++	+	?
2	Flat worm-gear	-	-	++	+	?
3	***Worm/bevel-gear***	***+***	***+***	***+***	***++***	***+***
4	Helical/ worm-gear	0	-	+	++	?
5	***Helical/ bevel-gear***	***++***	***++***	***+***	***++***	***+***
6	Helical/bevel/ helical-gear	++	++	-	++	+

1.4 Worm-gear unit for the lower load range

Danfoss Bauer uses principle 3 for the first two gear unit sizes, BM09 and BM10, in the lower load range up to 2000 kg – worm for the first stage and helical for the second stage. The helical-gear stage uses special, very small reduction ratios with outstanding levels of efficiency that only slightly below those of bevel-gear units. This solution offers significantly better running characteristics than principles 1, 2 or 4 due to the greater level of efficiency. The level of efficiency of worm-gear units is heavily influenced by the speed and is at its best at high speeds, i.e. in the first stage. Worm-gear stages have therefore been avoided for the slow final stage. Principle 3 is more cost-effective than a solution which uses bevel-gear units. The price of the geared motor is a major factor for systems that convey smaller weights due to the cost pressures on the conveyor system manufacturer and the high number of components required. The new BM09 and BM10 gear units are reasonably priced and offer advanced technology. In addition, the new BM09 gear unit offers exactly the same reduction ratio and mounting dimensions as the SZ2-V3209, which has sold in its thousands for many years. The continuity of system expansions is thus ensured.

1.5 Bevel-gear units for large loads

The market situation looks a little different for the large load range, i.e. up to 2 tonnes. Many end customers reject worm-gear units in this load range. The number of components is smaller and the technical benefits far outweigh the slightly higher price. The major benefit of Danfoss Bauer bevel-gear units is their two-stage design. They form the foundations for an economical principle in the heavy-load range while providing virtually all the reduction ratios required in two stages. For reasons of technology, the noise emissions from two-stage gear units are lower than those from three-stage gear units because the first gear-wheel, which is key in the generation of noise, has a smaller diameter than that on the three-stage solution.

1.6 Clutch is required

Where bevel/helical or worm/helical-gear units with high levels of efficiency are used, one might wonder whether the reversing torques are low enough to move the carriages in the event of a malfunction with the brake released. There would be no need for a clutch in this case. However, practice clearly shows that the force required is significantly greater than with the clutch disengaged. In addition to the reversing torque, the motor's rotor must be accelerated when the carriage is pushed on gear units without a clutch.

1.7 Additional benefit to the customer

Each new development must check which additional benefits can be included with as little effect on price as possible. The new sizes, BM10, BM30 and BM40, have the option of four large securing threads on the top and bottom of the gear unit in addition to the flanged version. This opens up new possibilities for the designer of integrating the drive into the carriage assembly. This mountable variant can also be used very successfully to drive floor conveyors. A version with an output shaft on both sides is available for this particular application. This is possible because the clutch lever is not mounted opposite the output shaft but instead on the front of the gear unit, opposite the motor.

2 Questionnaire on the design of geared motors for overhead conveyors

2.1 Carriage dimensions

Dimension X = _____ mm (distance between driven wheels)
Dimension Y = _____ mm (distance between revolute joints)
Dimension Z = _____ mm (distance rail to centre of gravity of the load to be conveyed)

2.2 Driven wheel diameter

d=_____ mm

2.3 Driven wheel material

Vulkollan = ☐ Steel = ☐ Other = _____

2.4 Moving masses

Travelling gear = _____ kg
Suspension gear = _____ kg
Geared motor = _____ kg
Load to be conveyed = _____ kg

_____

Total mass to be moved = _____ kg

2.5 Travelling speeds

Horizontal = _____m/min; Cornering = _____m/min
Ascending/Descending gradients =_____m/min

2.6 Mains operation with one speed

Travelling speed = _____ m/min

2.7 Mains operation with two speeds (pole-changing)

High linear speed = _____ m/min
Low linear speed = _____ m/min
Only for positioning yes ☐ no ☐. Required in continuous operation yes ☐ no ☐
Linear speed on the gradient = _____ m/min
Time taken on gradients = _____ s

2.8 Operation from an inverter

High linear speed = _____ m/min
Low linear speed = _____ m/min
Only for positioning yes ☐ no ☐. Required in continuous operation yes ☐ no ☐
Linear speed on the gradient = _____ m/min
Time taken on gradients = _____ s

2.9 Design information

Minimum curve radius = _____ m; Angle of the tightest curve = ___ degrees
Ambient temperature = _____ °C
Maximum rise =___ degrees, Maximum fall = ___ degrees,
Difference in height =_____ m

2.10 Coupling

Manual coupling ☐, Mechanical coupling ☐

2.11 Acceleration/deceleration

Required acceleration = _____m/s^2; Required deceleration = _____m/s^2

2.12 Brakes

Mechanical brake, yes ☐ no ☐
Permissible braking travel when operational (from vmax) = _____mm (electrical and mechanical)
Necessary holding precision when operational = _____mm (mechanical only)
Permissible braking travel in an emergency shutdown (from vmax) = _____mm
Non-latching manual release, yes ☐ no ☐

2.13 Electrical data, motor, brake

Motor voltage = _____V, Frequency = ____Hz
Brake system supply voltage = _____V, DC ☐ or AC ☐
Motor protection Thermistors (PTC) ☐ thermostat ☐
Brake rectifier In carriage control ☐ In the motor terminal box ☐
Operating the brakes AC side ☐ DC ☐
Motor connection Terminal box ☐ plug ☐

2.14 Switching duty/load cycles

Number of starts per hour = _____ Duty factor = _____%

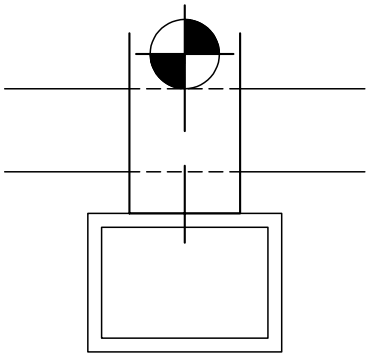
2.15 Further information

RAL paintwork_____(Danfoss Bauer Standard RAL7031)
Regulations: _____
Further important information

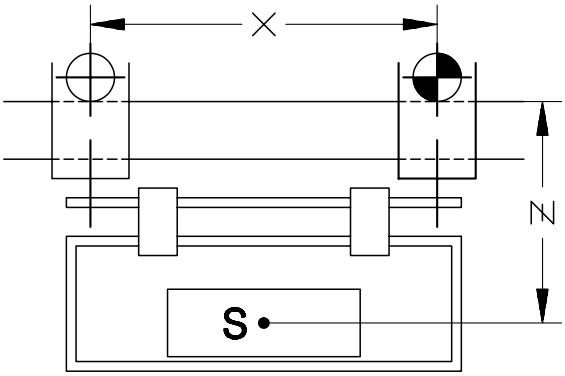
2.16 Carriage design

Principle „X/X" = „ / „ (Please enter principle used)

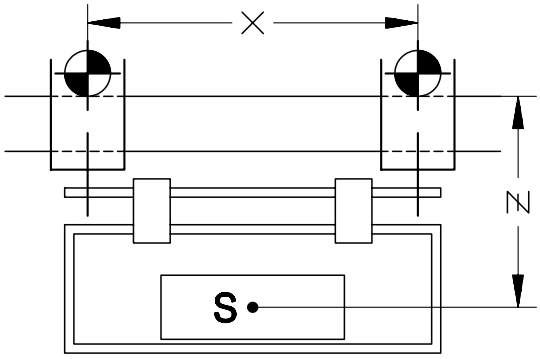
Principle „1/1": One running wheel/one driven wheel



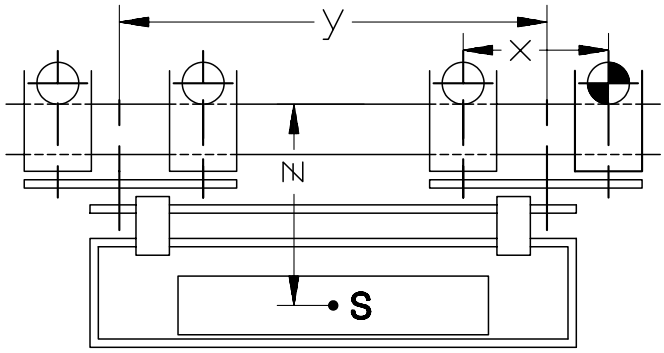
Principle „1/2": Two running wheels/one driven wheel



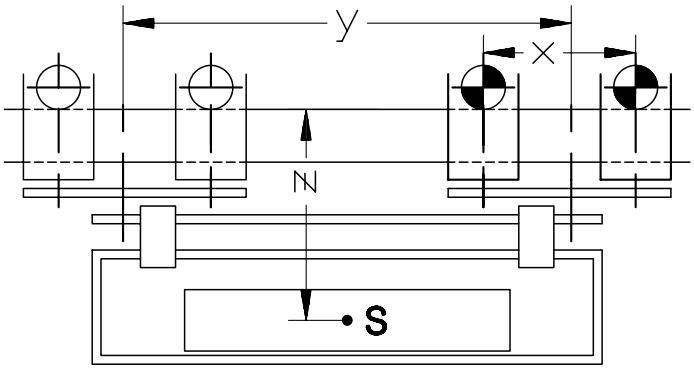
Principle „2/2": Two running wheels/two driven wheels



Principle „1/4“: Four running wheels/one driven wheel



Principle „2/4“: Four running wheels/two driven wheels



Note, “Principle 2/2” and “Principle 2/4” both involve carriages with two drives. Particular attention must be paid to cornering in such cases since different speeds will be present on the two drives when entering and exiting the corner; in practice this is resolved by the different motor slip on the two drives. This can cause considerable additional loading on the gear unit and motor, particularly where curves are tight and there are large distances between the driven wheels.

Please provide a sketch of your own principle here:

3 Description of BM geared motors

3.1 Assembly and possible applications of BM gear units

The BM (Bauer Monorail) series offers four gear unit sizes which differ in their permissible torques (from 50 to 680 Nm). The gear units are also offered in heavy duty versions for increased permissible wheel loads.

Gear unit	F_{RN}	d_{AW}	Shaft height	Shaft collar
	in N	in mm	in mm	in mm
		(revised)		
BM09	4400	20	61	30
BM09X	6500	25	61	30
BM10(Z)	8000	25	62.5 (60)	34.5
BM10(Z)X	10000	25	62.5 (60)	34.5
BM30(Z)	12000	35	94 (90)	45
BM30(Z)X	15000	35	94 (90)	45
BM40(Z)	20000	55	125 (120)	60
BM40(Z)X	25000	55	125 (120)	60

The BM09 and BM10 gear units can run on „C1 profiles''. Compliance with the VDI Code of practice (3643) and the need to reduce the cost of overhead conveyor drives of this size resulted in a thoroughly tested design which uses a worm-gear set in the first stage and a helical gear set in the second stage. The worm-gear stage with its very small reduction ratios offers particularly high levels of efficiency (greater than 85 %) thanks to the high speeds. The mechanical claw clutch engages the first stage on the BM09 and the final stage on the BM10.

BM30 and BM40 are heavy-load overhead conveyor drives and have a helical-gear set in the first stage and a bevel-gear set in the final stage. The clutch is mounted in the final stage on these gear units also.

All BM gear units have the clutch lever on the "L" gear side, i.e. on the side opposite to the motor. The BM09 supersedes the familiar SZ2-V3209 gear unit. It offers the same reduction ratios and has the same mounting dimensions (flange, shaft, clutch lever) as the SZ2-V3209.

The BM10, BM30 and BM40 offer additional mounting options. The flange can be located outside on the front of the gear unit, or on the back ("H" side). A version with sturdy securing threads on the underside ("U") and on top ("O") of the gear unit can also be supplied. This enables new and easy-to-maintain carriage designs. The use of BM gear units as drive units for floor conveyors is simplified by the version with an output shaft on both sides. Hollow shaft design available on request.

Gear unit designs:

Gear unit	1st stage	2nd stage	Flange on rear	"U" and "O" foot threads	Output shaft on both sides	Preferred flange
BM09(X)	Worm-gear	Helical-gear	-	-	-	-
BM10(X)	Worm-gear	Helical-gear	Option	Option	Option	-
BM30Z(X)	Helical-gear	Bevel-gear	Option	Option	Option	Option
BM40Z(X)	Helical-gear	Bevel-gear	Option	Option	Option	Option

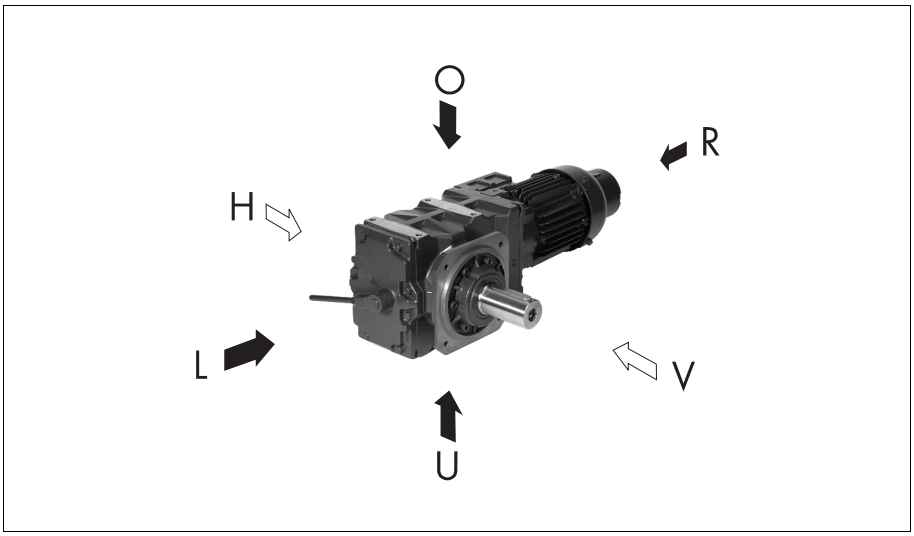
3.2 Type designation and components of the BM-series helical-geared motors

Bauer Monorail geared motor
BM..- Gear unit size (BM09, 10, 30, 40)
BM..Z-.. Gear unit with additional preliminary stage for very high reduction ratios
BM..G-.. Gear unit with double gearing for extremely high reduction ratios
BM..X-.. Reinforced gear unit for high wheel loads

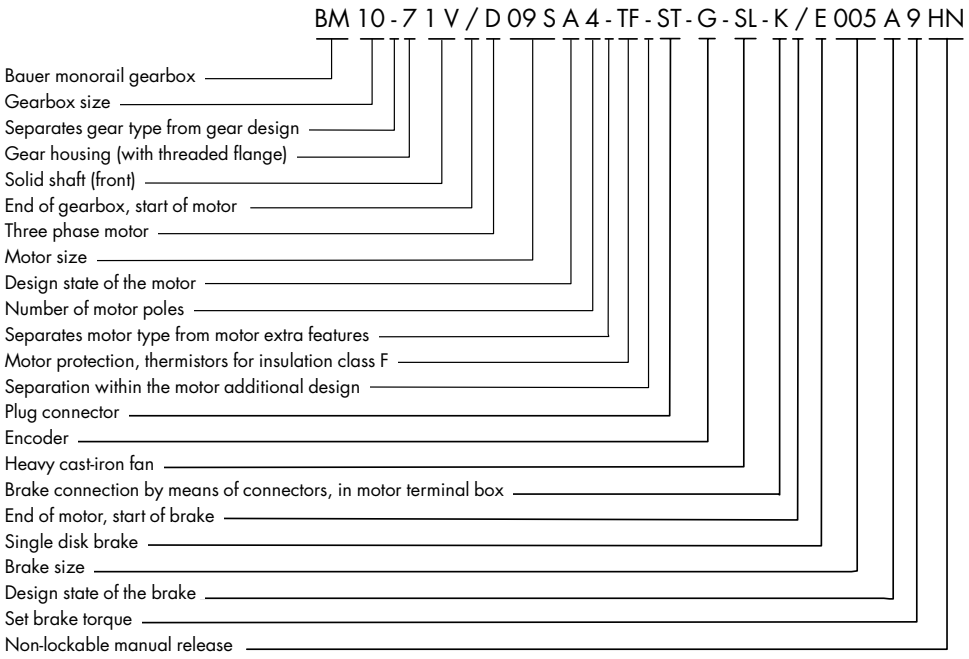
BM..-7.V C-flange with threaded holes on the "V" side of the gear unit
BM..-7.H C-flange with threaded holes on the "H" side of the gear unit (available on request)
BM..-6.UO/ Foot thread on the "U" and "O" sides of the gear unit (not with BM09)

BM..-.1/ Solid shaft on the "V" side of the gear unit
BM..-.2/ Solid shaft on the "H" side of the gear unit (available on request)
BM..-.3/ Solid shaft on the "V" and "H" sides of the motor (available on request)

BM..-07V/../S01 A-flange and solid shaft extended on the V side of the gear unit (BM30; BM40)
BM..-07V/../S02 A-flange and solid shaft "greatly" extended on the V side of the gear unit (BM30; BM40)

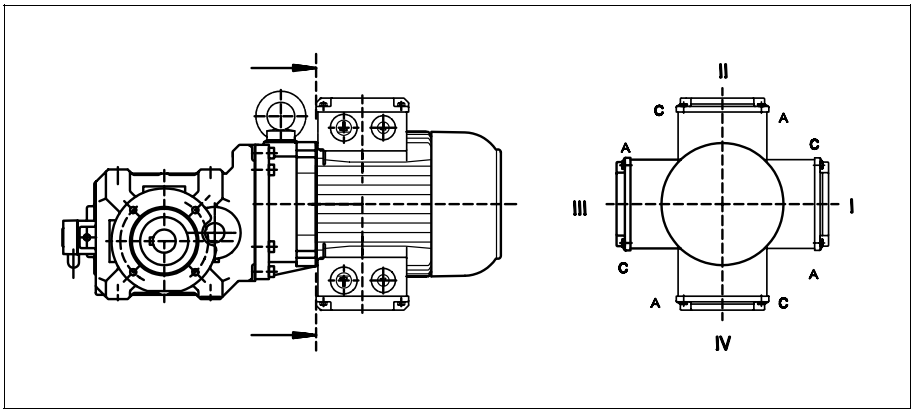


The type designation of a BAUER geared motor is a code designating all the features in the drive configuration.



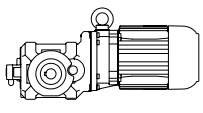
3.3 Position of the terminal box and the cable glands

The standard position of the terminal box for BM geared motors is position III, opposite the output shaft pointing towards the "H" side of the gear unit. This position is preferred for most overhead conveyor applications. The terminal box can be supplied rotated by 90 degrees about the motor axis upon request. The standard cable entry is from side A or C. Cable entry towards the fan cowl (B) available on request.



3.4 Standard fitting position of BM geared motors

Geared motor carriages for overhead conveyors are almost always installed horizontally in installation type H1. The lubricant quantity is adapted to suit the resulting inclined positions of the gear unit where ascents and descents have to be negotiated. Please therefore specify the rise angle with your enquiries or orders. BM-series geared motors can also be used as ***point operating gears.*** Please indicate the mounting orientation. This usually differs from the fitting position of the carriage drives.



Standard type of installation H1

3.5 Lubricant grade

Bauer geared motors are shipped ready-filled with gear lubricant. This protects the gear unit for ambient temperatures of -10 °C to +40 °C (lubrication for operation at high ambient temperatures available on request). The quantity of lubricant is optimized for the individual application and is marked on the motor's rating plate. BM-series geared motors are supplied as standard with a synthetic lubricant with a viscosity grade of 460 (PGLP 460).

3.6 Lubricant quantity for installation type H1

Gear unit	Litres in the main gear unit	Litres in the preliminary stage (Z)
BM09(X)	0.3	-
BM10(X)	0.6	-
BM30(X)	1.2	-
BM40(X)	2.5	-
BM30Z(X)	1.2	0.4
BM40Z(X)	2.5	0.7

Lubricant quantities for other types of installation available on request.

3.7 Gear ventilation

BM gear units are shipped ready-equipped with a breather valve. Low operating temperatures are achieved thanks to the high levels of efficiency of BM gear units and the fact that their surfaces have been designed for optimum heat dissipation. This results in oil change intervals of 15000 hours or 3 to 4 years.

3.8 Operating noise

The typical operating noise levels of BAUER geared motors are within the limits stipulated by VDI directive 2159 for gears and EN 60034-9, Table 2 for motors. For physical reasons, low-ratio, high-speed gears produce more noise than medium-ratio and high-ratio gears operating at low speeds.

See Danfoss Bauer special publication SD18.. for more information.

3.9 Paint finish and corrosion protection

BAUER geared motors are spray-painted in RAL 7031 to DIN 1843 as standard. Other RAL colours are available on request. The output shafts are shipped in protective sleeves or with a protective coating to prevent corrosion. In the case of high requirements on corrosion resistance, the BM-series drives may be requested with enhanced corrosion protection: CORO 1 or CORO 2.

4 Geared motor selection

Danfoss Bauer has an experienced team of experts available for the dimensioning of EHB carriage drives.

If you give a precise description of the conditions of operation, using our questionnaire (2 section), a quote for the best drive for you can be processed as quickly as possible.

For frequently used applications where the drives are supplied from a frequency inverter, however, the selection tables below can be used for rough drive dimensioning.

4.1 Procedure for selecting BM-series geared motors

1) Establish the wheel load and running wheel diameter

$F_A = m_A \cdot g$

F_A	[N]	(Wheel load on running wheel)
m_A	[kg]	(Mass acting on the drive wheel)
g	[9.81 m/s²]	(Acceleration due to gravity)
F_{RN}	[N]	(Maximum permissible radial force at the centre of the wheel, see table 3.1 or sec. 6)

Selection is based on the following: $\boldsymbol{F_A} < F_{RN}$

Running wheel diameter d is determined by the plant engineer (preferred diameters: 125 mm, 160 mm, 200 mm, 250 mm, 300 mm). Criteria are wheel load and carriage design, for example.

2) The travelling speed is a further important criterion in the selection tables.
Two characteristics are available for selection: The 50 Hz characteristic curve or the 87 Hz characteristic curve. The full range of rated torques up to these frequencies are available. At higher frequencies, the torque decreases as a result of the speed range under field control. As a rule, geared motors with the 50 Hz characteristic curve are somewhat quieter in operation, and those with the 87 Hz characteristic curve have smaller, less expensive motor components. The 87 Hz characteristic curve facilitates lower positioning speeds.

$$n_2 = \frac{v}{d \cdot \pi}$$

v	[m/min]	(Travelling speed
n_2	[rpm]	(Speed at the output shaft)
d	[m]	(Running wheel diameter)

3) Geared motor selection in accordance with the required acceleration torque M_{acc2} (specification: $M_{acc2} \geq M_{tot}$) and the permissible long-term rated torque M_{N2} (specification: $M_{N2} > M_w + M_h$). The values for M_{acc2} and M_{N2} are contained in the selection tables. If acceleration torque M_{acc2} is not sufficient, the table usually provides higher values for torques M_{acc2} and M_{N2} at a higher permissible shearing force F_{RN}.

Torque from rolling friction [Nm]:

$$M_w = F_w \cdot \frac{d}{2} = m \cdot f_w \cdot \frac{d}{2}$$

Lift on gradient: [Nm]:

$$M_h = m \cdot g \cdot \sin\alpha \cdot \frac{d}{2}$$

Acceleration torque [Nm]:

$$M_a = m \cdot a \cdot \frac{d}{2} = m \cdot \frac{v}{t_a} \cdot \frac{d}{2}$$

Total torque required during acceleration [Nm]:

$M_{tot} = M_w + M_h + M_a$

M_{acc2} = Torque [Nm] available at the output shaft during acceleration.

M_{N2} = Torque [Nm] available at the output shaft during continuous operation.

d	[m]	(Running wheel diameter)
M	[kg]	(Moving mass)
f_w	[N/kg]	(Rolling resistance from rolling friction per 1,000 kg, guide value approximately 200 N/ 1,000 kg = 0.2 N/kg)
f_w	[N]	(Rolling resistance from rolling friction)
v	[m/s]	(Maximum travelling speed)
t_a	[s]	(Run-up time)
A	[m/s²]	(Acceleration, standard values approximately 0.3 m/s² ... 1 m/s²)
α		(Angle of inclination)

4) Establishing the brake size in the brake selection table.

Choose a brake which can be fitted externally and then select the required braking torque. Guide value for braking torque on the horizontal $M_{br1} = 0.9 \cdot M_{N1}$.

Total load and rotor at the moment of inertia at the rotor shaft [kgm²]

$J_{tot1} = J_{Last1} + J_{rot}$ (+ J_{SL}) ($J_{SL,\ with\ heavy\ cast\text{-}iron\ fan}$)

$$J_{Last1} = m \cdot \frac{\left(\frac{d}{2}\right)^2}{i^2} \text{ oder } J_{Last1} = 91{,}2 \cdot m \cdot \frac{v^2}{n_1^2}$$

Braking time [s]:

$$t_{br} = \frac{J_{tot1} \cdot n_1}{9{,}55 \cdot M_{br}}$$

Rate of deceleration [m/s²]:

$$a_{br} = \frac{v}{t_{br}}$$

The calculated rate of deceleration a_{br} is a guide value which is exceeded somewhat in practice since the rolling resistance and level of efficiency are not taken into account.

d	[m]	(Running wheel diameter)
M	[kg]	(Moving mass)
i		(Gear reduction ratio)
v	[m/s]	(Travelling speed)
n_1	[rpm]	(Rotor shaft speed)
J_{Rot}	[kgm²]	(Moment of inertia of the rotor at the rotor shaft from the motor table)
J_{SL}	[kgm²]	(Moment of inertia of the heavy cast-iron fan from the motor table)
M_{br}	[Nm]	(Brake torque of the mechanical brake)
v	[m/s]	(Travelling velocity)
a_{br}	[m/s²]	(Rate of deceleration)

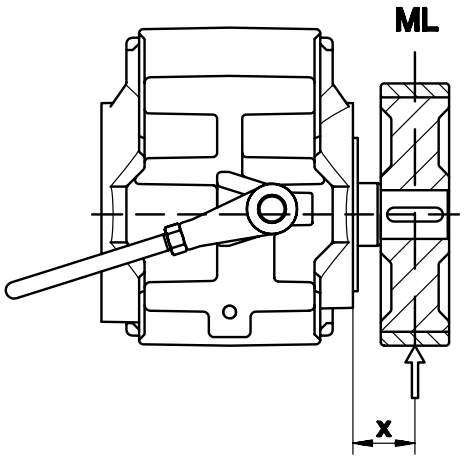
5) Compare the dimensional drawing of the geared motor with the carriage design, and determine the position of the terminal box.

6) Compare the electrical data of the motor (I_N and I_{acc}) with the data of the inverter supplied.

In each of the 13 tables for 50 Hz and 60 Hz, the wheel diameters and permissible radial forces for the various geared motors are assigned M_{acc2}, M_{N2}, $n_2$and weights.

Selection table	d_{Wheel}	F_{RN}	Gear unit type	d_{Shaft}
	in mm	in N		in mm
1	***125***	4400	BM09	20
2	***125***	6500	BM09X	25
3	***125***	8000	BM10	25
4	***160***	6500	BM09X	25
5	***160***	8000	BM10	25
6	***200***	8000	BM10	25
7	***200***	10000	BM10X	25
8	***200***	12000	BM30(Z)	35
9	***200***	15000	BM30(Z)X	35
10	***250***	15000	BM30(Z)	35
11	***250***	20000	BM40(Z)	55
12	***300***	20000	BM40(Z)	55
13	***300***	25000	BM40(Z)X	55

Definition of the acting point of the wheel load



Dimension x, see corresponding dimension sheet

Abbreviations in the selection tables:

v	Travelling speed of the wheel diameter at a synchronous speed
i	Gear reduction ratio
M_{acc2}	Acceleration torque at the output shaft in inverter duty
M_{N2}	Permissible permanent load torque at the output shaft between 30 and 50 or 30 and 87 Hz in inverter duty
I_{acc}	Acceleration current (must be produced by the inverter)
I_L	Required current in inverter duty with $M_L = M_{N2}$
P	Rated output
n_2	Rated speed of the output shaft on a 50 Hz system
F_{RN}	Permissible radial force at the centre of the wheel (see dimension diagram)
d	Running wheel diameter
d_{AW}	Output shaft diameter

4.2 Selection tables for 50 Hz systems

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 4400 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
51	90	11.34	20 27.5	12.7 17.4	BM09-../D06LA4 "	0.18 0.25	120 "	16 "
44	77	13.23	23.5	14.9	BM09-../D06LA4	0.18	103	16
33	57	17.73	31.5 43	19.9 27	BM09-../D06LA4 "	0.18 0.25	77 "	16 "
27	48	21.20	37.5 52	23.5 32.5	BM09-../D06LA4 "	0.18 0.25	64 "	16 "
23	41	24.74	44	27.5	BM09-../D06LA4	0.18	55	16
22	39	25.98	46 64	29 40	BM09-../D06LA4 "	0.18 0.25	52 "	16 "
19	33	30.31	54	34	BM09-../D06LA4	0.18	45	16
17	31	32.97	59 80	37 50	BM09-../D06LA4 "	0.18 0.25	41 "	16 "
15	26	38.46	68	43	BM09-../D06LA4	0.18	35.5	16
13	24	42.44	75	47	BM09-../D06LA4	0.18	32	16
10	19	53.85	94	59	BM09-../D06LA4	0.18	25.5	16

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 6500 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
51	90	11.34	20 27.5	12.7 17.4	BM09X-../D06LA4 "	0.18 0.25	120 "	16 "
44	77	13.23	23.5	14.9	BM09X-../D06LA4	0.18	103	16
33	57	17.73	31.5 43	19.9 27	BM09X-../D06LA4 "	0.18 0.25	77 "	16 "
27	48	21.20	37.5 52	23.5 32.5	BM09X-../D06LA4 "	0.18 0.25	64 "	16 "
23	41	24.74	44	27.5	BM09X-../D06LA4	0.18	55	16
22	39	25.98	46 64	29 40	BM09X-../D06LA4 "	0.18 0.25	52 "	16 "
19	33	30.31	54	34	BM09X-../D06LA4	0.18	45	16
17	31	32.97	59 80	37 50	BM09X-../D06LA4 "	0.18 0.25	41 "	16 "
15	26	38.46	68	43	BM09X-../D06LA4	0.18	35.5	16
13	24	42.44	75	47	BM09X-../D06LA4	0.18	32	16
10	19	53.85	94	59	BM09X-../D06LA4	0.18	25.5	16

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
50	87	11.68	64	40	BM10-../D08MA4	0.55	120	32
			86	54	BM10-../D08LA4	0.75	"	33
			126	79	BM10-../D09SA4	1.1	"	38
45	79	12.95	71	44.5	BM10-../D08MA4	0.55	109	32
			96	60	BM10-../D08LA4	0.75	"	33
			140	88	BM10-../D09SA4	1.1	"	38
35	62	16.39	60	37.5	BM10-../D07LA4	0.37	86	24
			88	55	BM10-../D08MA4	0.55	"	32
			118	74	BM10-../D08LA4	0.75	"	33
32	56	18.18	67	42	BM10-../D07LA4	0.37	78	24
			97	61	BM10-../D08MA4	0.55	"	32
			131	82	BM10-../D08LA4	0.75	"	33
26	45	22.62	66	41.5	BM10-../D07LA4	0.3	62	24
			81	51	"	0.37	"	"
			120	75	BM10-../D08MA4	0.55	"	32
23	40	25.09	73	46	BM10-../D07LA4	0.3	56	24
			91	57	"	0.37	"	"
			132	83	BM10-../D08MA4	0.55	"	32
22	38	26.55	64	40.5	BM10-../D06LA4	0.25	51	22
			78	49	BM10-../D07LA4	0.3	53	24
			96	60	"	0.37	"	"
			140	88	BM10-../D08MA4	0.55	"	32
19	34	29.45	72	45	BM10-../D06LA4	0.25	46	22
			86	54	BM10-../D07LA4	0.3	48	24
			107	67	"	0.37	"	"
			156	98	BM10-../D08MA4	0.55	"	32
17	30	33.19	79	49.5	BM10-../D06LA4	0.25	41	22
			94	59	BM10-../D07LA4	0.3	42.5	24
			118	74	"	0.37	"	"
15	27	36.82	64	40.5	BM10-../D06LA4	0.18	37	22
			88	55	"	0.25	"	"
			105	66	BM10-../D07LA4	0.3	38.5	24
			131	82	"	0.37	"	"
14	25	40.56	69	43.5	BM10-../D06LA4	0.18	33.5	22
			94	59	"	0.25	"	"
			113	71	BM10-../D07LA4	0.3	35	24
			140	88	"	0.37	"	"
13	22	45.00	76	48	BM10-../D06LA4	0.18	30	22
			105	66	"	0.25	"	"
			126	79	BM10-../D07LA4	0.3	31.5	24
			156	98	"	0.37	"	"
11	19	52.44	88	55	BM10-../D06LA4	0.18	26	22
			120	75	"	0.25	"	"
			144	90	BM10-../D07LA4	0.3	27	24
10	17	58.18	97	61	BM10-../D06LA4	0.18	23.5	22
			132	83	"	0.25	"	"

Diameter of running wheel (d) 160 mm
Permissible radial force (F_{RN}) 6500 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
66	115	11.34	20 27.5	12.7 17.4	BM09X-../D06LA4 "	0.18 0.25	120 "	16 "
56	99	13.23	23.5	14.9	BM09X-../D06LA4	0.18	103	16
42	73	17.73	31.5 43	19.9 27	BM09X-../D06LA4 "	0.18 0.25	77 "	16 "
35	61	21.20	37.5 52	23.5 32.5	BM09X-../D06LA4 "	0.18 0.25	64 "	16 "
30	53	24.74	44	27.5	BM09X-../D06LA4	0.18	55	16
29	50	25.98	46 64	29 40	BM09X-../D06LA4 "	0.18 0.25	52 "	16 "
24	43	30.31	54	34	BM09X-../D06LA4	0.18	45	16
22	39	32.97	59 80	37 50	BM09X-../D06LA4 "	0.18 0.25	41 "	16 "
19	34	38.46	68	43	BM09X-../D06LA4	0.18	35.5	16
17	30	42.44	75	47	BM09X-../D06LA4	0.18	32	16
13	24	53.85	94	59	BM09X-../D06LA4	0.18	25.5	16

Diameter of running wheel (d) 160 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
64	112	11.68	64	40	BM10-../D08MA4	0.55	120	32
			86	54	BM10-../D08LA4	0.75	"	33
			126	79	BM10-../D09SA4	1.1	"	38
58	101	12.95	71	44.5	BM10-../D08MA4	0.55	109	32
			96	60	BM10-../D08LA4	0.75	"	33
			140	88	BM10-../D09SA4	1.1	"	38
45	80	16.39	60	37.5	BM10-../D07LA4	0.37	86	24
			88	55	BM10-../D08MA4	0.55	"	32
			118	74	BM10-../D08LA4	0.75	"	33
41	72	18.18	67	42	BM10-../D07LA4	0.37	78	24
			97	61	BM10-../D08MA4	0.55	"	32
			131	82	BM10-../D08LA4	0.75	"	33
33	57	22.62	66	41.5	BM10-../D07LA4	0.3	62	24
			81	51	"	0.37	"	"
			120	75	BM10-../D08MA4	0.55	"	32
30	52	25.09	73	46	BM10-../D07LA4	0.3	56	24
			91	57	"	0.37	"	"
			132	83	BM10-../D08MA4	0.55	"	32
28	49	26.55	64	40.5	BM10-../D06LA4	0.25	51	22
			78	49	BM10-../D07LA4	0.3	53	24
			96	60	"	0.37	"	"
			140	88	BM10-../D08MA4	0.55	"	32
25	44	29.45	72	45	BM10-../D06LA4	0.25	46	22
			86	54	BM10-../D07LA4	0.3	48	24
			107	67	"	0.37	"	"
			156	98	BM10-../D08MA4	0.55	"	32
22	39	33.19	79	49.5	BM10-../D06LA4	0.25	41	22
			94	59	BM10-../D07LA4	0.3	42.5	24
			118	74	"	0.37	"	"
20	35	36.82	64	40.5	BM10-../D06LA4	0.18	37	22
			88	55	"	0.25	"	"
			105	66	BM10-../D07LA4	0.3	38.5	24
			131	82	"	0.37	"	"
18	32	40.56	69	43.5	BM10-../D06LA4	0.18	33.5	22
			94	59	"	0.25	"	"
			113	71	BM10-../D07LA4	0.3	35	24
			140	88	"	0.37	"	"
16	29	45.00	76	48	BM10-../D06LA4	0.18	30	22
			105	66	"	0.25	"	"
			126	79	BM10-../D07LA4	0.3	31.5	24
			156	98	"	0.37	"	"
14	25	52.44	88	55	BM10-../D06LA4	0.18	26	22
			120	75	"	0.25	"	"
			144	90	BM10-../D07LA4	0.3	27	24
12	22	58.18	97	61	BM10-../D06LA4	0.18	23.5	22
			132	83	"	0.25	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
80	140	11.68	64	40	BM10-../D08MA4	0.55	120	32
			86	54	BM10-../D08LA4	0.75	"	33
			126	79	BM10-../D09SA4	1.1	"	38
72	126	12.95	71	44.5	BM10-../D08MA4	0.55	109	32
			96	60	BM10-../D08LA4	0.75	"	33
			140	88	BM10-../D09SA4	1.1	"	38
57	100	16.39	60	37.5	BM10-../D07LA4	0.37	86	24
			88	55	BM10-../D08MA4	0.55	"	32
			118	74	BM10-../D08LA4	0.75	"	33
51	90	18.18	67	42	BM10-../D07LA4	0.37	78	24
			97	61	BM10-../D08MA4	0.55	"	32
			131	82	BM10-../D08LA4	0.75	"	33
41	72	22.62	66	41.5	BM10-../D07LA4	0.3	62	24
			81	51	"	0.37	"	"
			120	75	BM10-../D08MA4	0.55	"	32
37	65	25.09	73	46	BM10-../D07LA4	0.3	56	24
			91	57	"	0.37	"	"
			132	83	BM10-../D08MA4	0.55	"	32
35	61	26.55	64	40.5	BM10-../D06LA4	0.25	51	22
			78	49	BM10-../D07LA4	0.3	53	24
			96	60	"	0.37	"	"
			140	88	BM10-../D08MA4	0.55	"	32
31	55	29.45	72	45	BM10-../D06LA4	0.25	46	22
			86	54	BM10-../D07LA4	0.3	48	24
			107	67	"	0.37	"	"
			156	98	BM10-../D08MA4	0.55	"	32
28	49	33.19	79	49.5	BM10-../D06LA4	0.25	41	22
			94	59	BM10-../D07LA4	0.3	42.5	24
			118	74	"	0.37	"	"
25	44	36.82	64	40.5	BM10-../D06LA4	0.18	37	22
			88	55	"	0.25	"	"
			105	66	BM10-../D07LA4	0.3	38.5	24
			131	82	"	0.37	"	"
23	40	40.56	69	43.5	BM10-../D06LA4	0.18	33.5	22
			94	59	"	0.25	"	"
			113	71	BM10-../D07LA4	0.3	35	24
			140	88	"	0.37	"	"
20	36	45.00	76	48	BM10-../D06LA4	0.18	30	22
			105	66	"	0.25	"	"
			126	79	BM10-../D07LA4	0.3	31.5	24
			156	98	"	0.37	"	"
17	31	52.44	88	55	BM10-../D06LA4	0.18	26	22
			120	75	"	0.25	"	"
			144	90	BM10-../D07LA4	0.3	27	24
16	28	58.18	97	61	BM10-../D06LA4	0.18	23.5	22
			132	83	"	0.25	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 10000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
80	140	11.68	64	40	BM10X-../D08MA4	0.55	120	32
			86	54	BM10X-../D08LA4	0.75	"	33
			126	79	BM10X-../D09SA4	1.1	"	38
72	126	12.95	71	44.5	BM10X-../D08MA4	0.55	109	32
			96	60	BM10X-../D08LA4	0.75	"	33
			140	88	BM10X-../D09SA4	1.1	"	38
57	100	16.39	60	37.5	BM10X-../D07LA4	0.37	86	24
			88	55	BM10X-../D08MA4	0.55	"	32
			118	74	BM10X-../D08LA4	0.75	"	33
51	90	18.18	67	42	BM10X-../D07LA4	0.37	78	24
			97	61	BM10X-../D08MA4	0.55	"	32
			131	82	BM10X-../D08LA4	0.75	"	33
41	72	22.62	66	41.5	BM10X-../D07LA4	0.3	62	24
			81	51	"	0.37	"	"
			120	75	BM10X-../D08MA4	0.55	"	32
37	65	25.09	73	46	BM10X-../D07LA4	0.3	56	24
			91	57	"	0.37	"	"
			132	83	BM10X-../D08MA4	0.55	"	32
35	61	26.55	64	40.5	BM10X-../D06LA4	0.25	51	22
			78	49	BM10X-../D07LA4	0.3	53	24
			96	60	"	0.37	"	"
			140	88	BM10X-../D08MA4	0.55	"	32
31	55	29.45	72	45	BM10X-../D06LA4	0.25	46	22
			86	54	BM10X-../D07LA4	0.3	48	24
			107	67	"	0.37	"	"
			156	98	BM10X-../D08MA4	0.55	"	32
28	49	33.19	79	49.5	BM10X-../D06LA4	0.25	41	22
			94	59	BM10X-../D07LA4	0.3	42.5	24
			118	74	"	0.37	"	"
25	44	36.82	64	40.5	BM10X-../D06LA4	0.18	37	22
			88	55	"	0.25	"	"
			105	66	BM10X-../D07LA4	0.3	38.5	24
			131	82	"	0.37	"	"
23	40	40.56	69	43.5	BM10X-../D06LA4	0.18	33.5	22
			94	59	"	0.25	"	"
			113	71	BM10X-../D07LA4	0.3	35	24
			140	88	"	0.37	"	"
20	36	45.00	76	48	BM10X-../D06LA4	0.18	30	22
			105	66	"	0.25	"	"
			126	79	BM10X-../D07LA4	0.3	31.5	24
			156	98	"	0.37	"	"
17	31	52.44	88	55	BM10X-../D06LA4	0.18	26	22
			120	75	"	0.25	"	"
			144	90	BM10X-../D07LA4	0.3	27	24
16	28	58.18	97	61	BM10X-../D06LA4	0.18	23.5	22
			132	83	"	0.25	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 12000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
93	162	10.06	150	94	BM30-../D09LA4	1.5	140	60
			220	138	BM30-../D09XA4	2.2	"	64
75	131	12.46	185	116	BM30-../D09LA4	1.5	113	60
			270	171	BM30-../D09XA4	2.2	"	64
58	101	16.10	177	111	BM30-../D09SA4	1.1	87	56
			240	151	BM30-../D09LA4	1.5	"	60
47	82	19.96	148	93	BM30-../D08LA4	0.75	71	51
			215	137	BM30-../D09SA4	1.1	"	56
			295	187	BM30-../D09LA4	1.5	"	60
40	70	23.38	172	108	BM30-../D08LA4	0.75	60	51
			250	159	BM30-../D09SA4	1.1	"	56
			340	215	BM30-../D09LA4	1.5	"	60
31	55	29.76	163	102	BM30-../D08MA4	0.55	47.5	49
			220	138	BM30-../D08LA4	0.75	"	51
			320	200	BM30-../D09SA4	1.1	"	56
27	46	34.88	192	120	BM30-../D08MA4	0.55	40.5	49
			255	161	BM30-../D08LA4	0.75	"	51
22	39	41.13	153	96	BM30-../D07LA4	0.37	34.5	42
			220	140	BM30-../D08MA4	0.55	"	49
			300	188	BM30-../D08LA4	0.75	"	51
18	33	49.66	147	92	BM30-../D07LA4	0.3	28.5	42
			182	114	"	0.37	"	"
			265	167	BM30-../D08MA4	0.55	"	49
15	26	61.33	110	69	BM30-../D06LA4	0.18	22.5	40
			150	94	"	0.25	"	"
			180	113	BM30-../D07LA4	0.3	23	42
			220	140	"	0.37	"	"
13	23	71.09	128	80	BM30-../D06LA4	0.18	19	40
			174	109	"	0.25	"	"
			205	131	BM30-../D07LA4	0.3	20	42

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 15000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
93	162	10.06	150	94	BM30X-../D09LA4	1.5	140	60
			220	138	BM30X-../D09XA4	2.2	"	64
75	131	12.46	185	116	BM30X-../D09LA4	1.5	113	60
			270	171	BM30X-../D09XA4	2.2	"	64
58	101	16.10	177	111	BM30X-../D09SA4	1.1	87	56
			240	151	BM30X-../D09LA4	1.5	"	60
47	82	19.96	148	93	BM30X-../D08LA4	0.75	71	51
			215	137	BM30X-../D09SA4	1.1	"	56
			295	187	BM30X-../D09LA4	1.5	"	60
40	70	23.38	172	108	BM30X-../D08LA4	0.75	60	51
			250	159	BM30X-../D09SA4	1.1	"	56
			340	215	BM30X-../D09LA4	1.5	"	60
31	55	29.76	163	102	BM30X-../D08MA4	0.55	47.5	49
			220	138	BM30X-../D08LA4	0.75	"	51
			320	200	BM30X-../D09SA4	1.1	"	56
27	46	34.88	192	120	BM30X-../D08MA4	0.55	40.5	49
			255	161	BM30X-../D08LA4	0.75	"	51
22	39	41.13	153	96	BM30X-../D07LA4	0.37	34.5	42
			220	140	BM30X-../D08MA4	0.55	"	49
			300	188	BM30X-../D08LA4	0.75	"	51
18	33	49.66	147	92	BM30X-../D07LA4	0.3	28.5	42
			182	114	"	0.37	"	"
			265	167	BM30X-../D08MA4	0.55	"	49
15	26	61.33	110	69	BM30X-../D06LA4	0.18	22.5	40
			150	94	"	0.25	"	"
			180	113	BM30X-../D07LA4	0.3	23	42
			220	140	"	0.37	"	"
13	23	71.09	128	80	BM30X-../D06LA4	0.18	19	40
			174	109	"	0.25	"	"
			205	131	BM30X-../D07LA4	0.3	20	42

Diameter of running wheel (d) 250 mm
Permissible radial force (F_{RN}) 15000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
117	203	10.06	150	94	BM30X-../D09LA4	1.5	140	60
			220	138	BM30X-../D09XA4	2.2	"	64
94	164	12.46	185	116	BM30X-../D09LA4	1.5	113	60
			270	171	BM30X-../D09XA4	2.2	"	64
73	127	16.10	177	111	BM30X-../D09SA4	1.1	87	56
			240	151	BM30X-../D09LA4	1.5	"	60
58	102	19.96	148	93	BM30X-../D08LA4	0.75	71	51
			215	137	BM30X-../D09SA4	1.1	"	56
			295	187	BM30X-../D09LA4	1.5	"	60
50	87	23.38	172	108	BM30X-../D08LA4	0.75	60	51
			250	159	BM30X-../D09SA4	1.1	"	56
			340	215	BM30X-../D09LA4	1.5	"	60
39	68	29.76	163	102	BM30X-../D08MA4	0.55	47.5	49
			220	138	BM30X-../D08LA4	0.75	"	51
			320	200	BM30X-../D09SA4	1.1	"	56
33	58	34.88	192	120	BM30X-../D08MA4	0.55	40.5	49
			255	161	BM30X-../D08LA4	0.75	"	51
28	49	41.13	153	96	BM30X-../D07LA4	0.37	34.5	42
			220	140	BM30X-../D08MA4	0.55	"	49
			300	188	BM30X-../D08LA4	0.75	"	51
23	41	49.66	147	92	BM30X-../D07LA4	0.3	28.5	42
			182	114	"	0.37	"	"
			265	167	BM30X-../D08MA4	0.55	"	49
19	33	61.33	110	69	BM30X-../D06LA4	0.18	22.5	40
			150	94	"	0.25	"	"
			180	113	BM30X-../D07LA4	0.3	23	42
			220	140	"	0.37	"	"
16	28	71.09	128	80	BM30X-../D06LA4	0.18	19	40
			174	109	"	0.25	"	"
			205	131	BM30X-../D07LA4	0.3	20	42

Diameter of running wheel (d) 250 mm
Permissible radial force (F_{RN}) 20000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
81	141	14.50	310	195	BM40-../D09XA4	2.2	97	84
			415	260	BM40-../D11SA4	3.0	98	100
			550	345	BM40-../D11MA4	4.0	"	106
65	113	18.05	380	240	BM40-../D09XA4	2.2	78	84
			510	320	BM40-../D11SA4	3.0	79	100
52	91	22.44	325	205	BM40-../D09LA4	1.5	63	80
			480	300	BM40-../D09XA4	2.2	"	84
			640	400	BM40-../D11SA4	3.0	64	100
41	71	28.59	305	192	BM40-../D09SA4	1.1	49	76
			415	260	BM40-../D09LA4	1.5	"	80
			610	385	BM40-../D09XA4	2.2	"	84
34	59	34.61	365	230	BM40-../D09SA4	1.1	40.5	76
			500	315	BM40-../D09LA4	1.5	"	80
28	50	40.88	295	187	BM40-../D08LA4	0.75	34.5	71
			440	275	BM40-../D09SA4	1.1	"	76
			600	375	BM40-../D09LA4	1.5	"	80
23	40	51.18	270	171	BM40-../D08MA4	0.55	27.5	70
			360	225	BM40-../D08LA4	0.75	"	71
			530	335	BM40-../D09SA4	1.1	"	76
19	34	59.66	315	199	BM40-../D08MA4	0.55	23.5	70
			420	265	BM40-../D08LA4	0.75	"	71
			620	390	BM40-../D09SA4	1.1	"	76
16	29	70.11	365	230	BM40-../D08MA4	0.55	20	70
			495	310	BM40-../D08LA4	0.75	"	71
13	24	84.36	440	275	BM40-../D08MA4	0.55	17	70
			590	370	BM40-../D08LA4	0.75	"	71
11	19	104.0	530	335	BM40-../D08MA4	0.55	13.5	70

Diameter of running wheel (d) 300 mm
Permissible radial force (F_{RN}) 20000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
97	169	14.50	310	195	BM40-../D09XA4	2.2	97	84
			415	260	BM40-../D11SA4	3.0	98	100
			550	345	BM40-../D11MA4	4.0	"	106
78	136	18.05	380	240	BM40-../D09XA4	2.2	78	84
			510	320	BM40-../D11SA4	3.0	79	100
62	109	22.44	325	205	BM40-../D09LA4	1.5	63	80
			480	300	BM40-../D09XA4	2.2	"	84
			640	400	BM40-../D11SA4	3.0	64	100
49	85	28.59	305	192	BM40-../D09SA4	1.1	49	76
			415	260	BM40-../D09LA4	1.5	"	80
			610	385	BM40-../D09XA4	2.2	"	84
40	71	34.61	365	230	BM40-../D09SA4	1.1	40.5	76
			500	315	BM40-../D09LA4	1.5	"	80
34	60	40.88	295	187	BM40-../D08LA4	0.75	34.5	71
			440	275	BM40-../D09SA4	1.1	"	76
			600	375	BM40-../D09LA4	1.5	"	80
27	48	51.18	270	171	BM40-../D08MA4	0.55	27.5	70
			360	225	BM40-../D08LA4	0.75	"	71
			530	335	BM40-../D09SA4	1.1	"	76
23	41	59.66	315	199	BM40-../D08MA4	0.55	23.5	70
			420	265	BM40-../D08LA4	0.75	"	71
			620	390	BM40-../D09SA4	1.1	"	76
20	35	70.11	365	230	BM40-../D08MA4	0.55	20	70
			495	310	BM40-../D08LA4	0.75	"	71
16	29	84.36	440	275	BM40-../D08MA4	0.55	17	70
			590	370	BM40-../D08LA4	0.75	"	71
13	23	104.0	530	335	BM40-../D08MA4	0.55	13.5	70

Diameter of running wheel (d) 300 mm
Permissible radial force (F_{RN}) 25000 N

Gear motor with frequency converter (50 Hz Mains supply)

v 50 Hz m/min	v 87 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-50 Hz Nm	Type	P kW	n_2 rpm	m kg
97	169	14.50	310	195	BM40X-../D09XA4	2.2	97	84
			415	260	BM40X-../D11SA4	3.0	98	100
			550	345	BM40X-../D11MA4	4.0	"	106
78	136	18.05	380	240	BM40X-../D09XA4	2.2	78	84
			510	320	BM40X-../D11SA4	3.0	79	100
62	109	22.44	325	205	BM40X-../D09LA4	1.5	63	80
			480	300	BM40X-../D09XA4	2.2	"	84
			640	400	BM40X-../D11SA4	3.0	64	100
49	85	28.59	305	192	BM40X-../D09SA4	1.1	49	76
			415	260	BM40X-../D09LA4	1.5	"	80
			610	385	BM40X-../D09XA4	2.2	"	84
40	71	34.61	365	230	BM40X-../D09SA4	1.1	40.5	76
			500	315	BM40X-../D09LA4	1.5	"	80
34	60	40.88	295	187	BM40X-../D08LA4	0.75	34.5	71
			440	275	BM40X-../D09SA4	1.1	"	76
			600	375	BM40X-../D09LA4	1.5	"	80
27	48	51.18	270	171	BM40X-../D08MA4	0.55	27.5	70
			360	225	BM40X-../D08LA4	0.75	"	71
			530	335	BM40X-../D09SA4	1.1	"	76
23	41	59.66	315	199	BM40X-../D08MA4	0.55	23.5	70
			420	265	BM40X-../D08LA4	0.75	"	71
			620	390	BM40X-../D09SA4	1.1	"	76
20	35	70.11	365	230	BM40X-../D08MA4	0.55	20	70
			495	310	BM40X-../D08LA4	0.75	"	71
16	29	84.36	440	275	BM40X-../D08MA4	0.55	17	70
			590	370	BM40X-../D08LA4	0.75	"	71
13	23	104.0	530	335	BM40X-../D08MA4	0.55	13.5	70

4.3 Selection tables for 60 Hz systems

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 4400 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
62	107	11.34	23 27.5	14.6 17.4	BM09-../D06LA4 "	0.25 0.3	143 "	16 "
53	92	13.23	27	17.1	BM09-../D06LA4	0.25	123	16
39	69	17.73	36 43	22.5 27	BM09-../D06LA4 "	0.25 0.3	92 "	16 "
33	57	21.20	43 52	27 32.5	BM09-../D06LA4 "	0.25 0.3	77 "	16 "
28	49	24.74	51	32	BM09-../D06LA4	0.25	66	16
27	47	25.98	53 64	33.5 40	BM09-../D06LA4 "	0.25 0.3	63 "	16 "
23	40	30.31	62	39	BM09-../D06LA4	0.25	54	16
21	37	32.97	68 80	42.5 50	BM09-../D06LA4 "	0.25 0.3	49.5 "	16 "
18	31	38.46	79	49.5	BM09-../D06LA4	0.25	42.5	16

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 6500 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
62	107	11.34	23 27.5	14.6 17.4	BM09X-../D06LA4 "	0.25 0.3	143 "	16 "
53	92	13.23	27	17.1	BM09X-../D06LA4	0.25	123	16
39	69	17.73	36 43	22.5 27	BM09X-../D06LA4 "	0.25 0.3	92 "	16 "
33	57	21.20	43 52	27 32.5	BM09X-../D06LA4 "	0.25 0.3	77 "	16 "
28	49	24.74	51	32	BM09X-../D06LA4	0.25	66	16
27	47	25.98	53 64	33.5 40	BM09X-../D06LA4 "	0.25 0.3	63 "	16 "
23	40	30.31	62	39	BM09X-../D06LA4	0.25	54	16
21	37	32.97	68 80	42.5 50	BM09X-../D06LA4 "	0.25 0.3	49.5 "	16 "
18	31	38.46	79	49.5	BM09X-../D06LA4	0.25	42.5	16

Diameter of running wheel (d) 125 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
60	104	11.68	72	45	BM10-../D08MA4	0.75	144	32
			102	64	BM10-../D08LA4	1.1	"	33
54	94	12.95	80	50	BM10-../D08MA4	0.75	130	32
			113	71	BM10-../D08LA4	1.1	"	33
43	74	16.39	72	45	BM10-../D08SA4	0.55	103	30
			97	61	BM10-../D08MA4	0.75	"	32
			140	88	BM10-../D08LA4	1.1	"	33
38	67	18.18	80	50	BM10-../D08SA4	0.55	93	30
			108	68	BM10-../D08MA4	0.75	"	32
31	54	22.62	66	41.5	BM10-../D07LA4	0.37	75	24
			97	61	BM10-../D08SA4	0.55	"	30
			134	84	BM10-../D08MA4	0.75	"	32
28	48	25.09	73	46	BM10-../D07LA4	0.37	67	24
			108	68	BM10-../D08SA4	0.55	"	30
			148	93	BM10-../D08MA4	0.75	"	32
26	46	26.55	64	40.5	BM10-../D06LA4	0.3	62	22
			78	49	BM10-../D07LA4	0.37	64	24
			115	72	BM10-../D08SA4	0.55	"	30
23	41	29.45	72	45	BM10-../D06LA4	0.3	56	22
			86	54	BM10-../D07LA4	0.37	58	24
			128	80	BM10-../D08SA4	0.55	"	30
21	36	33.19	66	41.5	BM10-../D06LA4	0.25	49	22
			79	49.5	"	0.3	"	"
			94	59	BM10-../D07LA4	0.37	51	24
			140	88	BM10-../D08SA4	0.55	"	30
19	33	36.82	74	46.5	BM10-../D06LA4	0.25	44	22
			88	55	"	0.3	"	"
			105	66	BM10-../D07LA4	0.37	46	24
			156	98	BM10-../D08SA4	0.55	"	30
17	30	40.56	80	50	BM10-../D06LA4	0.25	40	22
			94	59	"	0.3	"	"
			113	71	BM10-../D07LA4	0.37	41.5	24
15	27	45.00	88	55	BM10-../D06LA4	0.25	36	22
			105	66	"	0.3	"	"
			126	79	BM10-../D07LA4	0.37	37.5	24
13	23	52.44	100	63	BM10-../D06LA4	0.25	31	22
			120	75	"	0.3	"	"
			144	90	BM10-../D07LA4	0.37	32.5	24
12	21	58.18	112	70	BM10-../D06LA4	0.25	28	22
			132	83	"	0.3	"	"

Diameter of running wheel (d) 160 mm
Permissible radial force (F_{RN}) 6500 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
79	138	11.34	23 27.5	14.6 17.4	BM09X-../D06LA4 "	0.25 0.3	143 "	16 "
68	118	13.23	27	17.1	BM09X-../D06LA4	0.25	123	16
51	88	17.73	36 43	22.5 27	BM09X-../D06LA4 "	0.25 0.3	92 "	16 "
42	73	21.20	43 52	27 32.5	BM09X-../D06LA4 "	0.25 0.3	77 "	16 "
36	63	24.74	51	32	BM09X-../D06LA4	0.25	66	16
34	60	25.98	53 64	33.5 40	BM09X-../D06LA4 "	0.25 0.3	63 "	16 "
29	51	30.31	62	39	BM09X-../D06LA4	0.25	54	16
27	47	32.97	68 80	42.5 50	BM09X-../D06LA4 "	0.25 0.3	49.5 "	16 "
23	40	38.46	79	49.5	BM09X-../D06LA4	0.25	42.5	16

Diameter of running wheel (d) 160 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
77	134	11.68	72	45	BM10-../D08MA4	0.75	144	32
			102	64	BM10-../D08LA4	1.1	"	33
69	121	12.95	80	50	BM10-../D08MA4	0.75	130	32
			113	71	BM10-../D08LA4	1.1	"	33
55	95	16.39	72	45	BM10-../D08SA4	0.55	103	30
			97	61	BM10-../D08MA4	0.75	"	32
			140	88	BM10-../D08LA4	1.1	"	33
49	86	18.18	80	50	BM10-../D08SA4	0.55	93	30
			108	68	BM10-../D08MA4	0.75	"	32
39	69	22.62	66	41.5	BM10-../D07LA4	0.37	75	24
			97	61	BM10-../D08SA4	0.55	"	30
			134	84	BM10-../D08MA4	0.75	"	32
36	62	25.09	73	46	BM10-../D07LA4	0.37	67	24
			108	68	BM10-../D08SA4	0.55	"	30
			148	93	BM10-../D08MA4	0.75	"	32
34	59	26.55	64	40.5	BM10-../D06LA4	0.3	62	22
			78	49	BM10-../D07LA4	0.37	64	24
			115	72	BM10-../D08SA4	0.55	"	30
30	53	29.45	72	45	BM10-../D06LA4	0.3	56	22
			86	54	BM10-../D07LA4	0.37	58	24
			128	80	BM10-../D08SA4	0.55	"	30
27	47	33.19	66	41.5	BM10-../D06LA4	0.25	49	22
			79	49.5	"	0.3	"	"
			94	59	BM10-../D07LA4	0.37	51	24
			140	88	BM10-../D08SA4	0.55	"	30
24	42	36.82	74	46.5	BM10-../D06LA4	0.25	44	22
			88	55	"	0.3	"	"
			105	66	BM10-../D07LA4	0.37	46	24
			156	98	BM10-../D08SA4	0.55	"	30
22	38	40.56	80	50	BM10-../D06LA4	0.25	40	22
			94	59	"	0.3	"	"
			113	71	BM10-../D07LA4	0.37	41.5	24
20	34	45.00	88	55	BM10-../D06LA4	0.25	36	22
			105	66	"	0.3	"	"
			126	79	BM10-../D07LA4	0.37	37.5	24
17	29	52.44	100	63	BM10-../D06LA4	0.25	31	22
			120	75	"	0.3	"	"
			144	90	BM10-../D07LA4	0.37	32.5	24
15	26	58.18	112	70	BM10-../D06LA4	0.25	28	22
			132	83	"	0.3	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 8000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
96	167	11.68	72	45	BM10-../D08MA4	0.75	144	32
			102	64	BM10-../D08LA4	1.1	"	33
87	151	12.95	80	50	BM10-../D08MA4	0.75	130	32
			113	71	BM10-../D08LA4	1.1	"	33
68	119	16.39	72	45	BM10-../D08SA4	0.55	103	30
			97	61	BM10-../D08MA4	0.75	"	32
			140	88	BM10-../D08LA4	1.1	"	33
62	107	18.18	80	50	BM10-../D08SA4	0.55	93	30
			108	68	BM10-../D08MA4	0.75	"	32
49	86	22.62	66	41.5	BM10-../D07LA4	0.37	75	24
			97	61	BM10-../D08SA4	0.55	"	30
			134	84	BM10-../D08MA4	0.75	"	32
45	78	25.09	73	46	BM10-../D07LA4	0.37	67	24
			108	68	BM10-../D08SA4	0.55	"	30
			148	93	BM10-../D08MA4	0.75	"	32
42	73	26.55	64	40.5	BM10-../D06LA4	0.3	62	22
			78	49	BM10-../D07LA4	0.37	64	24
			115	72	BM10-../D08SA4	0.55	"	30
38	66	29.45	72	45	BM10-../D06LA4	0.3	56	22
			86	54	BM10-../D07LA4	0.37	58	24
			128	80	BM10-../D08SA4	0.55	"	30
34	59	33.19	66	41.5	BM10-../D06LA4	0.25	49	22
			79	49.5	"	0.3	"	"
			94	59	BM10-../D07LA4	0.37	51	24
			140	88	BM10-../D08SA4	0.55	"	30
30	53	36.82	74	46.5	BM10-../D06LA4	0.25	44	22
			88	55	"	0.3	"	"
			105	66	BM10-../D07LA4	0.37	46	24
			156	98	BM10-../D08SA4	0.55	"	30
27	48	40.56	80	50	BM10-../D06LA4	0.25	40	22
			94	59	"	0.3	"	"
			113	71	BM10-../D07LA4	0.37	41.5	24
25	43	45.00	88	55	BM10-../D06LA4	0.25	36	22
			105	66	"	0.3	"	"
			126	79	BM10-../D07LA4	0.37	37.5	24
21	37	52.44	100	63	BM10-../D06LA4	0.25	31	22
			120	75	"	0.3	"	"
			144	90	BM10-../D07LA4	0.37	32.5	24
19	33	58.18	112	70	BM10-../D06LA4	0.25	28	22
			132	83	"	0.3	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 10000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
96	167	11.68	72	45	BM10X-../D08MA4	0.75	144	32
			102	64	BM10X-../D08LA4	1.1	"	33
87	151	12.95	80	50	BM10X-../D08MA4	0.75	130	32
			113	71	BM10X-../D08LA4	1.1	"	33
68	119	16.39	72	45	BM10X-../D08SA4	0.55	103	30
			97	61	BM10X-../D08MA4	0.75	"	32
			140	88	BM10X-../D08LA4	1.1	"	33
62	107	18.18	80	50	BM10X-../D08SA4	0.55	93	30
			108	68	BM10X-../D08MA4	0.75	"	32
49	86	22.62	66	41.5	BM10X-../D07LA4	0.37	75	24
			97	61	BM10X-../D08SA4	0.55	"	30
			134	84	BM10X-../D08MA4	0.75	"	32
45	78	25.09	73	46	BM10X-../D07LA4	0.37	67	24
			108	68	BM10X-../D08SA4	0.55	"	30
			148	93	BM10X-../D08MA4	0.75	"	32
42	73	26.55	64	40.5	BM10X-../D06LA4	0.3	62	22
			78	49	BM10X-../D07LA4	0.37	64	24
			115	72	BM10X-../D08SA4	0.55	"	30
38	66	29.45	72	45	BM10X-../D06LA4	0.3	56	22
			86	54	BM10X-../D07LA4	0.37	58	24
			128	80	BM10X-../D08SA4	0.55	"	30
34	59	33.19	66	41.5	BM10X-../D06LA4	0.25	49	22
			79	49.5	"	0.3	"	"
			94	59	BM10X-../D07LA4	0.37	51	24
			140	88	BM10X-../D08SA4	0.55	"	30
30	53	36.82	74	46.5	BM10X-../D06LA4	0.25	44	22
			88	55	"	0.3	"	"
			105	66	BM10X-../D07LA4	0.37	46	24
			156	98	BM10X-../D08SA4	0.55	"	30
27	48	40.56	80	50	BM10X-../D06LA4	0.25	40	22
			94	59	"	0.3	"	"
			113	71	BM10X-../D07LA4	0.37	41.5	24
25	43	45.00	88	55	BM10X-../D06LA4	0.25	36	22
			105	66	"	0.3	"	"
			126	79	BM10X-../D07LA4	0.37	37.5	24
21	37	52.44	100	63	BM10X-../D06LA4	0.25	31	22
			120	75	"	0.3	"	"
			144	90	BM10X-../D07LA4	0.37	32.5	24
19	33	58.18	112	70	BM10X-../D06LA4	0.25	28	22
			132	83	"	0.3	"	"

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 12000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
112	194	10.06	184	115	BM30-../D09LA4	2.2	167	60
			250	157	BM30-../D09XA4	3.0	"	64
90	157	12.46	155	97	BM30-../D09SA4	1.5	135	56
			225	143	BM30-../D09LA4	2.2	"	60
			310	194	BM30-../D09XA4	3.0	"	64
70	121	16.10	144	90	BM30-../D08LA4	1.1	105	51
			200	125	BM30-../D09SA4	1.5	"	56
			295	185	BM30-../D09LA4	2.2	"	60
56	98	19.96	179	112	BM30-../D08LA4	1.1	85	51
			245	156	BM30-../D09SA4	1.5	"	56
48	83	23.38	144	90	BM30-../D08MA4	0.75	72	49
			205	129	BM30-../D08LA4	1.1	"	51
			285	180	BM30-../D09SA4	1.5	"	56
37	65	29.76	184	115	BM30-../D08MA4	0.75	57	49
			260	165	BM30-../D08LA4	1.1	"	51
32	56	34.88	156	98	BM30-../D08SA4	0.55	48.5	48
			210	134	BM30-../D08MA4	0.75	"	49
			305	193	BM30-../D08LA4	1.1	"	51
27	47	41.13	182	114	BM30-../D08SA4	0.55	41	48
			250	157	BM30-../D08MA4	0.75	"	49
22	39	49.66	147	92	BM30-../D07LA4	0.37	34	42
			215	137	BM30-../D08SA4	0.55	"	48
			295	187	BM30-../D08MA4	0.75	"	49
18	31	61.33	126	79	BM30-../D06LA4	0.25	26.5	40
			150	94	"	0.3	"	"
			180	113	BM30-../D07LA4	0.37	27.5	42
			265	167	BM30-../D08SA4	0.55	"	48
15	27	71.09	145	91	BM30-../D06LA4	0.25	23	40
			174	109	"	0.3	"	"
			205	131	BM30-../D07LA4	0.37	24	42

Diameter of running wheel (d) 200 mm
Permissible radial force (F_{RN}) 15000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
112	194	10.06	184	115	BM30X-../D09LA4	2.2	167	60
			250	157	BM30X-../D09XA4	3.0	"	64
90	157	12.46	155	97	BM30X-../D09SA4	1.5	135	56
			225	143	BM30X-../D09LA4	2.2	"	60
			310	194	BM30X-../D09XA4	3.0	"	64
70	121	16.10	144	90	BM30X-../D08LA4	1.1	105	51
			200	125	BM30X-../D09SA4	1.5	"	56
			295	185	BM30X-../D09LA4	2.2	"	60
56	98	19.96	179	112	BM30X-../D08LA4	1.1	85	51
			245	156	BM30X-../D09SA4	1.5	"	56
48	83	23.38	144	90	BM30X-../D08MA4	0.75	72	49
			205	129	BM30X-../D08LA4	1.1	"	51
			285	180	BM30X-../D09SA4	1.5	"	56
37	65	29.76	184	115	BM30X-../D08MA4	0.75	57	49
			260	165	BM30X-../D08LA4	1.1	"	51
32	56	34.88	156	98	BM30X-../D08SA4	0.55	48.5	48
			210	134	BM30X-../D08MA4	0.75	"	49
			305	193	BM30X-../D08LA4	1.1	"	51
27	47	41.13	182	114	BM30X-../D08SA4	0.55	41	48
			250	157	BM30X-../D08MA4	0.75	"	49
22	39	49.66	147	92	BM30X-../D07LA4	0.37	34	42
			215	137	BM30X-../D08SA4	0.55	"	48
			295	187	BM30X-../D08MA4	0.75	"	49
18	31	61.33	126	79	BM30X-../D06LA4	0.25	26.5	40
			150	94	"	0.3	"	"
			180	113	BM30X-../D07LA4	0.37	27.5	42
			265	167	BM30X-../D08SA4	0.55	"	48
15	27	71.09	145	91	BM30X-../D06LA4	0.25	23	40
			174	109	"	0.3	"	"
			205	131	BM30X-../D07LA4	0.37	24	42

Diameter of running wheel (d) 250 mm
Permissible radial force (F_{RN}) 15000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
140	243	10.06	184	115	BM30X-../D09LA4	2.2	167	60
			250	157	BM30X-../D09XA4	3.0	"	64
113	196	12.46	155	97	BM30X-../D09SA4	1.5	135	56
			225	143	BM30X-../D09LA4	2.2	"	60
			310	194	BM30X-../D09XA4	3.0	"	64
87	152	16.10	144	90	BM30X-../D08LA4	1.1	105	51
			200	125	BM30X-../D09SA4	1.5	"	56
			295	185	BM30X-../D09LA4	2.2	"	60
70	122	19.96	179	112	BM30X-../D08LA4	1.1	85	51
			245	156	BM30X-../D09SA4	1.5	"	56
60	104	23.38	144	90	BM30X-../D08MA4	0.75	72	49
			205	129	BM30X-../D08LA4	1.1	"	51
			285	180	BM30X-../D09SA4	1.5	"	56
47	82	29.76	184	115	BM30X-../D08MA4	0.75	57	49
			260	165	BM30X-../D08LA4	1.1	"	51
40	70	34.88	156	98	BM30X-../D08SA4	0.55	48.5	48
			210	134	BM30X-../D08MA4	0.75	"	49
			305	193	BM30X-../D08LA4	1.1	"	51
34	59	41.13	182	114	BM30X-../D08SA4	0.55	41	48
			250	157	BM30X-../D08MA4	0.75	"	49
28	49	49.66	147	92	BM30X-../D07LA4	0.37	34	42
			215	137	BM30X-../D08SA4	0.55	"	48
			295	187	BM30X-../D08MA4	0.75	"	49
23	39	61.33	126	79	BM30X-../D06LA4	0.25	26.5	40
			150	94	"	0.3	"	"
			180	113	BM30X-../D07LA4	0.37	27.5	42
			265	167	BM30X-../D08SA4	0.55	"	48
19	34	71.09	145	91	BM30X-../D06LA4	0.25	23	40
			174	109	"	0.3	"	"
			205	131	BM30X-../D07LA4	0.37	24	42

Diameter of running wheel (d) 250 mm
Permissible radial force (F_{RN}) 20000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
97	168	14.50	350	220	BM40-../D09XA4	3.0	116	84
			415	260	BM40-../D11SA4	3.7	118	100
			500	315	BM40-../D11MA4	4.4	"	106
			630	395	BM40-../D11LA4	5.5	"	118
78	135	18.05	320	200	BM40-../D09LA4	2.2	94	80
			440	275	BM40-../D09XA4	3.0	"	84
			510	320	BM40-../D11SA4	3.7	95	100
			630	395	BM40-../D11MA4	4.4	"	106
62	109	22.44	270	171	BM40-../D09SA4	1.5	75	76
			400	250	BM40-../D09LA4	2.2	"	80
			540	340	BM40-../D09XA4	3.0	"	84
			640	400	BM40-../D11SA4	3.7	77	100
49	85	28.59	340	215	BM40-../D09SA4	1.5	59	76
			510	320	BM40-../D09LA4	2.2	"	80
40	70	34.61	300	190	BM40-../D08LA4	1.1	49	71
			415	260	BM40-../D09SA4	1.5	"	76
			610	385	BM40-../D09LA4	2.2	"	80
34	59	40.88	350	220	BM40-../D08LA4	1.1	41.5	71
			495	310	BM40-../D09SA4	1.5	"	76
27	47	51.18	305	191	BM40-../D08MA4	0.75	33	70
			430	270	BM40-../D08LA4	1.1	"	71
			600	380	BM40-../D09SA4	1.5	"	76
23	41	59.66	350	220	BM40-../D08MA4	0.75	28.5	70
			510	320	BM40-../D08LA4	1.1	"	71
20	34	70.11	300	189	BM40-../D08SA4	0.55	24	68
			405	255	BM40-../D08MA4	0.75	"	70
			590	370	BM40-../D08LA4	1.1	"	71
16	29	84.36	360	225	BM40-../D08SA4	0.55	20	68
			495	310	BM40-../D08MA4	0.75	"	70
13	23	104.0	430	270	BM40-../D08SA4	0.55	16.5	68

Diameter of running wheel (d) 300 mm
Permissible radial force (F_{RN}) 20000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
116	202	14.50	350	220	BM40-../D09XA4	3.0	116	84
			415	260	BM40-../D11SA4	3.7	118	100
			500	315	BM40-../D11MA4	4.4	"	106
			630	395	BM40-../D11LA4	5.5	"	118
93	162	18.05	320	200	BM40-../D09LA4	2.2	94	80
			440	275	BM40-../D09XA4	3.0	"	84
			510	320	BM40-../D11SA4	3.7	95	100
			630	395	BM40-../D11MA4	4.4	"	106
75	130	22.44	270	171	BM40-../D09SA4	1.5	75	76
			400	250	BM40-../D09LA4	2.2	"	80
			540	340	BM40-../D09XA4	3.0	"	84
			640	400	BM40-../D11SA4	3.7	77	100
59	102	28.59	340	215	BM40-../D09SA4	1.5	59	76
			510	320	BM40-../D09LA4	2.2	"	80
48	84	34.61	300	190	BM40-../D08LA4	1.1	49	71
			415	260	BM40-../D09SA4	1.5	"	76
			610	385	BM40-../D09LA4	2.2	"	80
41	71	40.88	350	220	BM40-../D08LA4	1.1	41.5	71
			495	310	BM40-../D09SA4	1.5	"	76
33	57	51.18	305	191	BM40-../D08MA4	0.75	33	70
			430	270	BM40-../D08LA4	1.1	"	71
			600	380	BM40-../D09SA4	1.5	"	76
28	49	59.66	350	220	BM40-../D08MA4	0.75	28.5	70
			510	320	BM40-../D08LA4	1.1	"	71
24	41	70.11	300	189	BM40-../D08SA4	0.55	24	68
			405	255	BM40-../D08MA4	0.75	"	70
			590	370	BM40-../D08LA4	1.1	"	71
20	34	84.36	360	225	BM40-../D08SA4	0.55	20	68
			495	310	BM40-../D08MA4	0.75	"	70
16	28	104.0	430	270	BM40-../D08SA4	0.55	16.5	68

Diameter of running wheel (d) 300 mm
Permissible radial force (F_{RN}) 25000 N

Gear motor with frequency converter (60 Hz Mains supply)

v 60 Hz m/min	v 104 Hz m/min	i	M_{acc2} Nm	M_{N2} 30-60 Hz Nm	Type	P kW	n_2 rpm	m kg
116	202	14.50	350	220	BM40X-../D09XA4	3.0	116	84
			415	260	BM40X-../D11SA4	3.7	118	100
			500	315	BM40X-../D11MA4	4.4	"	106
			630	395	BM40X-../D11LA4	5.5	"	118
93	162	18.05	320	200	BM40X-../D09LA4	2.2	94	80
			440	275	BM40X-../D09XA4	3.0	"	84
			510	320	BM40X-../D11SA4	3.7	95	100
			630	395	BM40X-../D11MA4	4.4	"	106
75	130	22.44	270	171	BM40X-../D09SA4	1.5	75	76
			400	250	BM40X-../D09LA4	2.2	"	80
			540	340	BM40X-../D09XA4	3.0	"	84
			640	400	BM40X-../D11SA4	3.7	77	100
59	102	28.59	340	215	BM40X-../D09SA4	1.5	59	76
			510	320	BM40X-../D09LA4	2.2	"	80
48	84	34.61	300	190	BM40X-../D08LA4	1.1	49	71
			415	260	BM40X-../D09SA4	1.5	"	76
			610	385	BM40X-../D09LA4	2.2	"	80
41	71	40.88	350	220	BM40X-../D08LA4	1.1	41.5	71
			495	310	BM40X-../D09SA4	1.5	"	76
33	57	51.18	305	191	BM40X-../D08MA4	0.75	33	70
			430	270	BM40X-../D08LA4	1.1	"	71
			600	380	BM40X-../D09SA4	1.5	"	76
28	49	59.66	350	220	BM40X-../D08MA4	0.75	28.5	70
			510	320	BM40X-../D08LA4	1.1	"	71
24	41	70.11	300	189	BM40X-../D08SA4	0.55	24	68
			405	255	BM40X-../D08MA4	0.75	"	70
			590	370	BM40X-../D08LA4	1.1	"	71
20	34	84.36	360	225	BM40X-../D08SA4	0.55	20	68
			495	310	BM40X-../D08MA4	0.75	"	70
16	28	104.0	430	270	BM40X-../D08SA4	0.55	16.5	68

5 Brake selection

	50 Hz	50 Hz	50 Hz	***60 Hz***	60 Hz	60 Hz	***Code***	***9***	***8***	***7***	***6***	***5***	***4***	***3***	***2***
Motor	***P***	M_{acc1}	M_{N1}	P	M_{acc1}	M_{N1}	Brake	max. M_{br}	red. M_{br}	red. M_{br}	red. M_{br}	red. M_{br}	red. M_{br}	red. M_{br}	red. M_{br}
	in kW	in Nm	in Nm	***in kW***	in Nm	in Nm		in Nm	in Nm	in Nm	in Nm	in Nm			
D05LA4	***0.18***	2.05	1.28	***0.25***	2.35	1.47	***E003B***	***3***		***2.2***			***1.5***		
D05LA4	***0.25***	2.8	1.75	***0.3***	2.8	1.75									
D06LA4	***0.18***	2.05	1.28	***0.25***	2.35	1.47	***E003B***	***3***		***2.2***			***1.5***		
D06LA4	***0.25***	2.8	1.75	***0.3***	2.8	1.75									
D07LA4	***0.30***	3.4	2.1	***0.37***	3.4	2.15	***E003B***	***3***		***2.2***			***1.5***		
D07LA4	***0.37***	4.2	2.6	-	-	-									
D08SA4	***0.37***	4	2.5	***0.55***	5.0	3.1	***E005A***	***5***	***4***		***3***		***2.5***		***1.5***
D08MA4	***0.55***	6.1	3.8	***0.75***	6.8	4.25	E008A	7.5	6		4.5				
D08LA4	***0.75***	8.1	5.1	***1.1***	9.9	6.1	Z005A	10	8		6.5		5		3.3
							Z008A	15	12		9				
D09SA4	***1.1***	12	7.5	***1.5***	13.6	8.5	E005A	***5***	***4***		***3***		***2.5***		***1.5***
D09LA4	***1.5***	16.3	10.2	***2.2***	20	12.5	***E008A***	7.5	6		4.5				
D09XA4	***2.2***	24	15	***3.0***	27.2	17	Z005A	10	8		6.5		5		3.3
							Z008A	15	12		9				
							E010A	10	8		6.5		5		
							E015A	15	12		10		7.5		
							Z010A	25	20		16		12.5		8.3
							Z015A	30	25		20		15		
D11SA4	***3.0***	32	20	***3.7***	32.8	20	E010A	10	8		6.5		5		
D11MA4	***4.0***	42.4	26.5	***4.4***	39.2	24.5	E015A	15	12		10		7.5		
D11LA4	***5.5***	59.2	37	***5.5***	48.8	30.5	Z010A	25	20		16		12.5		8.3
							Z015A	30	25		20		15		
							E025A	***25***	***20***		***16***		***12.5***		
							Z025A	***50***	***40***		***32***		***25***		***16.5***
							E050A	50	45	37		30	25		

$M_{acc}1$	Acceleration torque at the motor shaft (see the 7 section)
M_{N1}	Rated torque (S1-100%) at the motor shaft (see the 7 section)
max. M_{br}	Maximum braking torque
red. M_{br}	Reduced braking torque
Code	Code number for the reduced braking torques

Examples of brake selection:
Selected geared motor: BM10-71V/D08MA4 0.55 kW, 78/min, M_{N1} = 3.8 Nm M_{acc1} = 6 Nm
Externally mounted brakes: E005A, E008A, Z005A, Z008A
Brake selection: M_{N1} = 3.8 Nm, M_{br} = 0.9 x M_{n1} = 3.4 Nm
Brake E005A selected with 3 Nm braking torque (=code 6) i.e.: E005A6
If a non-lockable manual release is required: E005A6HN

5.1 Type designation for brakes

E	Single-disc brake
Z	Double-disc brake
005	Brake size (compare section 5)
A (B)	Design date
9.8, …	Set braking torque (compare section 5)
HA	Lockable manual release
HN	Non-lockable manual release
K/E005	Terminal in the motor terminal box
S/E005	Standard rectifier in the motor terminal box

EK	Single-disc brake (option with separate brake terminal box)
ZK	Double-disc brake (option with separate brake terminal box)
EK***S***005	Standard rectifier in the brake terminal box
EK***K***005	Terminal in the brake terminal box

5.2 Bauer brakes

BM-series geared motors are delivered with an externally mounted spring-loaded brake. The brake secures the carriage in position when the motor is switched off, and brakes the moving masses mechanically during an emergency shutdown or a power failure.

5.3 Design

Single-disc or double-disc BAUER brakes are available. Braking torque is applied by spring force when the motor is de-energised. The brake releases electromagnetically when electric power is applied. The D.C. solenoid is designed for continuous operation (S1). BAUER brakes are safety brakes with holding function. They are mounted on the motors from the outside. This design makes the brakes very easy to service (shorter time-outs for inspection). On D05, D06, D07 and D08 motors, the brakes are mounted on the B-end bearing plate below the fan cowl; on D09 motors and larger (available as an option for D08) they are mounted externally on a cast-iron fan cowl. The externally mounted BAUER brakes can also be supplied with brake terminal boxes if required. On EHB carriages, the brake rectifier is usually integrated in the carriage control system. The brake rectifier can generally also be mounted in the motor terminal box if required, or in the brake terminal box for D08 motors and larger.

5.4 Run-on limits in an emergency shutdown

In inverter duty, holding precision is achieved by the inverter. The brake acts as a holding brake. Holding in an emergency shutdown is influenced by several factors. Run-on during actuation time (see table) is virtually independent of load and practically constant. This component can be relatively large, because almost full speed is maintained during the actuation time. The figures for t_A in the table are for interruption of the solenoid's d.c. circuit (see Operating Instructions), the recommended means of actuating the brake in applications benefiting from short run-on, and for gradients. It is important to note the inherent delays and scatter of the switching devices. Run-on during braking time depends on load, on external mass moments of inertia and on the braking torque. Variation in friction due to physical factors is always possible, so for safety's sake the tolerances used in calculations should always be relatively large. We recommend a tolerance of roughly +/- 25 % for total run-on time and total run-on travel, and the inclusion of additional margins to all for fluctuating boundary conditions (load, temperature, response times of the switching devices and controllers).

5.5 Brake electrical ratings

Type	M_{br}	t_{DC}	t_{AC}	P_{el}	W_{rot}	W_{th}	W_L
	Nm	ms	ms	W	10^3J	10^3J	10^6J
E003B	3	12	100	20	15	140	85
E..005A	5	12	100	25	50	250	100
Z..005A	10	15	100	25	50	250	150
E..008A	7.5	7	45	25	50	250	50
Z..008A	15	7	45	25	50	250	100
E..010A	10	10	200	45	50	350	200
Z..010A	25	15	200	45	50	350	300
E..015A	15	10	200	45	50	350	200
Z..015A	30	15	200	45	50	350	300
E..025A	25	20	400	70	75	450	300
Z..025A	50	20	400	70	75	450	400
E..050A	50	25	450	115	100	600	500

M_{Br} Rated brake torque
t_{DC} Brake application response time with D.C.-side switching
t_{AC} Brake application response time with A.C.-side switching
P_{el} Electrical power consumption of the solenoid coil
W_{rot} Permissible switching work per braking operation
W_{th} Thermally permissible switching work per hour
W_L Permissible switching energy before the friction discs must be replaced at max. M_{Br}.

5.6 Connection

The electrical brake connection in overhead conveyor drives is usually created by EHB control using D.C. voltage via terminals or rectifiers in the motor terminal box.

Standard voltages:

Direct, via the terminal connection:	Via the rectifier with supply voltage:
24 V DC	
105 V DC	220 ... 230 V 50/60 Hz
180 V DC	380 ... 420 V 50/60 Hz
210 V DC	440 ... 480 V 60 Hz
250 V DC	550 ... 575 V 60 Hz

Other voltages available at extra cost.

5.7 D.C. connection via terminal (K)

The brake must be connected directly to the direct current via separate terminals in the motor terminal box or brake terminal box. The standard voltages are 250 V DC, 210 V DC, 180 V DC, 105 V DC and 24 V DC. Brakes for other voltages are available at extra cost.

5.8 Standard rectifier (S)

The brake must be connected to the alternating current via the standard rectifier in the motor terminal box or brake terminal box. Standard voltages are 550 ... 575 V 60 Hz, 440 ... 480 V 60 Hz, 380 ... 420 V 50/60 Hz or 220 ... 230 V 50/60 Hz. Other voltages up to 575 V Hz can be supplied at greater cost. In a configuration with standard rectifier, the brake circuit can be interrupted by an extra contact on the d.c. side in order to reduce the response time. (See 5.4). This significantly reduces the braking time and run-on travel.

5.9 Brake connection, operation with frequency inverter

The voltage at the motor terminal board of a motor operating with a frequency inverter is frequency-dependent. Brakes require a constant voltage, so they need an electrical connection of their own. This is the reason why the brake is never connected to the motor terminals ex-works.

5.10 Brake connection, pole-changing motors

The brakes of pole-changing motors also need an electrical connection of their own. As is the case with motors for operation with frequency inverters, the brake is not connected to the motor terminals ex-works.

5.11 Manual release (HA, HN)

All brakes are available with mechanical manual release on request. Non-lockable manual release is the standard version (HN). A lockable manual release (HA) can be supplied if required from brake size 005 and above. For reasons of safety, however, this manual release is not usual on overhead conveyors.

5.12 Degree of protection

BAUER brakes of sizes 005 to 050 comply with degree of protection IP 65.

5.13 Special corrosion protection

If high requirements for corrosion resistance apply, the brakes are available with two levels of enhanced corrosion protection:
CORO1 (C1): Finished with two-component paint to protect against chemically aggressive gases and vapours.
CORO2 (C2): Same finish as CORO1. The screws for the terminal-box cover are non-rusting steel. The mechanical internals of the brake are made of corrosion-proof material.

5.14 CE mark

BAUER geared motors with externally mounted spring-loaded brakes bear the CE mark.

The brakes comply with:

- Machinery Directive 89/392/EEC, manufacturer's declarations may also be required
- the Low Voltage Directive (73/23/EEC), bearing the CE mark
- the EMW Directive (89/336/EEC), bearing the CE mark

5.15 Dimensional drawings: (from ME or or from the DG2000/99 catalogue)

E003, E005-E025 HN, Z005-Z025 HN, E050 and Z050 HN

6 Important notes

6.1 Notes for ordering

Please refer to our quotation when ordering (if applicable). When ordering spare parts, please quote the motor number from the original shipment so that we can take the special features of the motor into account.

6.2 Support for drive design

It would be helpful to our overhead conveyor systems experts if you could offer a preliminary design of the optimum drive solution for your overhead conveyor. Please complete the questionnaire (section 2) and return it to us.

6.3 Notes on safety

See the safety notes in Bulletin 122 regarding installation ... Important: Secure the carriage before disconnecting while on ascending/descending gradients.

6.4 Covers for rotating parts

The guards required under German law (Law Concerning Industrial Equipment (Equipment safety law) or Accident Prevention Regulations (UVV)) are not included in the standard scope of supply because they are usually fitted by the customer or the risk of accident can be eliminated by suitable installation. See Bulletin 122...

6.5 Dimensions and fits of output shafts and keyways

Output shaft and second shaft stub, keyway and key are in compliance with the DIN standards and ISO fits listed below:

Solid shaft
Shaft diameter to D = 50 mm in ISO k6 (DIN 748 Part 1)
as of D = 50 mm in ISO m6 (DIN 748 Part 1)
Keyway ISO P9 (DIN 6885 Page 1)
Key, high ISO h9 (DIN 6885 page 1 and DIN 6880)
Bore - customer ISO H7

6.6 Mounting of running wheels

Always exercise great care when fitting running wheels onto output shafts and, whenever possible, use the DIN 332 tapped end hole provided for this purpose. It has been found that fitting is made easier by heating the running wheel being installed to approximately 100° C. Dimension the locating bore to ISO H7. Gears with solid shaft at each end (gear code -.3/): alignment of the two keys is subject to the DIN 7168 tolerances, the degree of accuracy is fine.

7 Motor data

7.1 4-pole motors for continuous operation S1-100% at 50 Hz system

P	Type	Y	n	M_N	$I_{N\ (400V)}$	cos φ	I_A/I_N	MA/MN	M_S/M_N	MK/MN	J_{Rot}
kW			rpm	Nm	A						kgm^2
0.18	D06LA4	Y	1350	1.28	0.63	0.70	3.4	2.3	2.2	2.4	0.000295
0.25	D06LA4	Y	1350	1.75	0.89	0.69	3.2	2.3	2.2	2.3	0.000295
0.30	D07LA4	Y	1350	2.1	1.30	0.60	3.2	2.7	2.5	2.7	0.000385
0.37	D07LA4	Y	1350	2.6	1.37	0.69	2.7	2.2	2.1	2.2	0.000385
0.37	D08SA4	Y	1400	2.5	1.23	0.70	3.9	2.2	2.0	2.4	0.000870
0.55	D08MA4	Y	1400	3.8	1.60	0.75	4.2	2.1	1.9	2.3	0.00115
0.75	D08LA4	Y	1400	5.1	2.0	0.76	4.6	2.2	2.0	2.5	0.00150
1.10	D09SA4	Y	1400	7.5	2.8	0.78	5.1	2.3	2.1	2.7	0.00245
1.50	D09LA4	Y	1400	10.2	3.6	0.80	5.4	2.4	2.2	2.8	0.00320
2.2	D09XA4	Y	1400	15	5.1	0.80	4.6	2.2	2.1	2.6	0.00380
3.0	D11SA4	Y	1420	20	6.8	0.82	5.3	2.1	1.9	2.7	0.0081
4.0	D11MA4	Y	1420	26.5	8.5	0.83	5.2	2.1	2.0	2.7	0.0105
5.5	D11LA4	Y	1420	37	11.6	0.83	5.9	2.4	2.3	2.9	0.0140

7.2 Operation from a frequency inverter with constant torque of up to 50 Hz

							Thermally permissible torques at S1-100% operation				
P	Type	Y	30-50 Hz	30-50 Hz	up to 50 Hz	up to 50 Hz	5 Hz	10 Hz	20 Hz	60 Hz	70 Hz
(50 Hz)			M_L	$I_{L\ (400V)}$	M_{acc}	I_{acc}	M	M	M	M	M
kW			Nm	A	Nm	A	Nm	Nm	Nm	Nm	Nm
0.18	D06LA4	Y	1.28	0.70	2.05	1.0	0.76	0.96	1.15	1.28	0.97
0.25	D06LA4	Y	1.75	0.85	2.8	1.4	1.05	1.32	1.58	1.75	1.29
0.30	D07LA4	Y	2.1	1.30	3.4	2.1	1.27	1.59	1.9	2.1	1.81
0.37	D07LA4	Y	2.6	1.37	4.2	2.2	1.57	1.96	2.3	2.5	1.83
0.37	D08SA4	Y	2.5	1.25	4	2.0	1.5	1.87	2.20	2.5	1.91
0.55	D08MA4	Y	3.8	1.55	6.1	2.7	2.20	2.8	3.30	3.8	2.8
0.75	D08LA4	Y	5.1	2.0	8.1	3.2	3.0	3.8	4.5	5.1	4.0
1.1	D09SA4	Y	7.5	2.7	12	4.4	4.5	5.6	6.7	7.5	6.4
1.5	D09LA4	Y	10.2	3.6	16.3	5.8	6.1	7.6	9.1	10.2	8.7
2.2	D09XA4	Y	15	5.1	24	8.2	9.0	11.2	13.5	15	12.4
3.0	D11SA4	Y	20	6.4	32	10.9	12	15	18	20	17.1
4.0	D11MA4	Y	26.5	8.5	42.4	13.6	15.9	19.8	23.5	26.5	22.5
5.5	D11LA4	Y	37	11.6	59.2	18.5	22	27.5	33	37	31.5

7.3 Operation from a frequency inverter with constant torque up to 87 Hz

							Thermally permissible torques at S1-100% operation				
P	Type	△	30-87 Hz	30-87 Hz	up to 87 Hz	up to 87 Hz	5 Hz	8.7 Hz	10 Hz	20 Hz	100 Hz
(50 Hz)			M_L	$I_{L\,(400V)}$	M_{acc}	I_{acc}	M	M	M	M	M
kW			Nm	A	Nm	A	Nm	Nm	Nm	Nm	Nm
0.18	D06LA4	△	1.28	1.22	2.05	1.75	0.76	0.92	0.96	1.15	1.28
0.25	D06LA4	△	1.75	1.5	2.8	2.5	1.05	1.26	1.32	1.58	1.75
0.30	D07LA4	△	2.1	2.25	3.4	3.7	1.27	1.59	1.9	2.1	1.81
0.37	D07LA4	△	2.6	2.4	4.2	3.8	1.57	1.96	2.3	2.5	1.83
0.37	D08SA4	△	2.5	2.2	4	3.5	1.5	1.8	1.87	2.20	2.5
0.55	D08MA4	△	3.8	2.7	6.1	4.5	2.20	2.7	2.8	3.30	3.8
0.75	D08LA4	△	5.1	3.65	8.1	5.6	3.0	3.6	3.8	4.5	5.1
1.1	D09SA4	△	7.5	4.7	12	7.7	4.5	5.4	5.6	6.7	7.5
1.5	D09LA4	△	10.2	6.3	16.3	10	6.1	7.3	7.6	9.1	10.2
2.2	D09XA4	△	15	8.9	24	14.2	9.0	10.8	11.2	13.5	15
3.0	D11SA4	△	20	11.1	32	18.9	12	14.4	15	18	20
4.0	D11MA4	△	26.5	14.8	42.4	24	15.9	19	19.8	23.5	26.5
5.5	D11LA4	△	37	20.1	59.2	32.5	22	26.5	27.5	33	37

Legend for motor data (7.1 to 7.3)

P	Rated power at 50 Hz line frequency
n	Guideline value for rated speed at the rotor shaft at 50 Hz line frequency
M_N	Rated torque at the rotor shaft
I_N	Rated current at 400 V
cos φ	Power factor
I_A/I_N	Relative starting currents
M_A/M_N	Relative starting torques
M_S/M_N	Relative pull-up torques
M_K/M_N	Relative breakdown torques
J_{rot}	Mass moment of inertia of the rotor

Important for the correct dimensioning of the frequency inverter:

M_L	Permissible load torque at the rotor shaft (S1-100%)
I_L	Permissible load current at 400 V (S1-100%)
M_{acc}	Acceleration torque at the rotor shaft (up to 50 or 87 Hz)
I_{acc}	Acceleration current at 400 V (up to 50 or 87 Hz)

7.4 4-pole motors for continuous operation S1-100% at 60 Hz system

P	Type	Y	n	M_N	$I_{N\ (460V)}$	cos φ	I_A/I_N	M_A/M_N	M_S/M_N	MK/MN	J_{Rot}
kW			rpm	Nm	A						kgm^2
0.25	D06LA4	Y	1620	1.47	0.8	0.69	3.2	2.5	2.4	2.5	0.000295
0.30	D06LA4	Y	1620	1.75	1.0	0.70	3.1	2.1	2.0	2.1	0.000295
0.37	D07LA4	Y	1620	2.1	1.2	0.69	3.0	2.4	2.3	2.4	0.000385
0.55	D08SA4	Y	1680	3.1	1.5	0.77	3.7	2.1	2.1	2.5	0.000870
0.75	D08MA4	Y	1680	4.25	2.2	0.76	4.0	2.2	2.2	2.5	0.00115
1.10	D08LA4	Y	1680	6.1	2.5	0.76	3.8	1.9	1.7	2.1	0.00150
1.50	D09SA4	Y	1680	8.5	3.2	0.85	4.5	2.3	2.3	2.5	0.00245
2.2	D09LA4	Y	1680	12.5	4.4	0.83	5.0	2.3	2.3	2.6	0.00320
3.0	D09XA4	Y	1680	17	6.1	0.87	5.1	2.4	2.4	2.8	0.00380
3.7	D11SA4	Y	1710	20	7.1	0.82	4.5	1.9	1.7	2.4	0.0081
4.4	D11MA4	Y	1710	24.5	8.0	0.84	5.8	2.4	2.4	3.0	0.0105
5.5	D11LA4	Y	1710	30.5	11	0.87	5.4	2.3	2.2	2.9	0.0140

7.5 Operation from a frequency inverter with constant torque of up to 60 Hz

							Thermally permissible torques at S1-100% operation				
P	Type	Y	36-60 Hz	36-60 Hz	up to 60 Hz	up to 60 Hz	5 Hz	10 Hz	20 Hz	70 Hz	0.80
60 Hz			M_L	$I_{L\ (460V)}$	M_{acc}	I_{acc}	M	M	M	M	M
kW			Nm	A	Nm	A	Nm	Nm	Nm	Nm	Nm
0.25	D06LA4	Y	1.47	0.8	2.35	1.28	0.88	1.1	1.32	1.47	1.29
0.30	D06LA4	Y	1.75	1.0	2.8	1.6	1.05	1.31	1.57	1.68	1.29
0.37	D07LA4	Y	2.15	1.21	3.4	1.91	1.29	1.61	1.93	2.1	1.81
0.55	D08SA4	Y	3.1	1.5	5.0	2.5	1.86	2.3	2.8	3.1	2.7
0.75	D08MA4	Y	4.25	2.2	6.8	3.6	2.5	3.1	3.8	4.2	3.7
1.10	D08LA4	Y	6.1	2.5	9.9	4.1	3.6	4.5	5.4	5.8	4.5
1.50	D09SA4	Y	8.5	3.2	13.6	5.2	5.1	6.3	7.6	8.5	7.4
2.2	D09LA4	Y	12.5	4.4	20.0	7.1	7.5	9.3	11.2	12.5	11.2
3.0	D09XA4	Y	17	6.1	27.2	9.8	10.2	12.7	15.3	17.0	15.3
3.7	D11SA4	Y	20	7.1	32.8	11.7	12.0	15.0	18.0	20.0	16.8
4.4	D11MA4	Y	24.5	8.0	39.2	12.8	14.7	18.3	22.0	24.5	22
5.5	D11LA4	Y	30.5	11	48.8	17.6	18.3	22.5	27.0	30.5	27

7.6 Operation from a frequency inverter with constant torque of up to 104 Hz

							Thermally permissible torques at S1-100% operation			
P	Type	△	30-104 Hz	30-104 Hz	up to 104 Hz	up to 104 Hz	5 Hz	10 Hz	20 Hz	120 Hz
60 Hz			M_L	$I_{L\,(460V)}$	M_{acc}	I_{acc}	M	M	M	M
kW			Nm	A	Nm	A	Nm	Nm	Nm	Nm
0.25	D06LA4	△	1.47	1.39	2.35	2.2	0.88	1.1	1.32	1.47
0.30	D06LA4	△	1.75	1.74	2.8	2.8	1.05	1.31	1.57	1.68
0.37	D07LA4	△	2.15	2.1	3.4	3.4	1.29	1.61	1.93	2.1
0.55	D08SA4	△	3.1	2.6	5.0	4.2	1.86	2.3	2.8	3.1
0.75	D08MA4	△	4.25	3.8	6.8	6.1	2.5	3.1	3.8	4.2
1.10	D08LA4	△	6.1	4.4	9.9	7.1	3.6	4.5	5.4	5.8
1.50	D09SA4	△	8.5	5.7	13.6	9.1	5.1	6.3	7.6	8.5
2.2	D09LA4	△	12.5	7.7	20.0	12.2	7.5	9.3	11.2	12.5
3.0	D09XA4	△	17	10.6	27.2	17	10.2	12.7	15.3	17.0
3.7	D11SA4	△	20	12.3	32.8	20.5	12.0	15.0	18.0	20.0
4.4	D11MA4	△	24.5	13.9	39.2	24.5	14.7	18.3	22.0	24.5
5.5	D11LA4	△	30.5	19.1	48.8	30.5	18.3	22.5	27.0	30.5

Legend for motor data (7.4 to 7.6)

P	Rated power at 60 Hz line frequency
n	Guideline value for rated speed at the rotor shaft at 60 Hz line frequency
M_N	Rated torque at the rotor shaft
I_N	Rated current at 460 V
cos φ	Power factors
I_A/I_N	Relative starting currents
M_A/M_N	Relative starting torques
M_S/M_N	Relative pull-up torques
M_K/M_N	Relative breakdown torques
J_{rot}	Mass moment of inertia of the rotor

Important for the correct dimensioning of the frequency inverter:

M_L	Permissible load torque at the rotor shaft (S1-100%)
I_L	Permissible load current at 460 V (S1-100%)
M_{acc}	Acceleration torque at the rotor shaft (up to 60 or 104 Hz)
I_{acc}	Acceleration current at 460 V (up to 60 or 104 Hz)

7.7 Information about operation with frequency inverter

The figures given in the table below are for BAUER motors operating in conjunction with Danfoss frequency inverters. See section 3.23.10 for notes on the use of other frequency inverters. The torques mentioned in tables 3.23.1 and 3.23.2 can be entered for the respective frequencies in continuous operation (S1 = duty factor 100%).

Field attenuation for frequencies above 50 Hz, winding for standard voltage 400 V Y / 50 Hz, temperature class F.

Motor with standard windings can be switched from star to delta connection for operation with a frequency inverter having a single-phase mains connection. This has no effect on the torques and frequencies as listed in the table above. As regards the choice of frequency inverter, however, note that currents are higher than those of the star connection by a factor of 1.73. The load currents in the table are guideline values for selecting the size of frequency inverter. Load cur-

rent is lower if the load torque is below the values permitted for 30-70 Hz and the frequency inverter used is of the high-grade type. This means that a smaller inverter can sometimes be used, particularly in conjunction with large motors.

Field weakening for frequencies above 87 Hz, winding design for 230 Ṽ/50 Hz (Umax = 400 Ṽ/87 Hz), temperature class F. The load currents given in the table serve as guide values for the frequency inverter size selection. Load current is lower if the load torque is below the values permitted for 30-100 Hz and the inverter used is of the high-grade type. This means that a smaller inverter can sometimes be used, particularly in conjunction with large motors.

7.8 Notes on design

Use the torque required at the lowest operating speed to select motors for applications which require constant torque over the entire speed range, as is the case, for example, with lifting gear and conveyors. Bear in mind, too, the possibility of torque being lower in the field-weakening range. The motor's power is frequency-dependent. It can be approximated in kW from torque M in Nm, the 50 Hz or 60 Hz speed n and the frequency f in Hz by means of the equation

$P = M \times n / 9550 \times f/50$
or
$P = M \times n / 9550 \times f/60.$

If a 5000-series Danfoss frequency inverter is used in conjunction with a pulse generator, the full 50 Hz or 60 Hz rated torque is available as holding torque at motor standstill (external fan required for prolonged periods at standstill). In many instances, however, a mechanical brake is necessary for holding a position exactly or for safety reasons. The use of thermistors (available for all motor sizes at extra cost) is strongly recommended for thermal protection of the windings of motors operating in conjunction with frequency inverters.

7.9 Increased torque with reduced duty factor

A reduction in duty factor increases the torque available at the low end of the frequency range (up to the transition frequency for field weakening) in accordance with the factors in the table below:

Duty factor	Motor torque with reduced duty factor	Increase in current requirement approximate
100 %	-	-
60 %	1.15 x S1 torque	1.15 x S1 current
40 %	1.30 x S1 torque	1.30 x S1 current
25 %	1.45 x S1 torque	1.45 x S1 current
15 %	1.60 x S1 torque	1.60 x S1 current

This, in turn, means that short-term overload by a factor of 1.6 is permissible for starting from a low speed, for example. An increase in torque in the field-weakening range due to a reduction in duty factor is possible only under certain conditions; the 1.6x S1 torque generally cannot be achieved.

7.10 Energy-saving function

5000-series VLT frequency inverters reduce voltage in part-load operation to lower the motor current and thus improve efficiency. This inverter function emulates the method of operation of commercially available energy-saving devices.

7.11 Regeneration

Regenerative torques (braking torques) are required of motors used on gradients, for example. In conjunction with VLT frequency inverters, the motor torques listed in the table can be applied as regenerative torques. As with motor torque, an increase in regenerative torque with reduced duty factor is permissible.

7.12 Notes on operation with other-make frequency inverters

The precondition is that the motor current generated by the frequency inverter is largely free of harmonics. The harmonics generated in the motor by some old-style frequency inverters result in additional losses and cut available torque by some 10% across the entire frequency range. There is also a risk of oscillation causing damage to the gear unit. At frequencies below approximately 5 Hz, operation without pulse generators is possible only using a frequency inverter with state-of-the-art control. If the frequency inverter does not feature load-dependent frequency and voltage adjustment, the increase in the motor's current consumption means that particularly in the case of small motors (D05-D09), torque has to be reduced at frequencies below approximately 10 Hz even if an external fan is used or the duty factor is reduced. Regenerative operation is possible only under certain circumstances.

7.13 BM-series geared motors with pole-changing winding on a 50 Hz system

7.13.1 8/2-pole motors Y/Y for travelling gears in S3-25/75% duty, supply frequency 50 Hz

P kW	*Type*	n rpm	M_N Nm	I_N (400 V) A	cos φ	I_A/I_N	MA/MN	M_S/M_N	MK/MN	J_{Rot} kgm²	J_{SL} kgm²
0.050/0.20	***D06LA82***	680/2700	0.70/0.70	0.51/1.02	0.63/0.75	1.4/2.8	1.7/2.0	1.7/1.9	1.8/2.1	0.000295	0.0014
0.063/0.25	***D07LA82***	680/2700	0.87/0.87	0.80/1.35	0.63/0.75	1.4/2.8	1.9/2.2	1.9/2.1	2.0/2.3	0.000385	0.0014
0.071/0.280	***D07LA82***	680/2700	0.98/0.98	0.80/1.50	0.63/0.75	1.4/2.8	1.7/2.0	1.7/1.9	1.8/2.1	0.000385	0.0014
0.09/0.36	***D08LA82***	700/2800	1.22/1.22	0.70/1.05	0.60/0.92	2.9/4.5	2.0/2.6	2.0/2.5	2.4/2.9	0.00150	0.004
0.12/0.50	***D08LA82***	700/2800	1.70/1.70	0.95/1.43	0.60/0.92	2.9/4.5	2.0/2.6	2.0/2.5	2.4/2.9	0.00150	0.004
0.16/0.63	***D08LA82***	700/2800	2.2/2.1	1.20/1.45	0.63/0.90	2.0/4.6	1.8/2.1	1.8/2.0	2.2/2.4	0.00150	0.004
0.25/1.00	***D09XA82***	700/2800	3.4/3.4	1.30/2.3	0.62/0.90	2.2/5.2	1.9/2.3	1.9/2.3	2.0/2.6	0.00380	0.007
0.36/1.40	***D09XA82***	700/2800	4.9/4.8	2.1/3.3	0.57/0.87	2.0/4.5	1.9/2.1	1.9/2.1	2.0/2.4	0.00380	0.007
0.45/1.80	***D09XA82***	700/2800	6.1/6.1	2.4/4.3	0.65/0.89	2.0/4.3	1.7/2.0	1.7/2.0	2.0/2.5	0.00380	0.007
0.56/2.2	***D11LA82***	710/2840	7.5/7.3	2.3/4.7	0.60/0.94	3.2/4.9	1.9/2.9	1.9/2.4	2.2/2.9	0.0140	0.0021
0.71/2.8	***D11LA82***	710/2840	9.5/9.4	2.8/5.6	0.58/0.94	2.5/4.7	1.9/2.3	1.9/2.0	2.1/2.4	0.0140	0.0021
0.90/3.6	***D11LA82***	710/2840	12.1/12.1	3.5/7.9	0.58/0.94	2.5/4.5	1.8/2.0	1.8/1.8	2.0/2.1	0.0140	0.0021

7.13.2 12/2-pole motors Y/Y for travelling gears in S3-25/75% duty, supply frequency 50 Hz

P kW	*Type*	n rpm	M_N Nm	I_N (400 V) A	cos φ	I_A/I_N	MA/MN	M_S/M_N	MK/MN	J_{Rot} kgm²	J_{SL} kgm²
0.045/0.28	***D08LA122***	470/2800	0.92/0.95	0.55/0.86	0.70/0.90	1.4/4.5	1.9/2.4	1.9/2.4	1.9/2.7	0.00150	0.004
0.063/0.40	***D08LA122***	470/2800	1.29/1.36	0.66/1.10	0.70/0.90	1.4/4.5	1.7/2.2	1.7/2.2	1.7/2.4	0.00150	0.004
0.09/0.56	***D08LA122***	470/2800	1.85/1.91	1.00/1.45	0.63/0.89	1.4/4.1	1.7/2.1	1.7/2.3	1.8/2.4	0.00150	0.004
0.11/0.71	***D09XA122***	470/2800	2.3/2.4	1.05/1.60	0.59/0.88	1.5/5.5	1.7/2.7	1.7/2.6	1.8/3.3	0.00380	0.007
0.16/1.00	***D09XA122***	470/2800	3.3/3.4	1.70/2.4	0.62/0.89	1.5/5.5	1.8/2.6	1.8/2.5	1.8/3.3	0.00380	0.007
0.20/1.25	***D09XA122***	470/2800	4.1/4.3	2.0/3.0	0.62/0.89	1.5/5.0	1.7/2.4	1.7/2.3	1.7/3.1	0.00380	0.007
0.25/1.60	***D11LA122***	470/2840	5.1/5.3	2.3/3.4	0.53/0.95	1.6/4.9	1.7/2.6	1.7/2.4	2.0/2.8	0.0140	0.021
0.32/2.0	***D11LA122***	470/2840	6.5/6.7	3.0/4.0	0.53/0.94	1.6/4.7	1.7/2.5	1.7/2.2	2.0/2.7	0.0140	0.021
0.45/2.8	***D11LA122***	470/2840	9.2/9.4	4.2/5.6	0.52/0.94	1.6/4.7	1.5/2.3	1.5/2.0	1.8/2.4	0.0140	0.021

P Rated powers at 50 Hz line frequency, operating mode S3-25/75%
n Guideline values for rated speeds at the rotor shaft at 50 Hz line frequency
M_N Rated torques at the rotor shaft
I_N Rated currents 400 V Y/Y (currents can be converted as inverse ratios of voltages from 400 V to the desired special voltage)
cos φ Power factors
I_A/I_N Relative starting currents
M_A/M_N Relative starting torques
M_S/M_N Relative pull-up torques
M_K/M_N Relative breakdown torques
J_{rot} Mass moment of inertia of the rotor
J_{SL} Mass moment of inertia of the heavy cast-iron fan

7.14 BM-series geared motors with pole-changing winding on a 60 Hz system

7.14.1 8/2-pole motors Y/Y for travelling gears in S3-25/75% duty, supply frequency 60 Hz

P kW	*Type*	n rpm	M_N Nm	I_N (400 V) A	cos φ	I_A/I_N	MA/MN	M_S/M_N	MK/MN	J_{Rot} kgm²	J_{SL} kgm²
0.050/0.20	***D06LA82***	810/3240	0.58/0.59	0.450/0.90	0.63/0.75	1.5/3.1	1.9/2.2	1.9/2.1	2.0/2.3	0.000295	0.0014
0.063/0.25	***D07LA82***	810/3240	0.72/0.72	0.70/1.18	0.63/0.75	1.5/3.1	2.1/2.4	2.1/2.3	2.2/2.5	0.000385	0.0014
0.071/0.280	***D07LA82***	810/3240	0.82/0.81	0.70/1.32	0.63/0.75	1.5/3.1	1.9/2.2	1.9/2.1	2.0/2.3	0.000385	0.0014
0.09/0.36	***D08LA82***	840/3360	1.01/1.01	0.63/0.94	0.60/0.92	3.2/4.9	2.2/2.9	2.2/2.8	2.7/3.2	0.00150	0.004
0.12/0.50	***D08LA82***	840/3360	1.41/1.41	0.87/1.28	0.60/0.92	3.2/4.9	2.2/2.9	2.2/2.8	2.7/3.2	0.00150	0.004
0.16/0.63	***D08LA82***	840/3360	1.79/1.75	1.08/1.30	0.63/0.90	2.2/5.0	2.0/2.3	2.0/2.2	2.5/2.7	0.00150	0.004
0.25/1.00	***D09XA82***	840/3360	2.8/2.8	1.14/2.0	0.62/0.90	2.4/5.7	2.1/2.5	2.1/2.5	2.2/2.8	0.00380	0.007
0.36/1.40	***D09XA82***	840/3360	4.1/4.0	1.83/3.0	0.57/0.87	2.2/4.9	2.1/2.3	2.1/2.3	2.2/2.6	0.00380	0.007
0.45/1.80	***D09XA82***	840/3360	5.1/5.0	2.2/3.8	0.65/0.89	2.2/4.7	1.9/2.2	1.9/2.2	2.2/2.7	0.00380	0.007
0.56/2.2	***D11LA82***	850/3420	6.2/6.0	2.1/4.1	0.60/0.94	3.5/5.4	2.1/3.2	2.1/2.6	2.4/3.2	0.0140	0.021
0.71/2.8	***D11LA82***	850/3420	7.9/7.8	2.5/4.9	0.58/0.94	2.7/5.1	2.1/2.5	2.1/2.2	2.3/2.6	0.0140	0.021
0.90/3.6	***D11LA82***	850/3420	10/10	3.2/6.9	0.58/0.94	2.7/4.9	2.0/2.2	2.0/2.0	2.2/2.3	0.0140	0.021

7.14.2 12/2-pole motors Y/Y for travelling gears in S3-25/75% duty, supply frequency 60 Hz

P kW	*Type*	n rpm	M_N Nm	I_N (400 V) A	cos φ	I_A/I_N	MA/MN	M_S/M_N	MK/MN	J_{Rot} kgm²	J_{SL} kgm²
0.045/0.28	***D08LA122***	560/3360	0.76/0.79	0.490/0.76	0.70/0.90	1.5/4.9	2.1/2.7	2.1/2.7	2.1/3.0	0.00150	0.004
0.063/0.40	***D08LA122***	560/3360	1.07/1.13	0.59/0.98	0.70/0.90	1.5/4.9	1.9/2.4	1.9/2.4	1.9/2.7	0.00150	0.004
0.09/0.56	***D08LA122***	560/3360	1.54/1.59	0.91/1.30	0.63/0.89	1.5/4.5	1.9/2.3	1.9/2.5	2.0/2.6	0.00150	0.004
0.11/0.71	***D09XA122***	560/3360	1.88/2.0	0.96/1.44	0.59/0.88	1.6/6.0	1.9/3.0	1.9/2.9	2.0/3.6	0.00380	0.007
0.16/1.00	***D09XA122***	560/3360	2.7/2.8	1.50/2.2	0.62/0.89	1.6/6.0	2.0/2.9	2.0/2.7	2.0/3.6	0.00380	0.007
0.20/1.25	***D09XA122***	560/3360	3.4/3.5	1.77/2.7	0.62/0.89	1.6/5.5	1.9/2.6	1.9/2.5	1.9/3.4	0.00380	0.007
0.25/1.60	***D11LA122***	560/3420	4.3/4.4	2.1/3.0	0.53/0.95	1.8/5.4	1.9/2.8	1.9/2.6	2.2/3.1	0.0140	0.021
0.32/2.0	***D11LA122***	560/3420	5.4/5.5	2.6/3.5	0.53/0.94	1.8/5.1	1.9/2.7	1.9/2.4	2.2/3.0	0.0140	0.021
0.45/2.8	***D11LA122***	560/3420	7.6/7.8	3.7/4.9	0.52/0.94	1.8/5.1	1.6/2.5	1.6/2.2	2.0/2.6	0.0140	0.021

P	Rated powers at 60 Hz line frequency, operating mode S3-25/75%
n	Guideline values for rated speeds at the rotor shaft at 60 Hz line frequency
M_N	Rated torques at the rotor shaft
I_N	Rated currents at 460 V Y/Y (currents can be converted as inverse ratios of voltages from 460 V to the desired special voltage)
cos φ	Power factors
I_A/I_N	Relative starting currents
M_A/M_N	Relative starting torques
M_S/M_N	Relative pull-up torques
M_K/M_N	Relative breakdown torques
J_{rot}	Mass moment of inertia of the rotor
J_{rot}	Mass moment of inertia of the heavy cast-iron fan

7.15 Switching and braking

Indexing is a very common application for geared motors. Standard BAUER geared motors can be used in most instances. Pole-changing motors are suitable for direct starts in both speeds. It is advisable to consult us beforehand if your application involves very high switching frequencies, speed changes, braking by reversal or reversals in direction of rotation. When a pole-changing motor goes from high to low speed, the drive functions as an asynchronous generator for the brief period of time in which it is in the oversynchronous speed range; the braking torque developed in this phase is significantly higher than the torque developed by the drive as a motor. It is strongly recommended that an electronic device (e.g. Bauer SPR) be used for soft resettings given the mechanical loading of gear units and driven machinery, or an electromagnetically susceptible load. The drive should always be shut down to a standstill directly from high speed and not from high speed to low speed and then to a standstill. Only motors with external mechanical brakes should be slowed down electrically to low speed, before being braked mechanically to a standstill. Rotary energy diminishes as the square of speed, so this type of shutdown means considerably less wear and tear on the brake. The drives can also be adapted for extreme applications and operating conditions by special measures. See BAUER special publication SD4.. for more information.

7.16 Heavy cast fan

A heavy cast fan can be used instead of the standard fan with motors D05 to D11 in applications requiring soft start or a reduction in switching shock when poles are changed. The heavy cast fan reduces the permissible switching frequency of the motor.

7.17 Plug connector terminal box

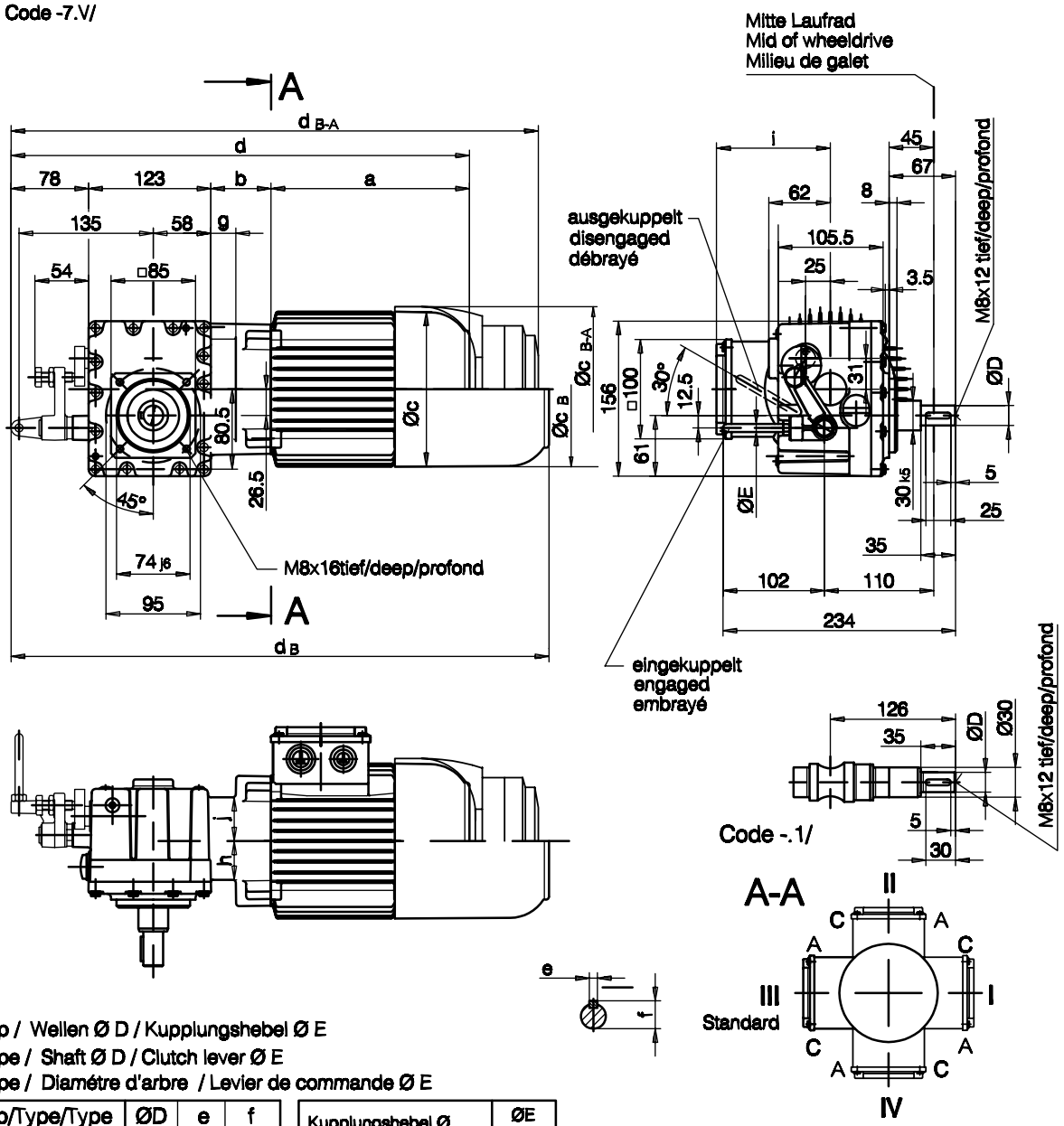
The motor terminal box can be supplied with an externally mounted plug if necessary.

Individual items available on request.

8 Dimensional drawings

Flansch mit Gewindelöchern vorne
flange with threaded holes at front
bride avec trous taraudés à l'avant
Code -7.V/

Nachfolgetyp von SZ2-V3209
Follow-up type of SZ2-V3209
Successeur du type SZ2-V3209



Typ / Wellen Ø D / Kupplungshebel Ø E
Type / Shaft Ø D / Clutch lever Ø E
Type / Diamétre d'arbre / Levier de commande Ø E

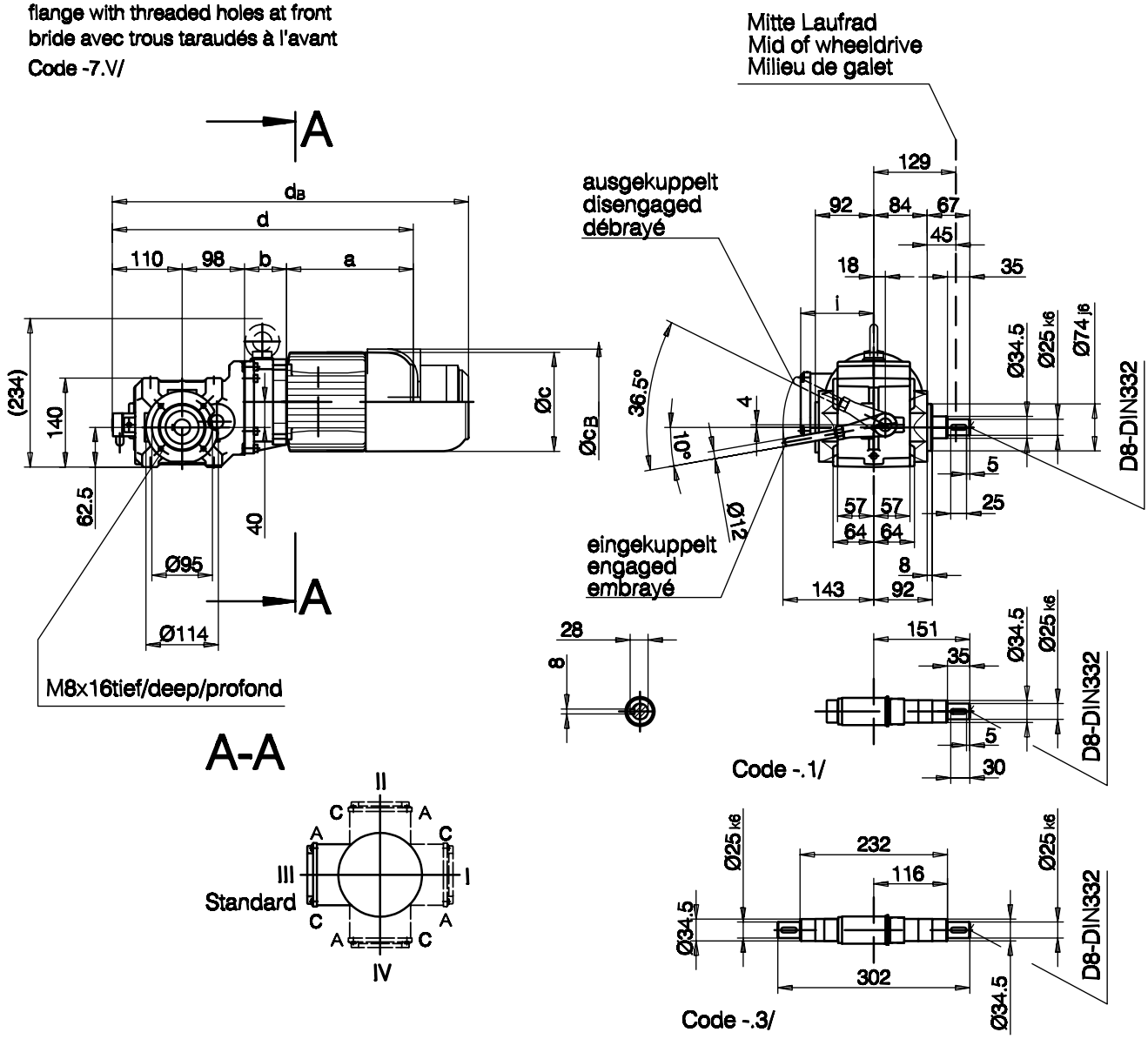
Typ/Type/Type	ØD	e	f
BM09-../D...	20 k6	6	22.5
BM09X-../D...	25 k6	8	28

Kupplungshebel Ø Clutch lever Ø Levier de commande Ø	ØE	
	8mm	Standard
	10mm	Verstärkte Ausführung/ Reinforced Version/ Exécution Renforcée

Ausführung mit Bremse / with brake / avec frein

Typ/Type/Type	a	b	c	d	g	h	i	j	E003		E005-E008		Z005-Z008		E005-A-E008-A		Z005-A-Z008-A	
									c_B	d_B	c_B	d_B	c_B	d_B	c_{B-A}	d_{B-A}	c_{B-A}	d_{B-A}
BM09(X)-../D05..	170	14	123	385	-	-	100	-	123	428								
BM09(X)-../D06..	170	14	123	385	-	-	100	-	123	428								
BM09(X)-../D07..	210	14	123	425	-	-	100	-	123	468								
BM09(X)-../D08..	200	60.5	156	461.5	25	39	115	44			156	548.5	156	548.5	166	536	166	550

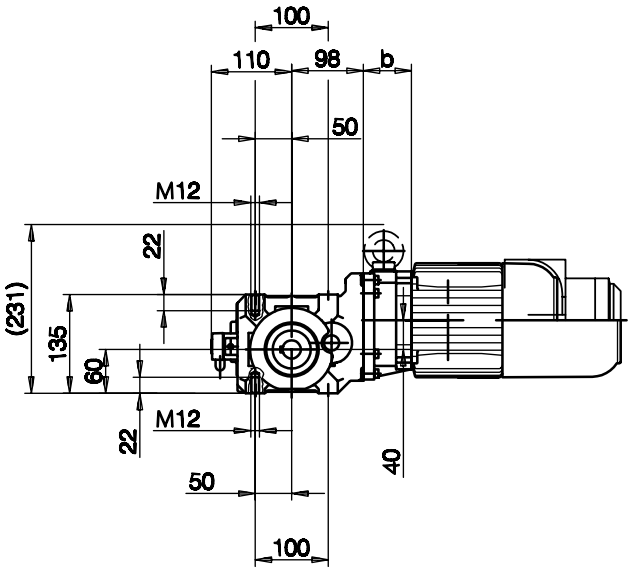
Flansch mit Gewindelöchern vorne
flange with threaded holes at front
bride avec trous taraudés à l'avant
Code -7.V/

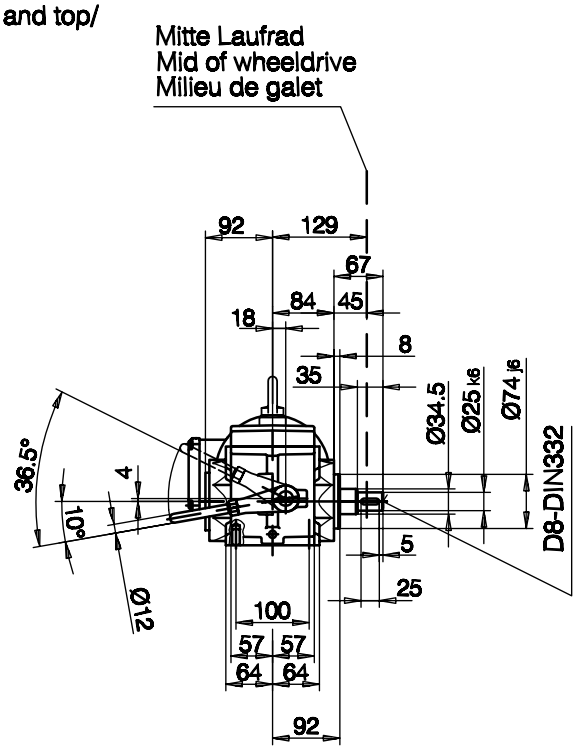


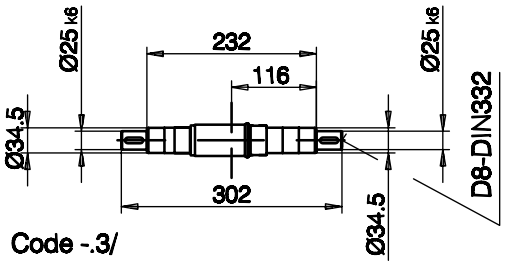
Ausführung mit Bremse / with brake / avec frein																		
Typ/Type/Type	a	b	c	d	i	E003		E004		E005-E008		Z005-Z008						
						c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B					
BM10Z-../D04..	143	86	111	437	90	111	480											
BM10-../D05..	170	62	123	440	100	123	483											
BM10Z-../D05..	170	88	123	466	100	123	509											
BM10-../D06..	170	62	123	440	100	123	483											
BM10Z-../D06..	170	88	123	466	100	123	509											
BM10-../D07..	190	62	123	460	100	123	513	123	513									
BM10Z-../D07..	190	88	123	486	100	123	539	123	539									
BM10-../D08..	200	66	156	474	115					156	561	156	561					
BM10Z-../D08..	200	132	156	540	115					156	627	156	627					
Typ/Type/Type	a	b	c	d	i	E005-E008		Z005-Z008		E010-E015		Z010-Z015		E025		Z025		
						c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	
BM10-../D09..	251	81	176	540	124	192	619	192	633	192	626	192	639	192	636	192	657	

Fuß mit Gewindelöchern unten u. oben/foot threads at bottom and top/
fixation inférieure: trous taraudés

Code -6.UO/







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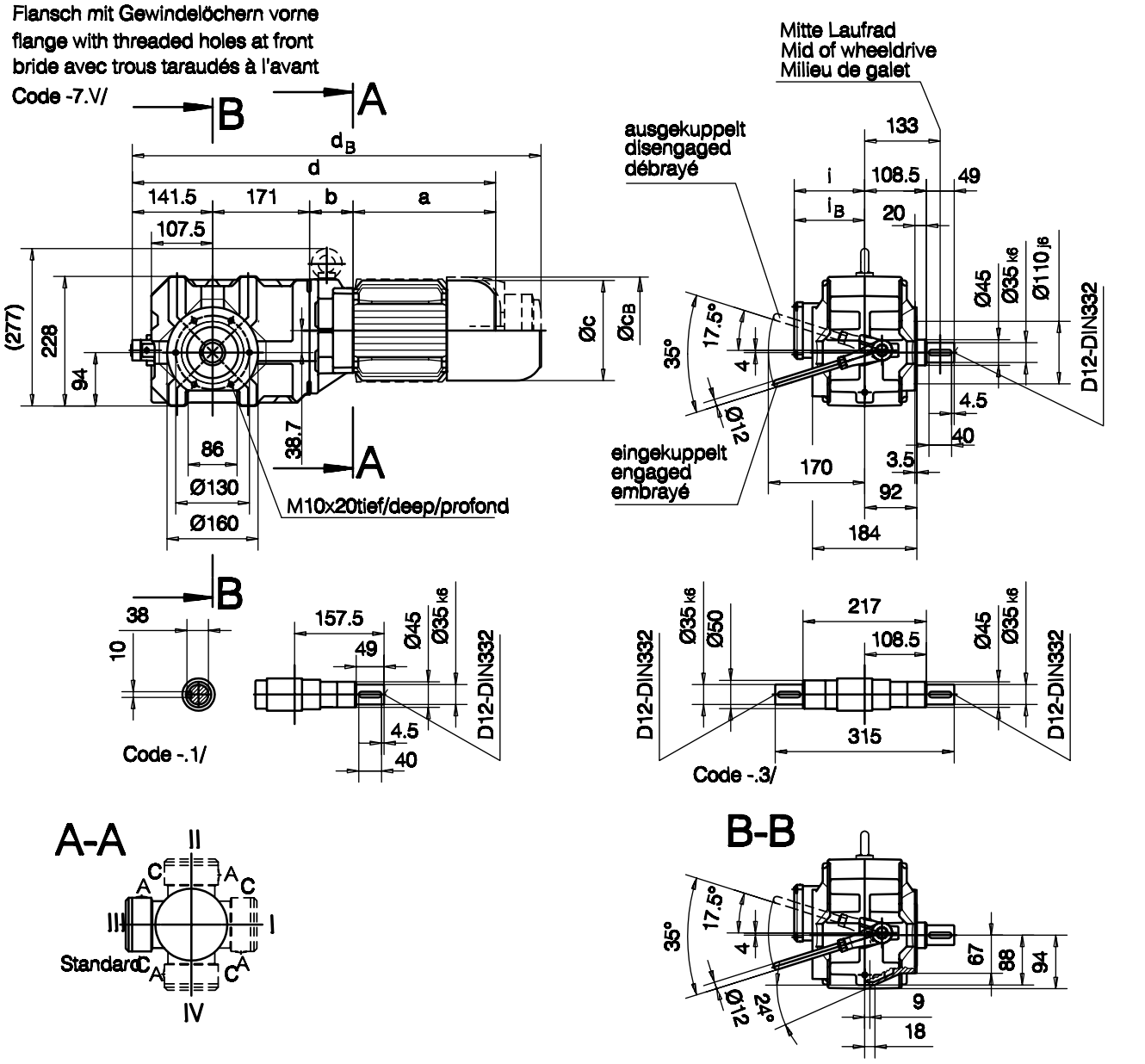
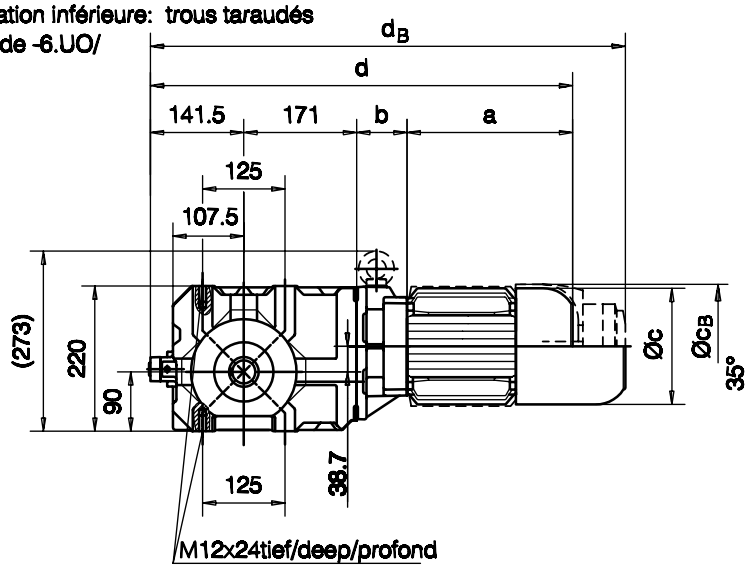
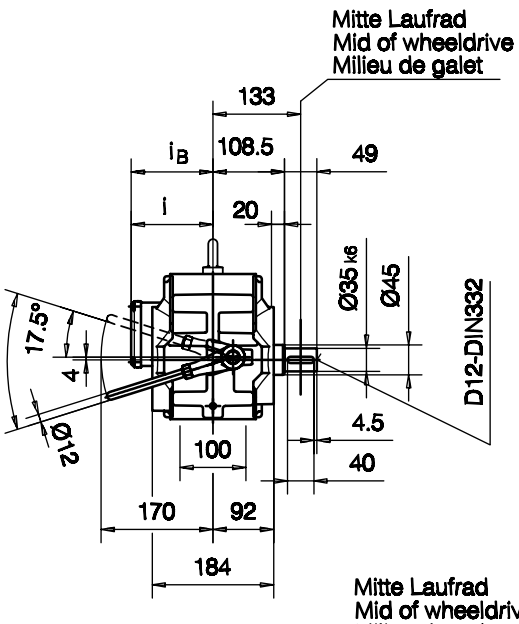


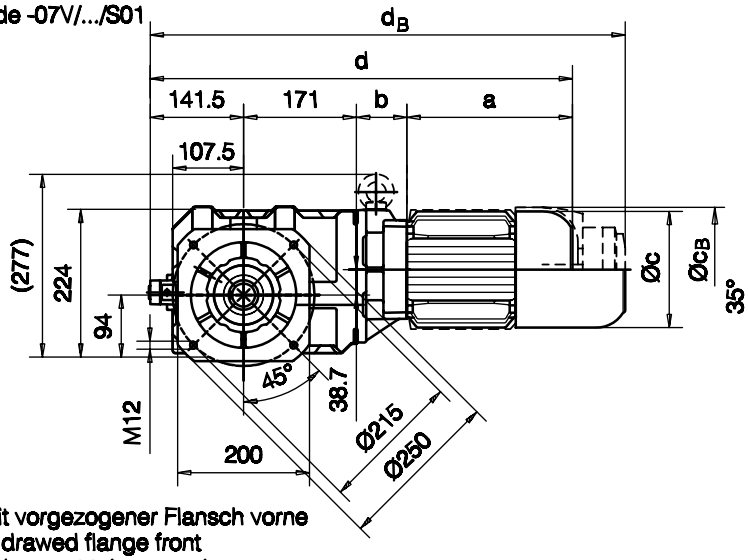
							Ausführung mit Bremse / with brake / avec frein											
Typ/Type/Type	a	b	c	d	i	i_B	E003		E004		E005-E008		Z005-Z008					
							c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B				
BM30-../D05..	170	58	123	541	100	100	123	584										
BM30Z-../D05..	170	134	123	617	100	100	123	658										
BM30-../D06..	170	58	123	541	100	100	123	584										
BM30Z-../D06..	170	134	123	617	100	100	123	658										
BM30-../D07..	190	58	123	561	100	100	123	614	123	614								
BM30Z-../D07..	190	134	123	637	100	100	123	688	123	688								
BM30-../D08..	200	62	156	575	115	115					156	662	156	662				
BM30Z-../D08..	200	138	156	651	115	115					156	738	156	738				
Typ/Type/Type	a	b	c	d	i	i_B	E005-E008		Z005-Z008		E010-E015		Z010-Z015		E025		Z025	
							c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B
BM30-../D09..	251	77	176	641	124	124	192	720	192	734	192	726	192	740	192	743	192	762
BM30Z-../D09..	251	152	176	716	124	124	192	795	192	809	192	801	192	815	192	818	192	837

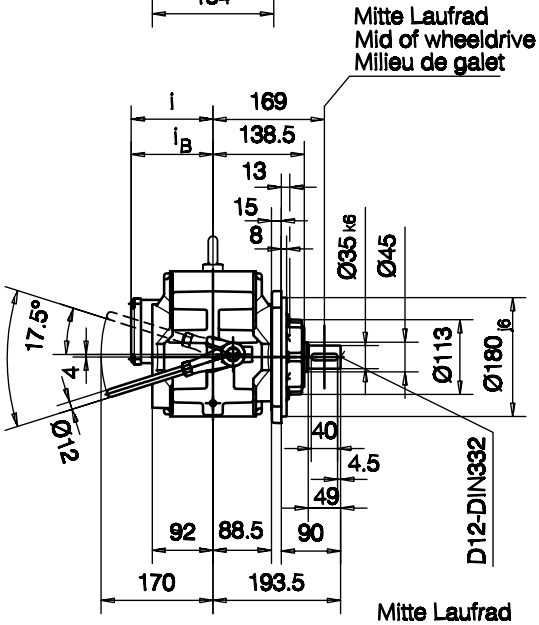
Fuß mit Gewindelöchern unten u. oben/foot threads at bottom and top/
fixation inférieure: trous taraudés
Code -6.UO/



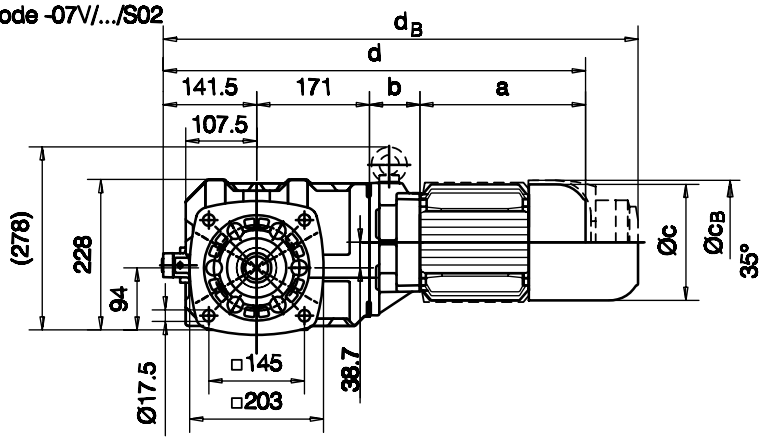


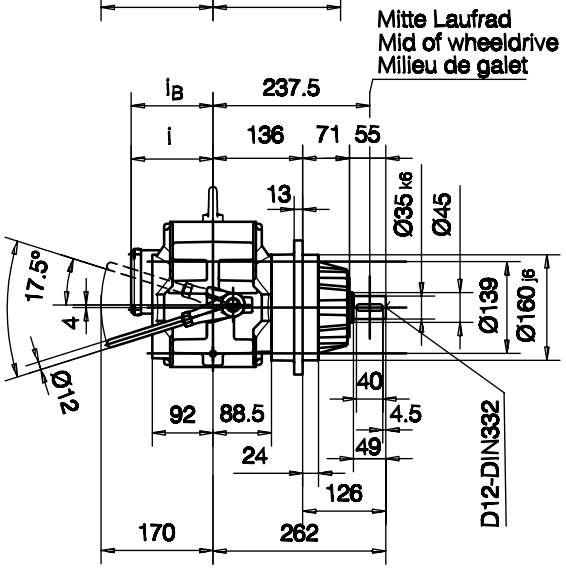
vorgezogener Flansch vorne
drawed flange front
bride avant trés avancée
Code -07V/.../S01



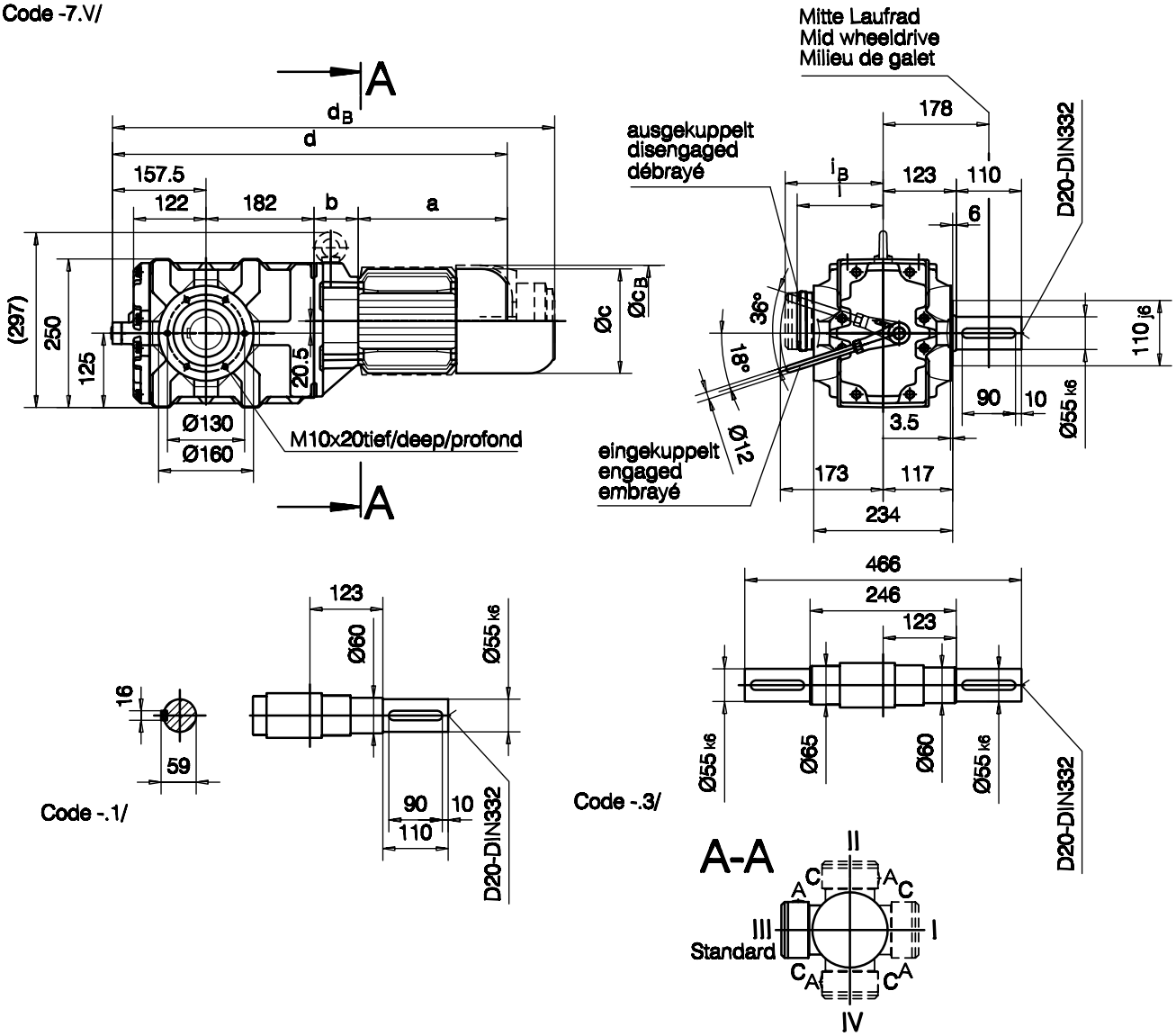


weit vorgezogener Flansch vorne
far drawed flange front
bride avant trés avancée
Code -07V/.../S02



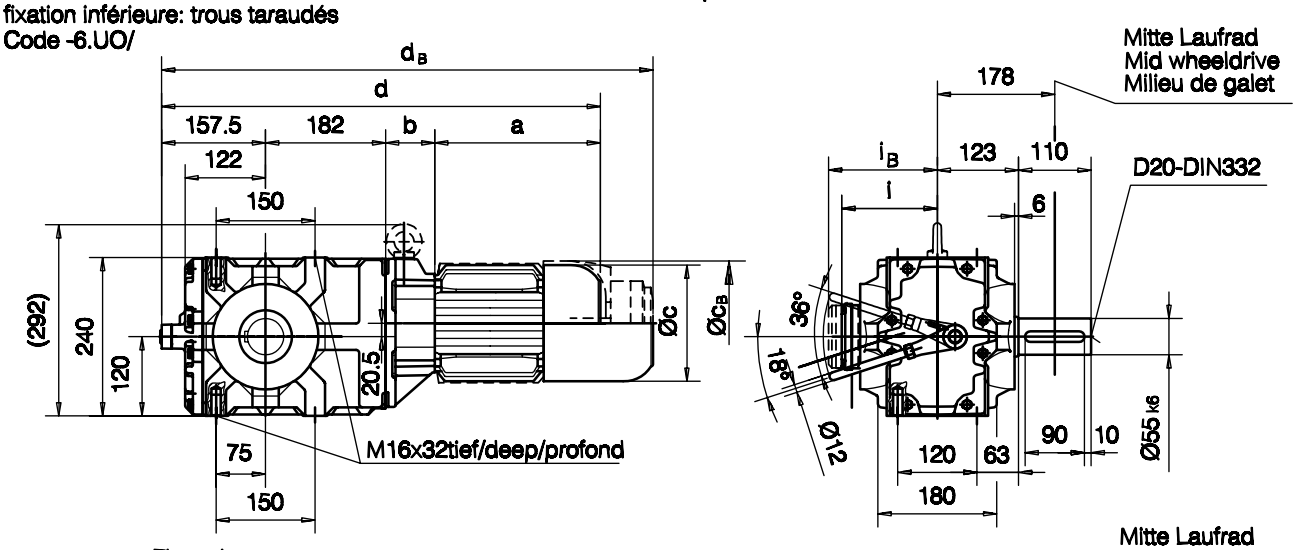


Flansch mit Gewindelöchern vorne
flange with threaded holes at front
bride avec trous taraudés à l'avant
Code -7.V/

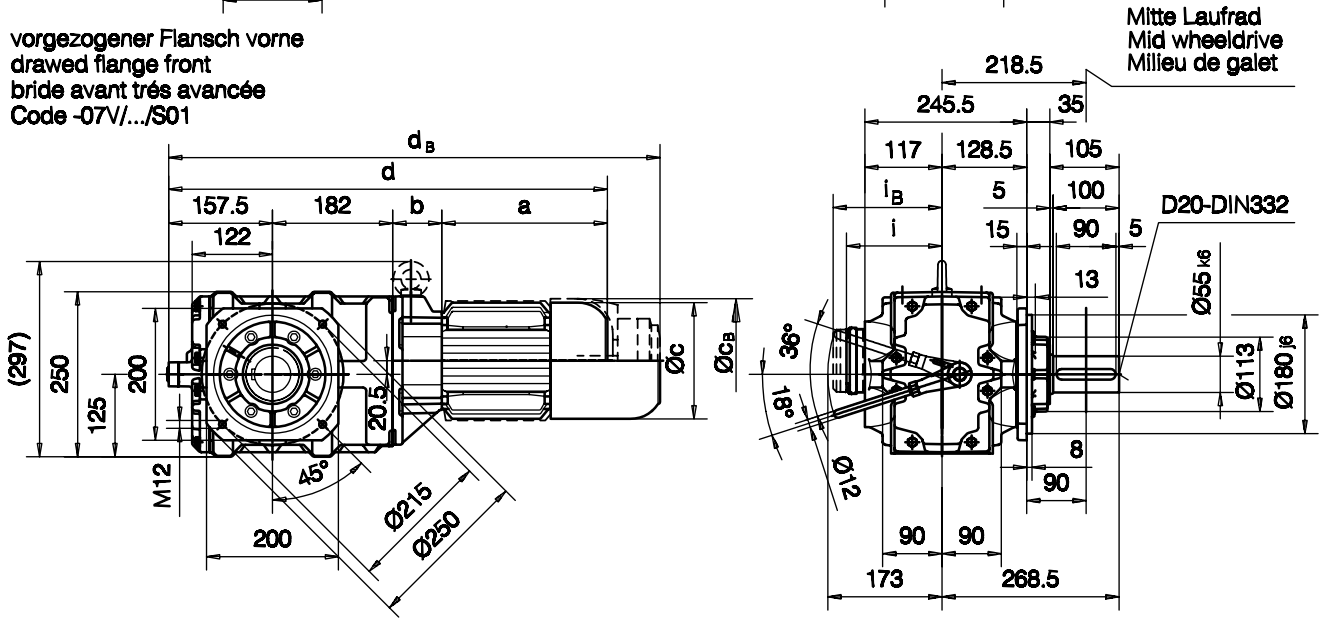


							Ausführung mit Bremse / with brake / avec frein											
Typ/Type/Type	a	b	c	d	i	i_B	E003		E004		E005-E008		Z005-Z008					
							c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B				
BM40Z-../D05..	170	139	123	649	109	100	123	692										
BM40Z-../D06..	170	139	123	649	100	100	123	692										
BM40Z-../D07..	190	139	123	669	100	100	123	722	123	722								
BM40-../D08..	200	60	156	600	115	115					156	687	156	687				
BM40Z-../D08..	200	143	156	683	115	115					156	770	156	770				
Typ/Type/Type	a	b	c	d	i	i_B	E005-E008		Z005-Z008		E010-E015		Z010-Z015		E025		Z025	
							c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B
BM40-../D09..	251	75	176	666	124	124	192	745	192	759	192	752	192	765	192	768	192	787
BM40Z-../D09..	251	157	176	748	124	124	192	827	192	841	192	834	192	847	192	850	192	869
Typ/Type/Type	a	b	c	d	i	i_B	E010-E015		Z010-Z015		E025		Z025		E050-E075		Z050-E075	
							c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B	c_B	d_B
BM40-../D11..	319	81	218	740	181	185	230	826	230	842	230	843	230	862	230	872	230	892

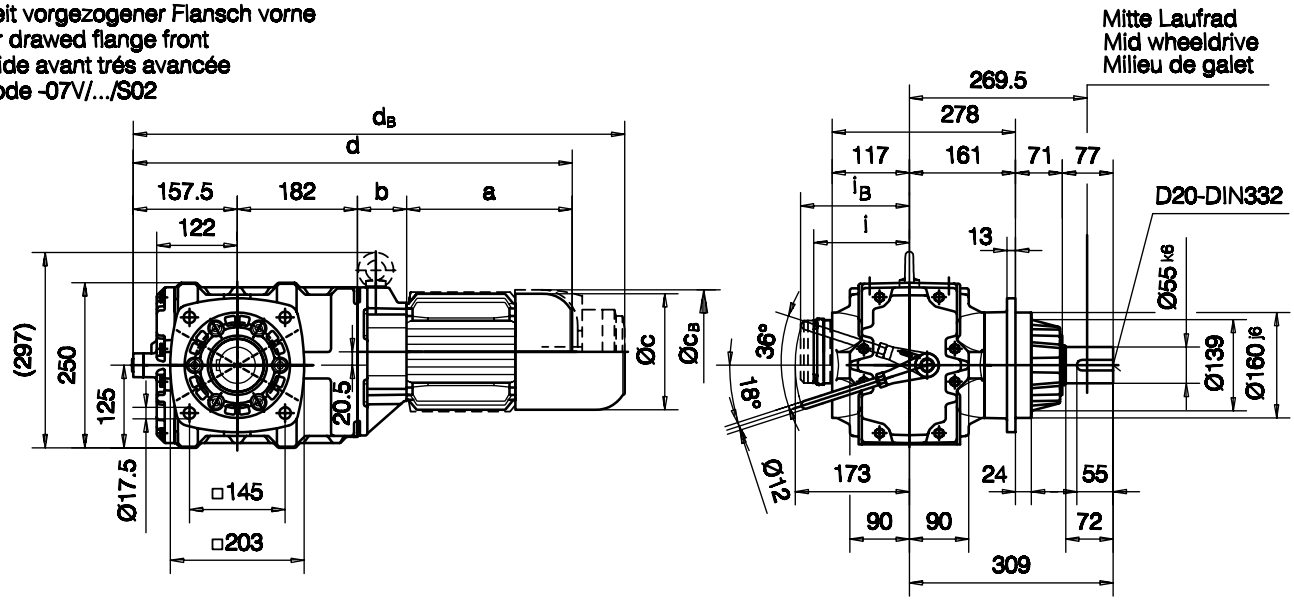
Fuß mit Gewindelöchern unten u. oben/foot threads at bottom and top/
fixation inférieure: trous taraudés
Code -6.UO/



vorgezogener Flansch vorne
drawed flange front
bride avant trés avancée
Code -07V/.../S01



weit vorgezogener Flansch vorne
far drawed flange front
bride avant trés avancée
Code -07V/.../S02



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