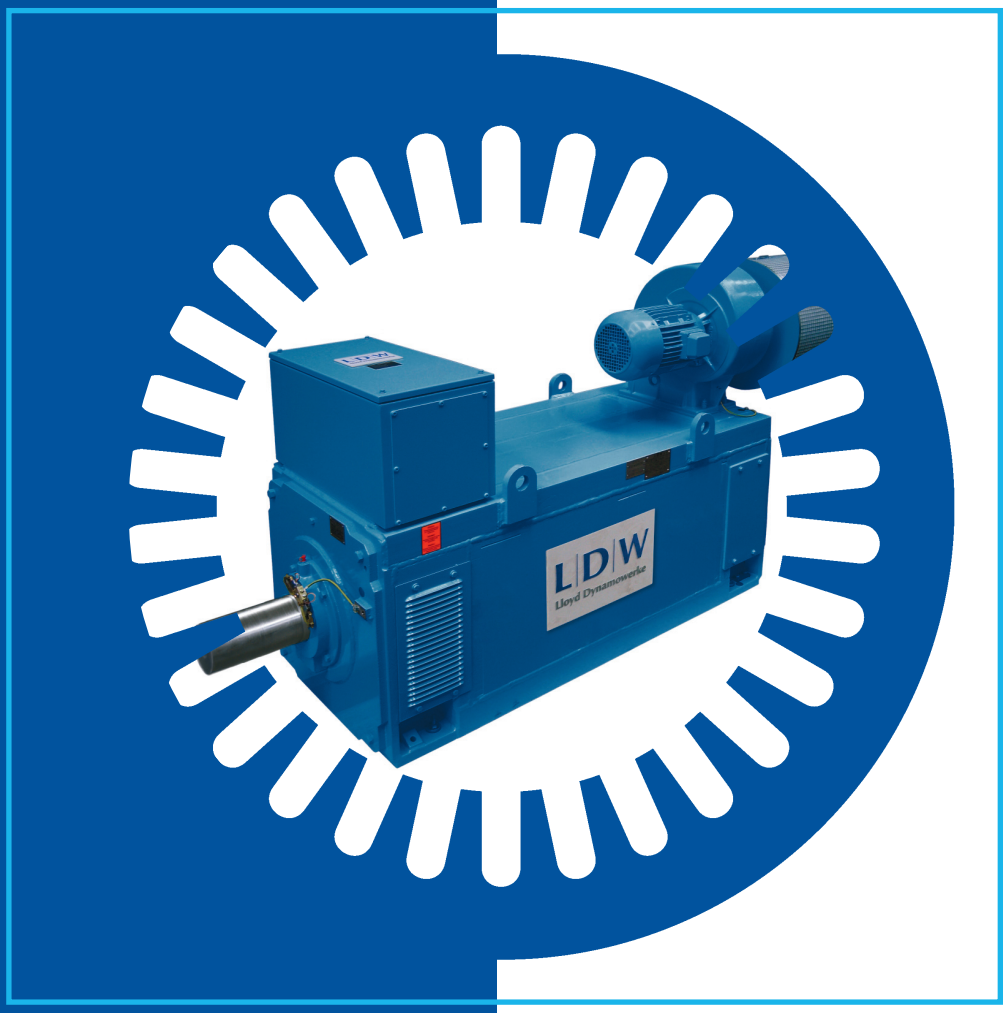
L|D|W
Lloyd Dynamowerke

High-Performance Compact Asynchronous Motors



Type series A5L

Shaft heights:

160, 200, 250, 315, 400 mm

Range of performance:

from 50 to approx. 2000 kW at 1500 RPM.

High-Performance Compact Asynchronous Motors

The angular without housing shell asynchronous machines with high power density are particularly developed for speed adjusted drives and supply by frequency converters.

The machines are forced ventilated. The catalog is for

Type series A5L

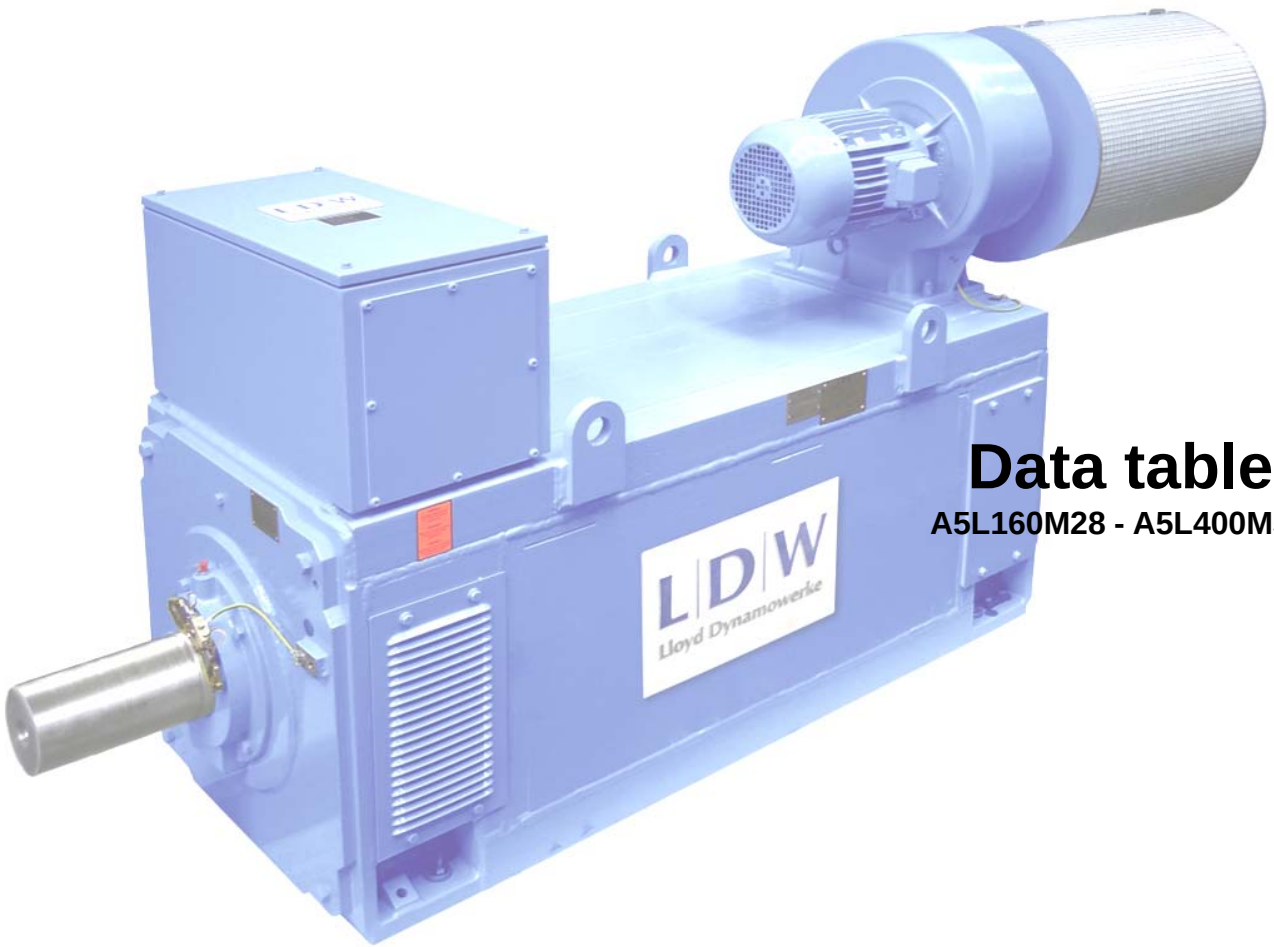
with shaft heights 160, 200, 250, 315 and 400

a range of performance

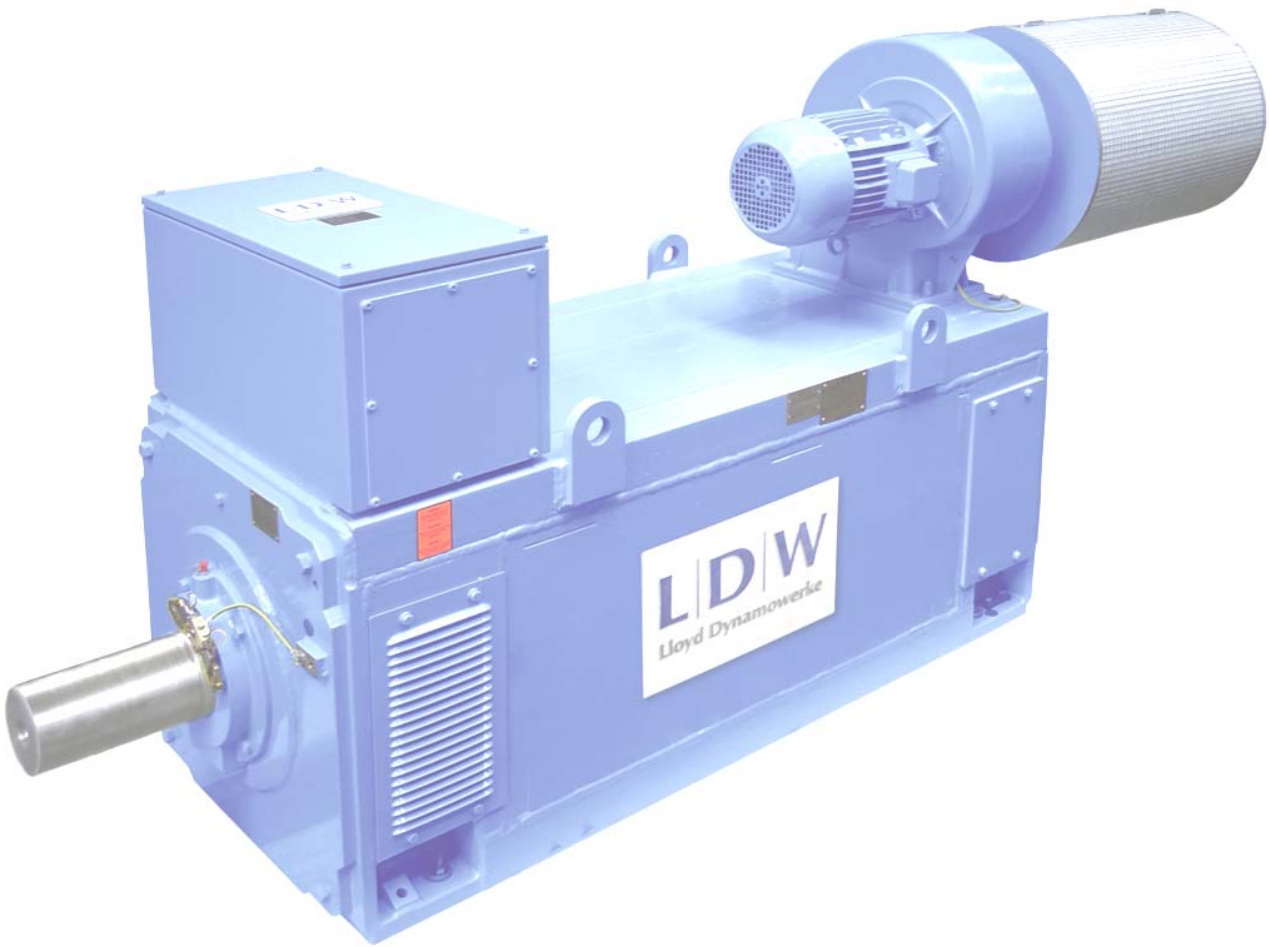
from 50 kW to approx. 2100 kW at 1500 rpm

Change reservation

A change of the achievements, indicated in this catalog, technical data, measures and weights remains reserving. The illustrations are noncommittal.



Preface 1



Contents: Part 1 Preface

1 General Information

1.1 Scope

This catalogue applies to LDW compact asynchronous machines of the following types:

A5L160M28	force-ventilated
	with radially mounted fan,
up to	with built-on air/water heat exchanger
	or via pipe connection
A5L400M54	type of cooling IC 06, IC 17, IC 37, IC 86W

1.2 General design

The series of compact asynchronous machines with high power density has been specifically designed for speed-controlled drives. The outward appearance of this series is very similar to the direct current series G5L.

The angular, laminated core without housing is braced between two press plates. The bearings and end plates come from the proven direct current series. All the standard NDE mounted components used in the direct current series, such as tachometers, pulse generators, centrifugal force switches, brakes etc., can also be used here.

The machines of this series are fed by modern converters with IGBT power modules and optimised pulse patterns and can replace direct current machines of, for example, the G5L series in virtually any application. The A5L machine is smaller (shorter) than comparable direct current machines in many applications without extreme speed ranges and with a constant output.

The machines of the A5L series are single-entry force-ventilated, open-circuit air-cooled machines. Most of the heat is dissipated via the axial cooling channels within the rotor and stator. The open-circuit air cooling achieves intensive cooling of the winding heads.

The unribbed stator cooling channels are located exclusively at the corner areas of the square laminated stator core; the thermal conductance of the fixed links between the channels is tuned to the channel dimensions. In terms of thermal characteristics, the machines are "stator-critical", which is why thermal monitoring and protection is uncomplicated.

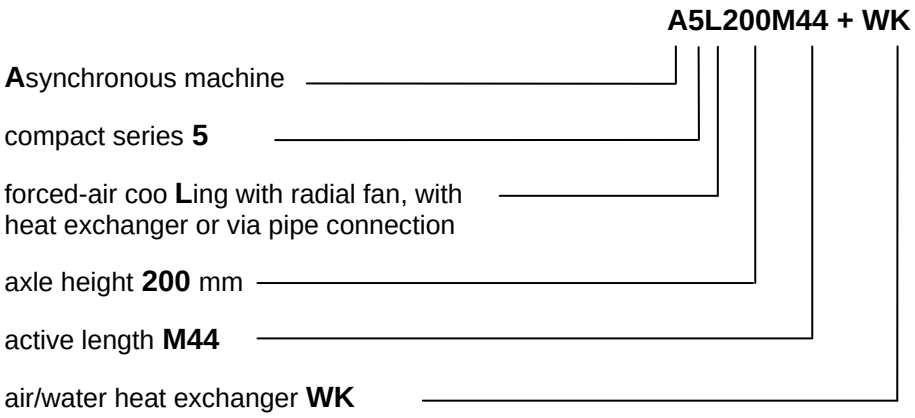
The proven external fans and heat exchangers of the direct current series are also used here. Because the machines are force-cooled independently of speed, they are capable of transferring the full torque over the entire speed adjustment range, as well as at standstill. The machine remains "stator-critical" even at standstill load.

1.3 Machine identification

The machines are designated according to LDW 12 factory standard. The designation is composed as follows:

A5	=>	asynchronous machine, compact series 5
L	=>	open machine / force-cooled by radially mounted fan, with heat exchanger or via pipe connections
1st digit	=>	axle height in mm
M and 2nd digit	=>	code number for active length
+ KA	=>	cooling air via pipe connection
+ WK	=>	air/water heat exchanger with external fan

Example:



1.4 Standards and guidelines

The machines comply with the DIN VDE and EU directives, in particular "Rotating electrical machines - Part 1: Rating and performance" EN 60034-1, the relevant DIN, EN, ISO and IEC standards and the German accident prevention regulations. The machines are in accordance with good engineering practice and state of the art technology at the time of manufacture.

It is virtually always possible to adapt the design of the machines to specific operator specifications; a surcharge will need to be added if the adaptation involves greater material and manufacturing expenditure.

1.5 Tolerances

Certain tolerances are permitted regarding the warranted values for industrial motors according to EN 60034-1, taking into account the necessary manufacturing tolerances and permissible deviations for the materials used.

Efficiency η	- 0.15 (1 - η) at $P_N \leq 50$ kW - 0.1 (1 - η) at $P_N > 50$ kW
Power factor cos φ	- (1 - cos φ) / 6 min. 0.02 max. 0.07
Slip s	$\pm$ 20%
Stall torque M_K	- 10%
Moment of inertia J	$\pm$ 10%

The slip and stall torque data in the table only serve to inform the choice for frequency converter dimensions. They are virtually irrelevant for the intended function of a speed-controlled drive. The same applies to other asynchronous machine variables such as starting current, starting torque and pull-up torque.

2 Electrical Design

2.1 General information

The electromagnetic design of the laminated core has been optimised for 4-pole windings. Slot dimensions and the iron cross sections conducting the current are matched to achieve both a high torque yield an a greater stall torque (required for an extensive flow weakening range and a high overload capacity).

Although the air-gap induction is much greater than in asynchronous standard motors, the magnetic noise excitation is kept very low.

In small rotors the short-circuit winding is an aluminium cast winding, otherwise it is a copper bar winding. The dimensions of rotor slots incl. leakage slots are specially designed for a pulse-controlled inverter feed.

2.2 Insulation system

The stator winding insulation system has been designed for the high voltage loads that generally occur with pulse-controlled inverters and is available in 2 different degrees of strength. The difference between level 2 and 1 is that the surface and winding insulations have been reinforced for level 2; the lower slot space of this level means that the exploitability is also lower.

Table 1

Level of strength	Mains voltage at the converter	Max. perm. voltage peak value at the motor terminals
1	up to 500 V	1300 V
2	over 500 V up to 690 V	2400 V

The insulation system incl. impregnation resin complies with thermal class H.

2.3 Rated power

The power values in the data table apply under the following conditions:

- Continuous operation S1
- Heating of the stator winding in accordance with thermal class F (without air filter, with air filter < thermal class H)
- Cooling air temperature max. 40°C
- Installation height max. 1000 m ASL

- Feed through IGBT pulse-controlled inverter
- Stator voltage as specified
- Standard EN 60034-1

If deviating conditions such as operating type, cooling air temperature and installation height apply, the following tables can be used for an approximate type determinations. The conditions must always be specified in the order to make sure the machines can be designed and tested accordingly.

If other deviating conditions apply, e.g. different regulations (regulations in other countries, customer specifications), a different feed – from GTO-PWR or a current-source inverter – or different voltages are used, these must be discussed with the manufacturing plant. This also applies to the special case of a direct mains feed with a constant frequency; here the starting conditions must be specified.

2.3.1 Deviating operating mode

S2 short-time operation and S3 intermittent operation, cycle duration max. 10 min

Compared to S1 mode, these operating modes thermally relieve the machine, a circumstance which allows greater power allocation. The degree of potential increase in power is determined by the actual thermal time constant and by the ratio of idle to load heating; it may differ slightly, depending on the design of the machine. The values in Table 2 are mean reference values; specific and binding values are provided on request.

Table 2

Operating mode	Permissible output approx.
S2 – 30 min	110% of the catalogue power
S2 – 60 min	105% of the catalogue power
S3 – 40%	120% of the catalogue power
S3 – 60%	110% of the catalogue power

2.3.2 Deviating cooling air temperature and/or installation height

The values specified in section 2.3.1 apply for the new power allocation when there is a deviating cooling air temperature or installation height; here the thermal time constant of course has no influence on the underlying operating mode S1. The approximate power allocations in percent of the catalogue power are found in Table 3:

Table 3

Installation height ASL	Cooling air temperature in °C							
	25	30	35	40	45	50	55	60
1000 M	110	106	103	100	95	90	85	80
1500 M	106	103	100	95	90	85	80	77
2000 M	103	100	95	90	85	80	77	74

2.4 Operational overload (impact load)

The values for overload capability specified in EN 60034-1 (1.5 times the reference current over a period of 2 minutes from a warmed-up condition must be possible) are valid in the event of a malfunction. The machines of this series meet this requirement, although with speed-controlled drives such overloads can generally be buffered by the control system.

Operational impact loads are intended short-time overloads, e.g. to accelerate the drive. In the case of asynchronous motors the overload capability is limited by the stall torque. The catalogue specifications regarding speed and overload in the flow weakening range, however, only exploit 70% of the stall torque. This means that current and torque can be assumed as virtually proportional.

Current and voltage, and thus torque and magnetic flow, can (in contrast to direct current machines) be adjusted without restriction at the same rate as the frequency converter's capability.

2.5 Standstill load

In contrast to the direct current machines, the machines of this series can be loaded with the rated torque at a standstill for an unlimited period.

2.6 Rated voltage

In terms of voltages, it is assumed that the (flow-generating) fundamental component at the converter output is only approx. 92% of the mains voltage at the converter input. The fundamental component is the rated voltage for the electromagnetic design of the machines. The data table lists the values for the most common mains voltages 400 V, 500 V and 690 V.

Other voltages are possible (on request).

2.7 Rated speed

The rated speed is the lowest permissible speed when fed with rated voltage. The frequency at the converter output must be adjusted

$$f = \frac{n\,[1/min]}{30} \times \left(1 + \frac{s\,[\%]}{100}\right) \text{ (Motor operation)}$$

accordingly. (In the case of generator operation (1 – s) must be used.)

The slip s depends on the following variables:

Load	=> proportional
Magnetic flow	=> inverse proportional
Operating temperature of the rotor winding	=> proportional to the change in the winding resistance, i.e. only limited influence

2.8 Speed adjustment range

The speed is adjusted via the converter output frequency. Because cooling is independent of the rotation speed, the machines can be operated with rated current at any speed within the specified speed adjustment range for an unlimited period.

Below the rated speed, the fundamental voltage must be reduced proportionally to the frequency. At very low speeds it may be appropriate to increase the voltage for I x R compensation.

Above the rated speed, an increase in speed is permissible at a constant fundamental voltage up to the flow weakening speeds and impact loads specified in the data tables. The limit for this flow weakening speed is

a) the mechanical strain on bearings and shaft
(identical speeds for different impact loads)

and / or

b) the degree of flow weakening and impact load combined.

The mechanically permissible maximum operating speed (case a) can be significantly increased by special construction measures. The electrically permissible speed (case b) on the other hand can only be increased if the (impact) load – e.g. at rated power – is further reduced. An enquiry is necessary in both cases.

The flow weakening range and the impact load must be specified in the order so that the machines can be tested accordingly.

2.9 Efficiency and power factor

The values specified in the data tables are valid for a feed with sinusoidal variables and will vary slightly for converter feeds, depending on the harmonic content.

The power consumption of external fan motors is not taken into account for the efficiency values.

2.10 Thermal motor protection

In terms of thermal characteristics the machines are "stator-critical" over the entire speed and load spectrum.

The machines can be protected against impermissibly high winding temperatures due, for example, to overloading, increased cooling air temperature, restricted cooling etc., by means of temperature-dependent protective measures.

The standard procedure is the continuous monitoring of the winding temperature by 3 resistance thermometers (type PT 100) that are installed within the stator winding. Usually the data is then processed and evaluated by the computer in the frequency converter control unit.

3 Mechanical Design

3.1 General standard design (construction size 160 to 250)

The end plates on the drive end DE and the non-drive end NDE have identical bearings and air openings. Each end plate has three identical air openings, one at the top, one on the right and one on the left relative to the base position. The corresponding covers, fans or heat exchangers are fitted on these openings, depending on the cooling type and protection class. If the installation position is subsequently changed, the air opening covers must be turned, refitted or reordered in accordance with the protections class.

The external fan is normally arranged at the top of the NDE and the terminal box at the top of the DE. A different terminal position (left, right or NDE top) or a fan installation on the side must be specified in the order. All external fans can be equipped with a filter for at an additional charge.

Monitoring facilities such as pressure switches for monitoring the cooling air flow, differential pressure switches for filter monitoring are also available at an additional charge.

3.1.1 A5L Series

The air openings at the top are provided so a pipe can be connected for ventilation via pipe. A connection at the side is also possible, even at a later stage. If ventilation should come from the bottom (between the feet), this must be specified in the order because subsequent retrofitting is not possible.

The air/water heat exchanger is arranged at the top and the terminal box on the right. Installation of the air/water heat exchanger at the side on request.

3.2 Special design with axially mounted external fan

In principle it is possible to equip the A5L series with axially mounted external fans.

A square pipe that houses the fan is here fitted to the modified end plate on the non-drive end NDE. The rated power must be reduced in this case because the fan is smaller than the radially mounted one. Additionally, the mounting options at the NDE are restricted.

3.3 Terminal box

The terminal box is a metal box and is normally mounted at the top on the end plate DE. A cable entry is provided that is sealed by an undrilled plate. The terminal box can be turned by 180°.

As standard, all winding ends are routed into the terminal box and placed onto the connecting bolts or copper rails.

Table 4

Machine type	Current [A]	Connection bolt
A5L160	up to 400 A	6 x M12
A5L200	up to 630 A	6 x M16
A5L250	up to 1000 A	6 x M20 or 3 copper rails + 1 x neutral point
A5L315	up to 1900 A	6 copper rails
A5L400	up to 2800 A	6 copper rails

Cable entry plate with holes or cable entries / cable entry fittings are available at an additional charge.

3.4 Type of design

The most frequently used design types are illustrated in Figure 1. The designation according to EN 60034-7, although Code II (bottom row) is to be preferred, because design type, installation and shaft ends are more precisely defined by digits 1 and 4.

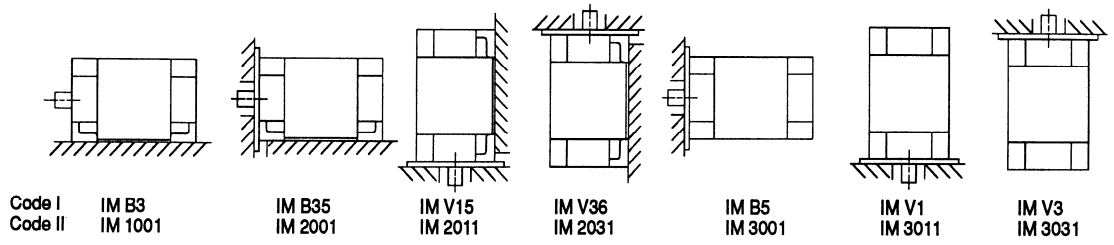


Figure 1

The machines are also supplied as flanged designs with feet. Machines with built-on air/water heat exchangers in flanged design without foot mounting must be enquired. The max. speeds for machines of flanged design must always be enquired.

3.5 Protection classes

The protection classes that are possible in combination with the different cooling types can be seen in Figure 2 to Figure 4. The designation is in accordance with EN 60034-5.

On A5L machines the air entry opening is, unless ordered differently, at the top in the case of protection class IP 23 and cooling type IC 06 or IC 17 and the air outlet openings are arranged at the side of the machine. A different position of the air openings is possible but must be specified in the order later modifications are not always possible.

With a built-on air/water or air/air heat exchanger, the machines comply with protection class IP 44. The protection class can be enhanced up to IP 55 at an additional charge.

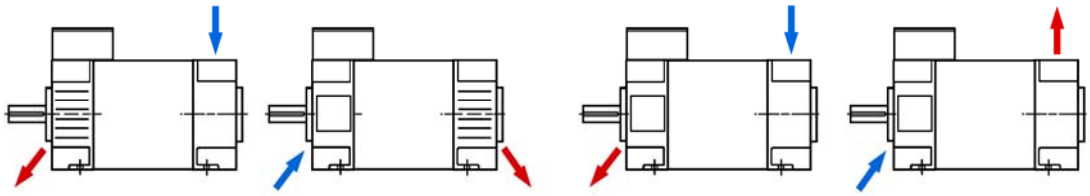
3.6 Cooling types

The figures below show the listed types of cooling. The designation IC .. is in accordance with EN 60034-6.

Air entry may occur at DE or NDE but must be specified in the order together with the desired terminal box position because later modifications are not possible for every combination.

3.6.1 Cooling by connecting the machines to a ventilation system via built-on pipe connections

Type A5L .. +KA

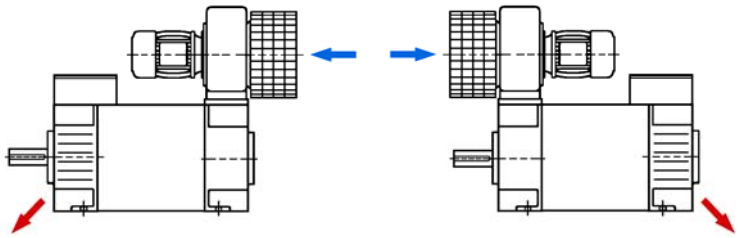


IP 23 – IC 17 IP 44 – IC 37

Figure 2

3.6.2 Cooling through a radially mounted external fan

Type A5L ..



IP 23 – IC 06

Figure 3

3.6.3 Cooling through an air/water heat exchanger (WK)

Type A5L .. +WK

Air movement through external fan

standard
water inlet temperature 25 °C

Water heating approx. 5 K

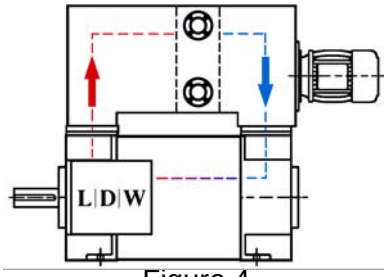


Figure 4

3.7 Data for required cooling air

Table 5

Machine type	Cooling air volume [m^3 /s]	Static counterpressure [hPa]
A5L160	0.35	9
A5L200	0.55	14
A5L250	0.85	14
A5L315	1.6	16
A5L400	3.2	17

3.8 Fan and fan motor data

Table 6

Machine type	Fan	Power [kW]	Voltage [V]	Current [A]	Frequency [Hz]	Weight [kg]
A5L160	D066/S515 *	1.1 1,4	220 - 300 380 - 520	5.2 3.0	50/60	18,5
A5L200	D08/S902	2.2	400	4.9	50	32
A5L250	D082/S902	3	400	6.3	50	36
A5L315	D092/S515	5.5	380 - 520	12	50	75
A5L400	L160	11	400	21	50	180

* Fan motors with multi-voltage range, can be used at 50 and 60 Hz

3.9 Cooling air requirements with open-circuit ventilation

In contrast to direct current machines with their sensitive commutator, the robust asynchronous machines, which do not contain any bare electrically conductive parts in the stator winding, make less demands on the cooling air. By using high-quality insulating materials and impregnations, the stator winding is largely protected against the effects of humidity, non-conducting dust and chemically reacting gases and vapours in the cooling air. The used resins, paints and impregnation methods provide adequate protection when the machines are installed in warm, humid climates.

The following cooling air requirements should be observed however:

1.) The cooling air should not contain more than 0.4 mg non-conductive dust per m^3 to avoid damaging the surface insulation of winding heads. The dust grain size should also be below 10 µm.
If these values are exceeded, an air filter of filter class EN 799-G4 should definitely be used. This is the LDW standard filter. It can be cleaned by rinsing it in water (up to approx. 40°C, with the addition of commercially available detergents, if required), shaking out, suctioning off or blowing.

2.) Fibres contained in the cooling air can seal off the cooling channels and thus reduce the cooling effect. In this case, fitting an air filter is also recommended. In some cases it may be appropriate to use a special wire screen or perforated sheet filter due to fibre structure and for ease of cleaning, by dusting off for example.

3.) Adhesive substances in the cooling air can settle on the cooling channel and winding head surfaces over time and so impair cooling. If an air filter does not seem appropriate in such a case, a different type of cooling should be chosen, e.g. IC 17 with cooling air intake via pipes or IC 86W with built-on air/water heat exchanger.

4.) Cement dust in the cooling air can cause clogging in the cooling channels, especially when combined with humidity. In such cases, the usual procedure is to use large filter surfaces of filter class EN 779-F9 (special design).
Cooling type IC 86W with built-on air/water heat exchanger is an alternative option.

5.) Cooling air with ozone content is not permissible due to its aggressive action on some of the materials used.

3.10 Shaft ends

The shaft ends are supplied with round-faced feather keys in compliance with DIN 6885-1. Two free shaft ends, smaller diameters, different lengths and a version with conical shaft ends are available as special versions.

The machines are always dynamically balanced with half a feather key and marked with an 'H' at the end of the shaft. The standard balance quality complies with Q 2.5 in accordance with ISO 1940-1. The tolerance for true running of the shaft ends, concentricity and linear movement of the fastening flanges is between 'N' and 'R' according to DIN 42955.

3.11 Drive

In the case of a direct clutch, the only option for the roller bearing design is an elastic or flexible clutch. The machines must be aligned with great care.

Lateral force loads (e.g. belt or pinion drive) must not exceed the permissible additional radial forces.

3.11.1 Additional radial forces without external axial force

Drive and non-drive end shaft ends are designed for the full torque during clutch operation.

The diagram below specifies the permissible additional forces Fr for shaft ends with dimensions that correspond with the illustrations of dimensions in the catalogue. Values are valid for standard steel (1) and special steel (2) shafts and bearings with a calculated bearing life of 20,000 operating hours. These limit values must not be exceeded so as not to affect the fatigue strength of the shaft ends.

The specified additional forces do not imply that masses (couplings, flywheels and the like) of this magnitude can be placed on the shaft.

Also, the additional forces must not act on the DE and NDE simultaneously. Details need to be requested for these special cases.

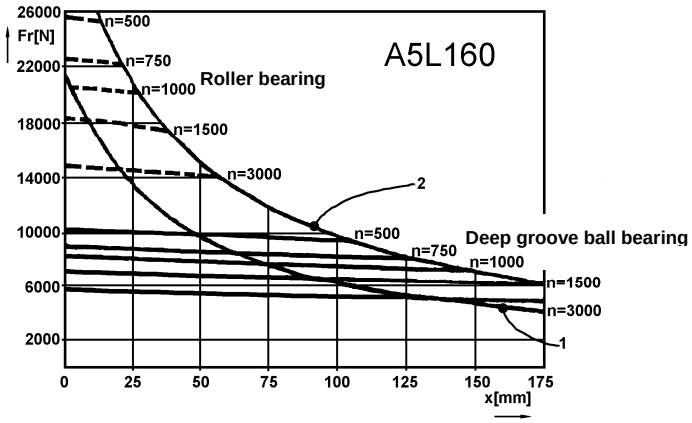


Figure 5

The values for construction sizes A5L200, A5L250, A5L315 and A5L400 are provided on request.

3.12 Vibrations

The standard machines are designed for vibration severity grades between 'N' and 'R' according to EN 60034-14.

Following VDI 2056, the externally excited vibrations specified below, measured near the bearings, are permitted up to 63 Hz:

- standard machines:
  v_{eff} = 4.5 mm/s, but not more than 100 µm oscillation amplitude
- vibration-resistant machines (additional charge):
  v_{eff} = 11 mm/s, but not more than 250 µm oscillation amplitude

3.13 Flanges

For the machines of design types IM 2001 (IM B35), IM 2011 (IM V15), IM 2031 (IM V36) and IM 3011 (IM V1), IM 3031 (IM V3) the flange dimensions are in accordance with IEC 60072-1. All flanges are oil-tight.

A shaft seal running on a hardened bushing is provided on the flange side to seal the bearing.

3.14 Anti-condensation heater

Machines that are subject to dew because of extreme temperature fluctuations when at a standstill, can be equipped with an anti-condensation heater at extra charge. The anti-condensation heater consists of heating strips that are placed around both winding heads. The supply voltage is normally 230 V for 50 and 60 Hz.

A T T E N T I O N ! **The anti-condensation heater must never be switched on during operation!**

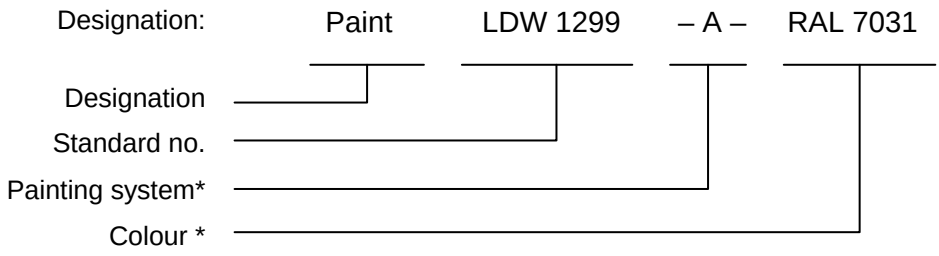
3.15 Accessories

Machines with belt drive must be fastened with tensioning bars and machines with foundation blocks, provided they are not mounted on a base frame or a load-bearing construction. A special foundation is required when installed on a concrete foundation. It is not permitted to install the machine directly on brick or concrete foundations.

Fastening components must be ordered separately.

3.16 Paint coat

The machines are painted in accordance with factory standard LDW 1299.



* as requested by customer

Paints of the **Standard – Painting system A** (normal strain) are resistant against machine and motor oils, grease, weather and humidity (rain, fog), scratching, impact and yellowing. To some extent they are also resistant against short-term exposure to petrol and water, as well as temperature fluctuations.

Painting system B (high strain) paints are available at an extra charge. They against machine and motor oils, grease, weather and humidity (rain, fog), scratching, impact, abrasion, yellowing, as well as water, seawater, temperature fluctuations, industrial and urban atmospheres. They are partially resistant against chemicals and solvents (e.g. concentrated acids, alkaline solutions, etc.).

Further special paint coats, including water-soluble paints, are available at an additional charge on request.

4 Machine Selection

4.1 General Information

Driven machines that are to be driven with speed-control can be divided into 3 groups based on their torque curve:

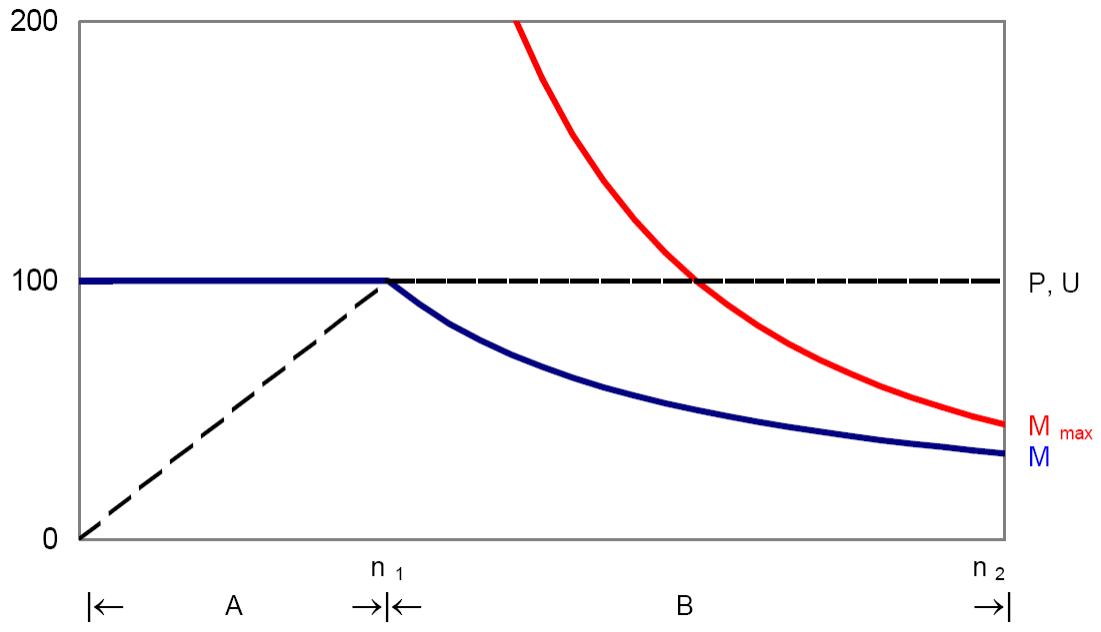
1. $M \sim n^2$
   e.g. flow machines such as pumps and blowers

2. M = const.
   e.g. reciprocating compressors, extruders, centrifuges, moving gear

3. lower speed range: M = const., upper range: P = const.:
   e.g. winders, dereelers, lifting gear

The torque curve of the asynchronous machine as a drive can be adjusted to the curve of the driven machines in a similar manner to direct current machines.

The following figure Figure 6 shows the typical curves for torque, power output and voltage of an asynchronous machine.



n_1 : rated speed n_2 : max. operating speed

Figure 6

Table 7

Range Term	A Constant flow range	W Flow weakening range
Voltage magnetic flow	U / f = const. ϕ = const.	U = const. $\phi \sim 1 / n$
Power Torque max. torque	P ~ n M = const. M_{max} = const.	P = const. M ~ 1 / n $M_{max} \sim (1 / n)^2$
Terms in DC technology	Armature control range	Field control range

4.2 Dimensioning of the required construction size

The machines are dimensioned primarily on the basis of the required torque. The short-time overloads that occur normally, e.g. for acceleration, must be included in the root mean square of the stator current as the rated current:

$$I_{Rated} = \sqrt{\frac{I_1^2 \times t_1 + I_2^2 \times t_2 + ... + I_n^2 \times t_n}{\sum t_1 + t_2 + ... + t_n}}$$

(Because – in contrast to direct current machines – the stator current is made up of the torque-forming active current and the flow-forming reactive current, it is not possible to substitute the stator current by the torque (in the constant-flow range) or the power (in the constant-flow range) when there are extreme load variations!)

In the event that the overload capability in the flow-weakening range should be insufficient, a larger construction size must be selected.

4.3 Overload capability

The potential overload capability is limited by the stall torque, of which only 70% is exploited in the catalogue information. The max. permissible torque naturally drops significantly in the speed adjustment range with constant voltage (flow-weakening range). This is illustrated in simplified fashion in Table 7. Accordingly, the following shall apply (also see examples in section 4.7):

Flow weakening range x overload $\leq$ 70% of stall torque

4.4 Determining the appropriate type of cooling and protection class

Cooling type and protection class must be adapted to the conditions at the place of installation. Section 3.9 must be noted for machines with open-circuit ventilation.

The design in protection class / cooling type IP 23 – IC 06 with air filter where required is the most economical solution.

If protection class IP 44 or higher is required, the following solutions are available:

Cooling air intake and outlet via pipe connection – IP 44 – IC 37 or

Cooling through built-on heat exchanger – IP 44 – IC 86W.

The air/water heat exchanger (IC 86W) allows the same machine utilisation for standard-sized machines as with open-circuit ventilation. The losses of the asynchronous machines are almost completely discharged via the cooling water.

The machines can also be specified for installation in potentially explosive areas. In this case, a joint search for the most economical solution is appropriate, depending on prevailing ambient conditions.

4.5 Data tables

The data tables are grouped and apply to the protection classes and cooling types:

IP 23 – IC 17 and IP 44 – IC 37	with pipe connection
IP 23 – IC 06	with radially mounted external fan
IP 44 – IC 86W	with built-on air/water heat exchanger

4.5.1 Performance chart

The performance chart on the first page is intended to provide an overview and to assist orientation. It is not an exact representation of the values in the table.

For the purpose of clarity, the chart is based on mean table-values and smoothed torque curves. For high speeds and generally with 690 V designs, the table values are below the chart figures.

4.5.2 Structure of the data tables

The data tables are structured in a similar manner to the catalogue for the direct current machines.

The technical data is listed for 12 successive or appropriately stepped stator winding variants. This is done in a row that is divided into three sections for the fundamental voltages 370 V, 465 V and 640 V (mains voltages at the converter input: 400 V, 500 V and 690 V).

It may be the case that the figures for the top winding variant are completely or partially suppressed for shorter machines: in these cases, the electrical rated speed exceeds the max. mechanically permissible operating speed.

The max. permissible speeds (within the flow weakening range) are specified for different overloads. Here the overload relates to the drop in torque with increased speed and not to the rated torque. In many cases, higher speeds than those specified are possible (also see section 2.8).

The stall torque applies to operation at nominal flow; for short-time overloads it should only be exploited up to max. 70%.

Strictly speaking the values for current, efficiency and power factor only apply to feeds with sinusoidal variables; in the case of converter feeds these values may be slightly impaired, depending on the pulse pattern or harmonic content.

4.6 Procedure for machine selection

Agreement:

The values for power, voltage speed etc. that are predefined by the machine to be driven and the feeding converter, are defined as **nominal** values.

1st step:

It is recommended that the required nominal torque be calculated first, because the machines are dimensioned on the basis of torque. Derived from

$M_{Nom} = P / \omega$ the numerical value equation

M_{Nom} [Nm] $= 9549 \times P$ [kW] / n [1/min] is applied

In addition, the required stall torque must be determined on the basis of overload and flow-weakening range demand:

$M_{Stall\ min} = 1 / 0.7 \times$ overload x flow weakening range x M_{Nom}

2nd step:

The performance chart can be used as a rough guide for potential construction sizes.

3rd step:

The data table for this construction size should be used to find the two winding variants where the required nominal speed lies between the respective rated speed. verification of whether the specified torques and stall torques are adequate, otherwise choose a greater construction dimension.

4th step:

In the case of the upper winding variants, the nominal speed can only be achieved by a proportional reduction of voltage and frequency. The figures for power and weakening flow speeds here drop according to the same ratio, the stall torque remains unchanged.

Calculation of the modified catalogue date; here efficiency and power factor can be assumed to be constant.

Calculating on the basis of nominal values: The approximate current for the lower nominal power can be determined as follows:

Nominal power > 90% of the modified catalogue power:

proportional to the converted power, i.e. cos φ and $\eta \approx$ constant

Nominal power < 90% and > 50% of the modified catalogue power:

Assumption: η and reactive current $\approx$ constant, then the following applies:

$$I_{\text{Eff Catalogue}} = I_{\text{Catalogue}} \times \cos\varphi_{\text{Catalogue}}$$

$$I_{\text{Eff Nom}} = I_{\text{Eff Catalogue}} \times P_{\text{Nom}} / P_{\text{Catalogue}}$$

$$I_{\text{Reactive Catalogue}} = \sqrt{I^2_{\text{Catalogue}} - I^2_{\text{Eff Catalogue}}}$$

$$I_{\text{Nom}} = \sqrt{I^2_{\text{Eff Nom}} + I^2_{\text{Reactive Catalogue}}} \qquad \cos\varphi_{\text{Nom}} = I_{\text{Eff Nom}} / I_{\text{Nom}}$$

The accuracy is generally sufficient for designing the converter.

5th step:

For the lower winding variant, the nominal speed can only be achieved by proportionally increasing the frequency (assumption: no voltage reserve in the converter). Voltage and power do not change, the stall torque and the field-weakening speeds are reduced due to flow weakening. For this reason, the variant is generally ruled out when a high flow-weakening range is combined with a high impact load.

For calculation of the modified catalogue date and nominal data see 4th step.

6th step:

Selection of the most efficient of the two winding variants, taking into account the maximum apparent power of the converter.

7th step:

Compiling the technical data for the chosen construction size.

4.7 Examples

For the sake of clarity, the same conditions as for the machines described in part 1 shall apply.

Speed adjustment ranges with constant torques are marked by a hyphen when the torque is specified, flow-weakening ranges with constant power are marked by a slash:

0 - 1000/2000 1/min therefore means:

- rated speed [1000 1/min]
- speed ranges up to standstill with constant torque
- flow-weakening range up to 2000 1/min with constant power

Short-time overloads (impact loads) are specified as multiples of the torque (at the respective speeds). In the examples, the impact loads are valid for the entire speed adjustment range.

Regarding the examples:

In examples 1 and 2 the required constructions size can be read directly from the data tables.

Example 3 illustrates how deliberate overdimensioning of the construction size allows reaching the speed range at constant power required for the crane lifting gear, as well as attaining the required overload capability.

The speed adjustment range at a constant power of 1:6 required for the winder in example 4 should not be achieved by means of the flow-weakening range, the appropriate limit is generally between 1:3 and 1:4. The example illustrate one possible approach.

4.7.1 Example 1: Kneader

350 kW 500 V 0 - 1650 1/min interm. 2.5 x M

1st step: M_{Nom} = 2026 Nm

$M_{Stall\ min}$ = 1 / 0.7 x 2.5 x 2026 Nm = 3.57 x 2026 Nm = 7234 Nm

2nd step: approximate construction size from performance chart: **A5L250M40**

3rd step: the two possible winding variants above and below the nominal speed have at

M = 2200 Nm, M_{Stall} = 4.0 x 2200 Nm = 8800 Nm and

M = 2264 Nm, M_{Stall} = 3.9 x 2264 Nm = 8830 Nm

sufficient torque and stall torque.

4th step: Data table: winding variants above the nominal speed:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M_{stall}
Catalogue values	412	2200	465	618	1790	2.8	4.0
mod. catal. values	380	2200	429	618	**1650**	2.8	4.0
relative to nominal values	**350**	2026	429	582	1650	3.04	4.34

Calculation of the approx. nominal current:

$I_{Eff\ Catalogue}$ = 618 A x 0.87 = 538 A $I_{Eff\ Nom}$ = 538 A x 350 / 380 = 496 A

$I_{Reactive\ Catalogue} = \sqrt{618^2 - 538^2} = 304\ A$ $I_{Nom} = \sqrt{496^2 + 304^2} = 582\ A$

5th step: Data table: winding variant below the nominal speed:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M_{stall}
Catalogue values	350	2264	465	526	1475	2.73	3.9
relative to nom. val.	**350**	2026	465	526	**1650**	2.44	3.49

6th step: Selection: The bottom winding variant is unsuitable because the maximum torque through the flow-weakening is no longer sufficient.

7th step: Technical data:

A5L250M40

350 kW 461 V $_{eff}$ (fundamental: 429 V) 582 A interm. 2.5 x M 0 - 1650 1/min

η approx. 95.6% $\cos \varphi = 496 / 582 = 0.85$

$$\text{Slip } s = 1.17\,\% \times \frac{2026\ \text{Nm} \times 1790\ 1/\text{min}}{2200\ \text{Nm} \times 1650\ 1/\text{min}} = 1.16\,\%$$

Mass moment of inertia I = 3.0 kgm²

Machine weight = 1120 kg + fan weight = 36 kg

4.7.2 Example 2: Textile machine

80 kW 400 V 0 - 2200 / 2700 1/min interm. 1.5 x M

1st step: M $_{Nom}$ = 347 Nm

M $_{Stall\ min}$ = 1 / 0.7 x 1.5 x 2700 2200 347 Nm = 2.63 x 347 Nm = 913 Nm

2nd step: approximate construction size from performance chart: **A5L160M32**

3rd step: the two possible winding variants above and below the nominal speed have at

M = 429 Nm, M $_{Stall}$ = 3.3 ×x 429 Nm = 1416 Nm and

M = 449 Nm, M $_{Stall}$ = 3.1 ×x 449 Nm = 1392 Nm

sufficient torque and stall torque.

4th step: Data table: next higher winding variant:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M $_{stall}$
Catalogue values	107	429	370	224	2385	2.31	3.3
mod. catalogue val.	99	429	341	224	**2200**	2.31	3.3
relative to nom. val.	**80**	348	341	196	2200	2.85	4.07
within adjust. range	80	284	341	196	2700	2.32	3.32

5th step: Data table: next lower winding variant:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M $_{stall}$
Catalogue values	96	449	370	199	2035	2.17	3.1
mod. catalogue val.	96	415	370	199	**2200**	2.1	2.87
relative to nom. val.	**80**	348	370	177	2200	2.4	3.42
within adjust. range	80	284	370	177	2700	1.95	2.79

6th step: Selection: Both winding heads are suitable; with both variants the max permissible impact load at the flow-weakening speed of 2700 1/min is significantly above the required value of 1.5 x M. The lower variant has the advantage of a smaller current and should therefore be preferred.

7th step: Technical data:

A5L160M32

80 kW 400 V $_{eff}$ (fundamental: 370 V) 177 A interm. 1.5 × M 0 - 2200 / 2700 1/min

η approx. 92.5% cos φ approx. 0.81

$$\text{Slip } s = 2.38\,\% \text{ x } \frac{348\,\text{Nm}}{415\,\text{Nm}} \text{ x } \frac{2200\,1/\text{min}\ _{\text{(magn. Flow)}}}{2035\,1/\text{min}} \text{ x } \frac{2035\,1/\text{min}\ _{\text{(related)}}}{2200\,1/\text{min}} = 2.0\,\%$$

(The change in slip percentage due to flow-weakening and the relation to the (new) nominal speed cancel each other.)

Mass moment of inertia I = 0.33 kgm²

Machine weight = 290 kg + fan weight = 18.5 kg

4.7.3 Example 3: Crane lifting gear

200 kW 400 V 0 - 900 / 1800 1/min interm. 2 x M

1st step: M_{Nom} = 2122 Nm

$M_{Stall\ min}$ = 1 / 0.7 x 2 x 1800 / 900 x 2122 = 5.71 x 2122 = 12126 Nm

2nd step: approximate construction size from performance chart: A5L250M40

3rd step: In terms of required impact load and flow-weakening range values, only the winding variant above the nominal speed is considered.

A5L250M40:

M = 2436 Nm, M_{Stall} = 8770 Nm → construction size not sufficient

A5L250M44:

M = 2822 Nm, M_{Stall} = 11288 Nm → construction size not sufficient

A5L250M48:

M = 3455 Nm, M_{Stall} = 14511 Nm → construction size is sufficient

4th step: **A5L250M48** data table: next higher winding variant:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M_{stall}
Catalogue values	332	3455	370	634	920	2.94	4.2
mod. catalogue val.	325	3455	362	634	**900**	2.94	4.2
relative to nom. val.	**200**	2122	362	461	900	4.79	6.84
within adjust.range	200	1061	362	< 461	1800	2.39	3.42

Calculation of the approx. nominal current:

$I_{Eff\ Catalogue}$ = 634 A x 0.87 = 552 A $I_{Eff\ Nom}$ = 552 A x 200 / 325 = 340 A

$$I_{Reactive\ Catalogue} = \sqrt{634^2 - 552^2} = 312\ \text{A} \qquad I_{Nom} = \sqrt{340^2 + 312^2} = 461\,\text{A}$$

5th step: not applicable

6th step: not applicable

7th step: Technical data:

A5L250M48

200 kW 391 V $_{eff}$ (fundamental: 362 V) 461 A interm. 2 x M 0 - 900 / 1800 1/min

η approx. 93.9% $\cos \varphi = 340 / 416 = 0.82$

$$\text{Slip } s = 2.19\,\% \text{ x } \frac{2122\,\text{Nm x } 920\,1/\text{min}}{3455\,\text{Nm x } 900\,1/\text{min}} = 1.37\,\%$$

Mass moment of inertia I = 4.5 kgm²

Machine weight = 1525 kg + fan weight = 36 kg

4.7.4 Example 4: Winder

50 kW 400 V 0 - 650 / 4000 1/min interm. 1.5 x M

1st step: M $_{Nom}$ = 735 Nm

M $_{Stall\ min}$ = 1 / 0.7 x 1.5 x 4000 / 650 x 735 = 13.2 x 735 = 9692 Nm

2nd step: not applicable

3rd step: In terms of stall torque, construction size A5L250M44 would be sufficient, its max operating speed is only 3000 1/min however (Important: Increasing the mechanically permissible operating speed, see section 2.8).

The largest constructions size is the A5L200M32 and can be operated at up to 4000 1/min; her stall torque is approx. 3280 Nm. The flow-weakening range must be restricted and only starts at speed n $_{base}$, which can be calculated as follows:

$$n_{gr} = 650\,1/\text{min x } \sqrt{\frac{9692\,\text{Nm}}{3120\,\text{Nm}}} = 1146\,1/\text{min}$$

4th step: **A5L200M32** data table: next higher winding variant:

	P [kW]	M [Nm]	U [V]	I [A]	n [1/min]	interm.	M $_{stall}$
Catalogue values	110	881	370	225	1190	2.59	3.7
mod. catalogue val.	60	881	202	225	650	2.59	3.7
relative to nom. val.	50	735	202	200	650	3.1	4.43
at base speed	50	401	370	150	1190	5.68	8.11
within adjust. range	50	119	370	< 150	4000	1.69	2.41

Lloyd Dynamowerke

Calculation of the approx. nominal current:

$I_{\text{Eff Catalogue}}$ = 225 A x 0.84 = 189 A $I_{\text{Eff Nom}}$ = 189 A x 50 / 60 = 158 A

$I_{\text{Reactive Catalogue}} = \sqrt{225^2 - 189^2} = 122\ \text{A}$ $I_{\text{Nom}} = \sqrt{158^2 + 122^2} = 200\text{A}$

5th step: not applicable

6th step: not applicable

7th step: Technical data

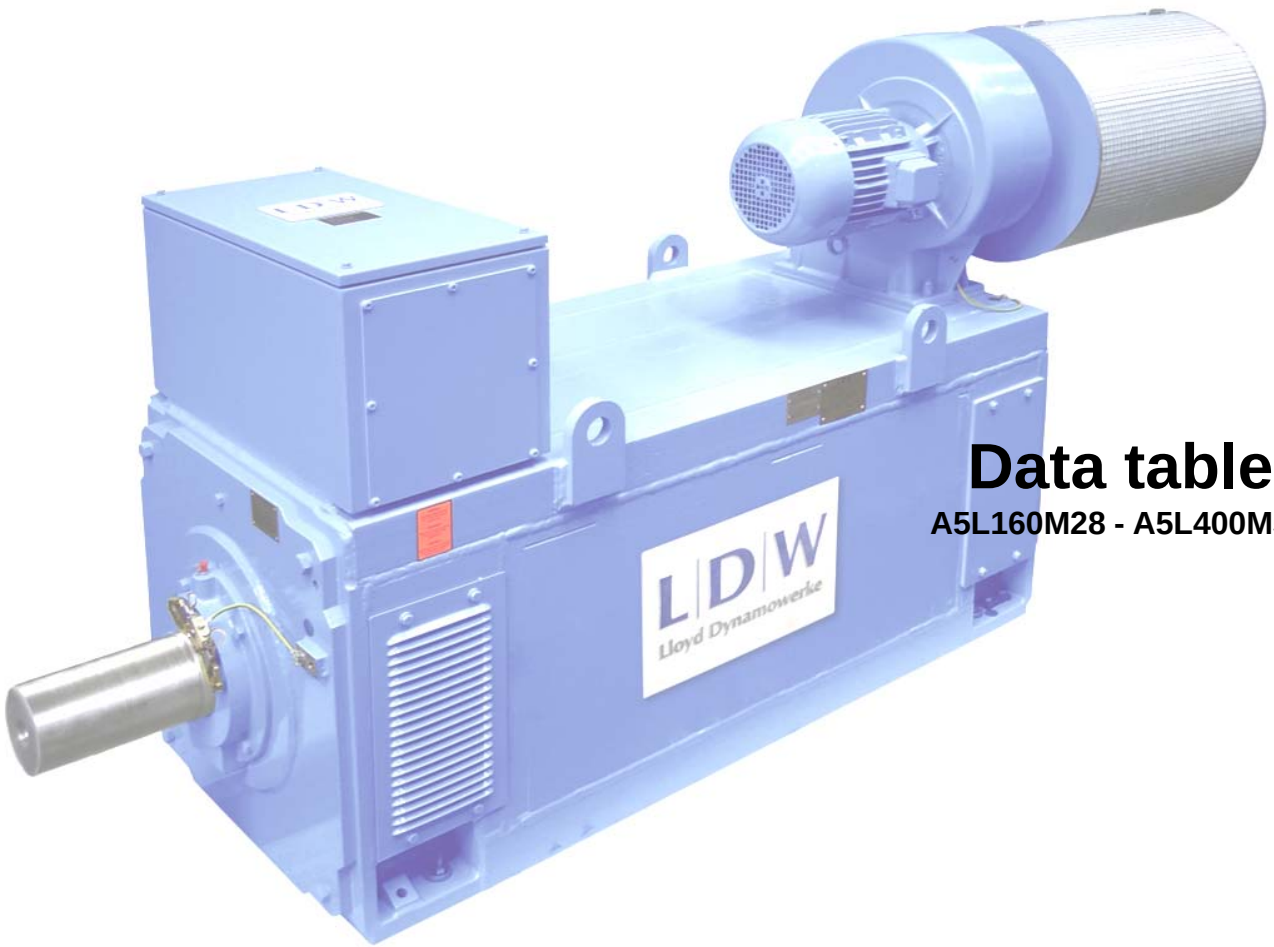
A5L200M32

0 - 50 kW	202 V	200 A	0 - 650 1/min	cos φ = 0.80
50 kW	202 V - 370 V	200 A - 150 A	650 - 1190 1/min	cos φ = 0.58
50 kW	370 V	< 150 A	1190 - 4000 1/min	

η approx. 91.4%

Mass moment of inertia I = 0.86 kgm²

Machine weight = 510 kg + fan weight = 32 kg



Data tables

A5L160M28 - A5L400M54

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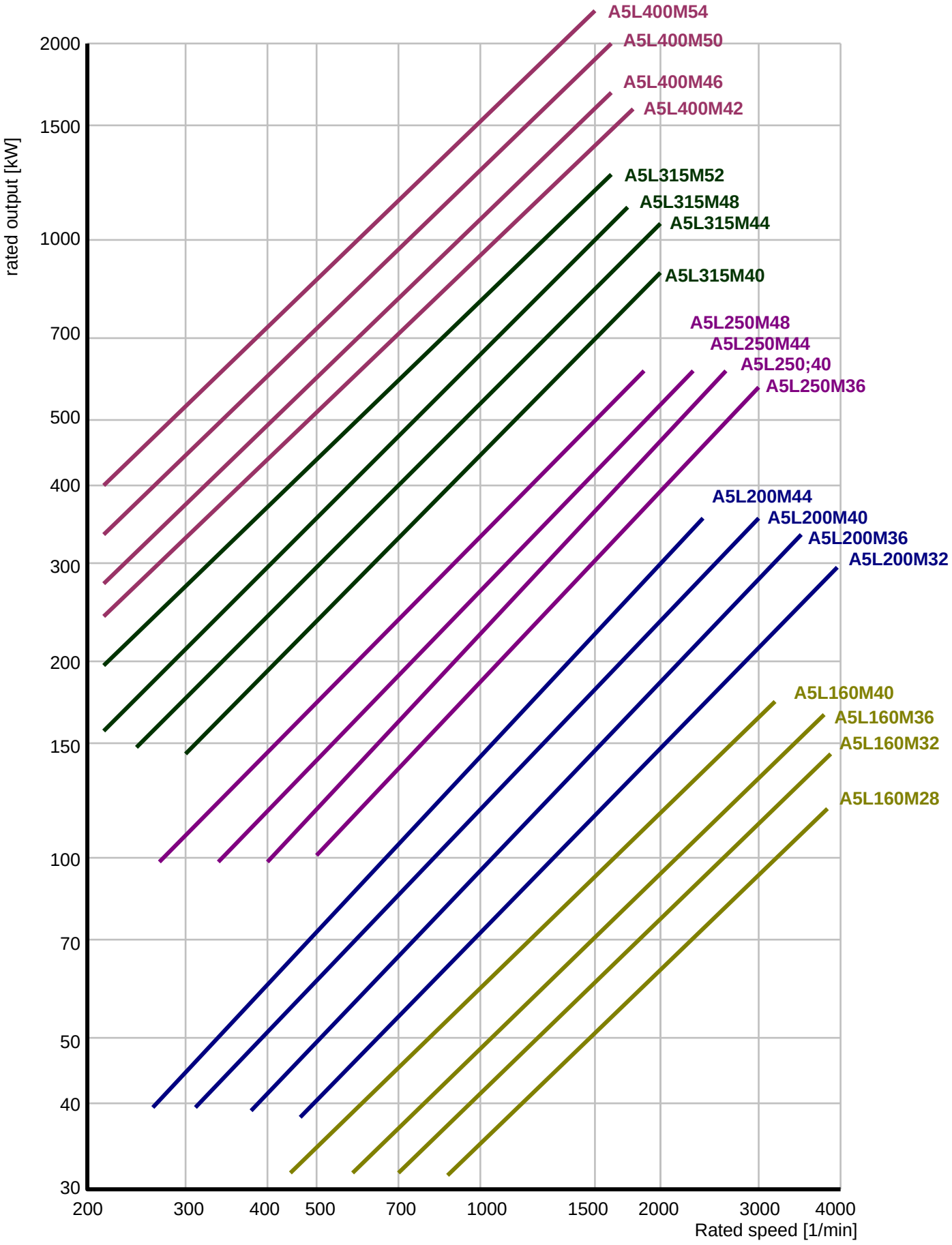
Contents: Part 2 Data tables A5L160M28 – A5L400M54

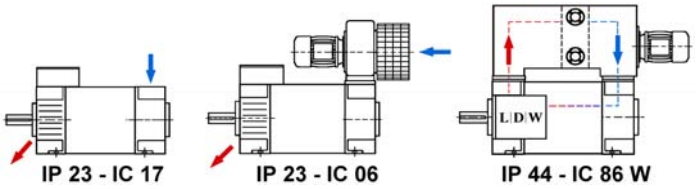
Performance diagram for preselection



A5L 160 M28

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,35	m³/s	
stat. counterpressure	9	hPa	
fan	D066/S515	18,5	kg
moment of inertia	0,27	kgm²	
weight (IC 17)	255	kg	



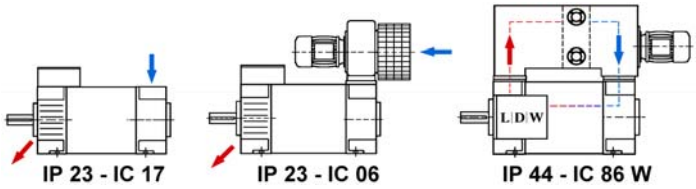
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V] 370	465	640	flow weakening speed at short-time load up to x M 2,0	1,8	1,4	1,0	rated current	rated slip	stall torque	cos φ	η
[kW]	[Nm]								[A]	[%]	[M n]		[%]
149	316	4490			4800	4800	4800	4800	318	1,01	3,6	0,78	93,7
-	-		-		-	-	-	-	-	-	-	-	-
-	-			-	-	-	-	-	-	-	-	-	-
123	329	3585			4315	4795	4800	4800	260	1,30	3,4	0,79	93,6
142	301		4515		4800	4800	4800	4800	245	0,98	3,8	0,77	93,5
-	-			-	-	-	-	-	-	-	-	-	-
107	342	2975			3385	3765	4800	4800	223	1,62	3,3	0,80	93,2
128	325		3755		4530	4800	4800	4800	215	1,24	3,4	0,79	93,6
-	-			-	-	-	-	-	-	-	-	-	-
96	362	2540			2690	2985	3840	4800	200	1,99	3,0	0,81	92,8
117	349		3210		3555	3950	4800	4800	195	1,54	3,2	0,80	93,5
122	263			4445	4800	4800	4800	4800	158	0,91	4,3	0,75	92,9
86	373	2215			2245	2490	3205	4485	178	2,32	2,9	0,82	92,3
106	363		2800		2940	3265	4200	4800	175	1,82	3,0	0,81	93,2
116	286			3880	4800	4800	4800	4800	148	1,11	3,9	0,76	93,2
67	363	1765			1775	1970	2535	3545	140	2,87	2,9	0,82	91,0
83	356		2230		2320	2575	3310	4635	138	2,25	3,0	0,81	92,2
96	295			3095	3965	4405	4800	4800	121	1,43	3,7	0,77	92,8
55	363	1460			-	1575	2025	2835	118	3,49	2,8	0,82	89,6
70	362		1850		-	2040	2620	3670	116	2,74	2,8	0,82	91,3
87	325			2570	2910	3230	4155	4800	108	1,85	3,2	0,79	92,5
49	375	1240			-	1250	1610	2255	104	4,20	2,6	0,83	88,4
62	378		1575		-	1610	2075	2900	103	3,33	2,6	0,83	90,3
71	311			2195	2535	2815	3620	4800	89	2,08	3,3	0,79	91,7
43	381	1080			-	-	1325	1855	92	4,88	2,5	0,84	87,1
54	379		1370		-	-	1740	2440	91	3,85	2,5	0,83	89,3
62	307			1915	2170	2415	3105	4345	77	2,38	3,2	0,79	90,9
37	374	955			-	-	1145	1605	81	5,47	2,4	0,84	85,7
48	374		1210		-	-	1505	2110	81	4,34	2,5	0,83	88,2
60	338			1695	1700	1890	2430	3400	74	2,88	2,9	0,81	90,5
32	362	855			-	-	1020	1430	71	5,98	2,4	0,84	84,2
41	363		1085		-	-	1345	1885	71	4,74	2,5	0,83	87,0
51	320			1520	1565	1740	2235	3130	64	3,11	2,9	0,80	89,5
26	360	700			-	-	775	1085	60	7,25	2,2	0,85	81,4
34	363		895		-	-	1030	1440	59	5,74	2,3	0,84	84,8
41	311			1260	-	1390	1790	2505	53	3,70	2,8	0,80	87,7

A5L 160 M32

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,35	m³/s	
stat. counterpressure	9	hPa	
fan	D066/S515	18,5	kg
moment of inertia	0,33	kgm²	
weight (IC 17)	290	kg	



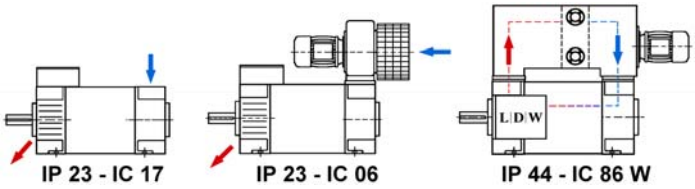
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
154	410	3600			4450	4500	4500	4500	324	1,24	3,5	0,79	94,2
-	-		-		-	-	-	-	-	-	-	-	-
-	-			-	-	-	-	-	-	-	-	-	-
126	420	2870			3400	3775	4500	4500	263	1,58	3,4	0,80	93,7
148	390		3620		4500	4500	4500	4500	250	1,20	3,7	0,78	94,1
-	-			-	-	-	-	-	-	-	-	-	-
107	429	2385			2715	3020	3880	4500	224	1,95	3,3	0,80	93,1
129	411		3010		3625	4025	4500	4500	217	1,50	3,4	0,79	93,8
147	338			4165	4500	4500	4500	4500	189	0,95	4,3	0,75	93,8
96	449	2035			2175	2415	3105	4345	199	2,38	3,1	0,81	92,5
119	443		2570		2825	3135	4030	4500	196	1,86	3,1	0,81	93,5
125	336			3565	4500	4500	4500	4500	161	1,11	4,2	0,75	93,6
85	460	1775			1820	2020	2595	3635	177	2,76	2,9	0,82	91,9
106	453		2240		2375	2635	3390	4500	175	2,18	3,0	0,81	93,0
119	366			3110	4165	4500	4500	4500	149	1,35	3,8	0,77	93,6
66	445	1410			1440	1600	2055	2880	138	3,40	2,9	0,82	90,3
82	439		1785		1885	2095	2690	3770	137	2,68	3,0	0,81	91,8
98	376			2480	3145	3495	4495	4500	121	1,72	3,6	0,78	92,9
54	444	1165			-	1275	1635	2290	116	4,13	2,8	0,82	88,7
69	446		1480		1485	1650	2125	2970	115	3,26	2,9	0,82	90,6
87	403			2055	2360	2620	3370	4500	107	2,21	3,3	0,79	92,3
47	458	990			-	1005	1295	1810	102	4,98	2,6	0,83	87,3
61	463		1260		-	1305	1680	2350	102	3,94	2,7	0,83	89,5
71	384			1755	2050	2280	2930	4105	89	2,49	3,3	0,79	91,2
42	464	860			-	-	1065	1490	90	5,77	2,5	0,84	85,8
53	464		1095		-	-	1405	1965	90	4,57	2,6	0,83	88,3
61	380			1530	1755	1950	2505	3510	77	2,84	3,3	0,79	90,3
36	456	760			-	-	910	1275	80	6,49	2,4	0,84	84,1
46	458		965		-	-	1210	1695	80	5,14	2,5	0,83	87,0
59	415			1355	1375	1525	1960	2745	73	3,43	2,9	0,81	89,7
31	440	680			-	-	810	1130	70	7,09	2,4	0,84	82,4
40	443		865		-	-	1075	1505	70	5,62	2,5	0,83	85,7
50	392			1215	1260	1400	1800	2520	64	3,70	3,0	0,80	88,6
25	435	555			-	-	605	850	59	8,55	2,2	0,85	79,3
33	443		710		-	-	815	1140	59	6,80	2,3	0,84	83,2
40	381			1005	-	1115	1430	2005	52	4,40	2,8	0,80	86,6

A5L 160 M36

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,35	m³/s	
stat. counterpressure	9	hPa	
fan	D066/S515	18,5	kg
moment of inertia	0,41	kgm²	
weight (IC 17)	335	kg	



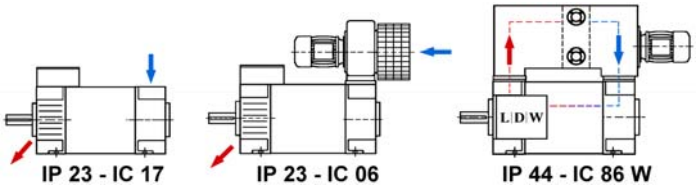
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
160	538	2830			3420	3800	3950	3950	330	1,55	3,4	0,80	94,3
185	495		3570		3950	3950	3950	3950	311	1,17	3,8	0,78	94,7
-	-			-	-	-	-	-	-	-	-	-	-
126	533	2255			2695	2995	3855	3950	263	1,94	3,4	0,80	93,5
152	510		2850		3615	3950	3950	3950	254	1,50	3,6	0,79	94,2
160	388			3945	3950	3950	3950	3950	210	0,90	4,9	0,73	94,1
106	538	1870			2175	2415	3105	3950	222	2,38	3,3	0,80	92,7
131	531		2365		2835	3150	3950	3950	218	1,86	3,4	0,80	93,6
153	447			3275	3950	3950	3950	3950	193	1,19	4,2	0,76	94,2
93	559	1595			1750	1945	2500	3500	196	2,87	3,1	0,81	91,9
118	557		2020		2265	2515	3235	3950	194	2,26	3,2	0,81	93,1
129	438			2805	3950	3950	3950	3950	163	1,38	4,2	0,76	93,7
83	571	1390			1460	1625	2090	2925	174	3,34	3,0	0,82	91,1
104	563		1760		1920	2130	2740	3835	172	2,63	3,1	0,81	92,5
120	470			2445	3285	3650	3950	3950	151	1,68	3,8	0,77	93,5
64	553	1105			1145	1275	1640	2295	136	4,12	3,0	0,82	89,2
80	548		1400		1510	1680	2160	3025	135	3,24	3,1	0,81	91,0
97	476			1950	2505	2785	3580	3950	121	2,12	3,7	0,78	92,5
52	550	910			915	1015	1305	1825	114	4,99	2,9	0,82	87,4
67	553		1155		1195	1325	1705	2385	113	3,93	2,9	0,82	89,6
85	505			1615	1890	2105	2705	3785	106	2,69	3,4	0,79	91,7
46	573	770			-	790	1015	1420	101	6,01	2,6	0,84	85,7
59	571		985		-	1050	1350	1885	100	4,74	2,7	0,83	88,3
69	481			1380	1640	1825	2345	3285	88	3,03	3,4	0,79	90,5
40	572	670			-	-	840	1175	89	6,96	2,5	0,84	83,9
51	574		855		-	870	1115	1565	88	5,51	2,6	0,83	86,9
60	475			1200	1400	1555	2000	2800	76	3,46	3,3	0,79	89,3
35	560	590			-	-	715	1005	78	7,80	2,4	0,84	82,1
45	566		755		-	-	955	1340	78	6,21	2,5	0,83	85,4
57	509			1060	1110	1235	1585	2220	72	4,15	3,0	0,80	88,6
30	548	525			-	-	620	870	69	8,55	2,4	0,85	80,1
39	546		675		-	-	845	1185	69	6,78	2,5	0,83	83,8
48	487			950	1000	1115	1430	2005	63	4,48	3,0	0,80	87,3
24	539	430			-	-	460	640	58	10,32	2,1	0,86	76,5
31	542		555		-	-	635	890	57	8,17	2,3	0,84	81,0
39	471			785	790	875	1130	1580	51	5,32	2,9	0,80	85,0

A5L 160 M40

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,35	m³/s	
stat. counterpressure	9	hPa	
fan	D066/S515	18,5	kg
moment of inertia	0,51	kgm²	
weight (IC 17)	390	kg	



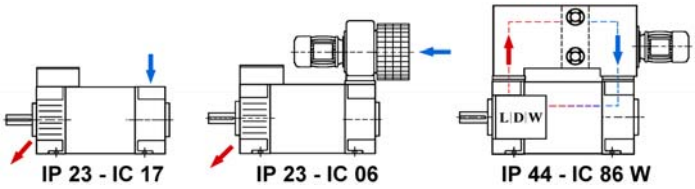
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
157	673	2225			2760	3065	3400	3400	325	1,89	3,5	0,80	94,0
186	632		2810		3400	3400	3400	3400	313	1,45	3,8	0,78	94,6
-	-			-	-	-	-	-	-	-	-	-	-
123	662	1770			2185	2430	3120	3400	258	2,36	3,5	0,80	93,0
151	644		2240		2895	3220	3400	3400	253	1,84	3,7	0,79	93,9
167	513			3105	3400	3400	3400	3400	215	1,14	4,8	0,74	94,3
102	665	1470			1765	1960	2520	3400	217	2,87	3,4	0,80	92,0
127	651		1860		2335	2590	3330	3400	214	2,25	3,6	0,79	93,2
156	576			2575	3400	3400	3400	3400	196	1,50	4,2	0,76	94,1
91	693	1250			1410	1570	2015	2825	192	3,48	3,2	0,81	91,0
113	680		1585		1870	2075	2670	3400	189	2,73	3,4	0,80	92,5
130	561			2205	3250	3400	3400	3400	165	1,72	4,2	0,76	93,4
80	705	1090			1180	1310	1685	2360	170	4,03	3,1	0,82	90,1
101	696		1380		1560	1735	2230	3120	168	3,18	3,2	0,81	91,7
119	593			1920	2640	2930	3400	3400	150	2,06	3,9	0,77	93,0
62	681	860			925	1025	1320	1845	133	4,97	3,1	0,82	87,8
78	675		1095		1225	1360	1750	2450	132	3,92	3,2	0,81	90,0
95	593			1530	2030	2255	2895	3400	120	2,58	3,8	0,78	91,9
50	675	710			730	815	1045	1465	112	6,02	2,9	0,82	85,7
64	672		905		975	1085	1395	1950	111	4,75	3,1	0,81	88,3
83	626			1265	1535	1705	2190	3070	104	3,25	3,5	0,79	90,8
44	692	600			-	640	820	1150	98	7,22	2,7	0,83	83,7
56	694		770		-	850	1095	1535	97	5,72	2,9	0,82	86,7
66	586			1080	1345	1495	1925	2695	86	3,66	3,6	0,78	89,4
38	698	520			-	-	665	930	86	8,37	2,6	0,84	81,7
49	702		665		-	695	895	1255	86	6,63	2,7	0,83	85,1
57	578			940	1145	1270	1635	2285	75	4,19	3,5	0,78	88,1
33	692	455			-	-	555	780	76	9,42	2,4	0,85	79,5
42	691		585		-	595	765	1070	76	7,46	2,6	0,83	83,4
55	629			830	890	990	1270	1780	71	5,03	3,1	0,80	87,1
28	664	405			-	-	485	680	67	10,28	2,4	0,85	77,3
37	669		525		-	-	670	940	67	8,18	2,6	0,83	81,6
47	600			740	800	890	1145	1605	61	5,42	3,1	0,80	85,7
23	651	330			-	-	355	495	56	12,40	2,1	0,86	73,1
30	661		430		-	-	495	695	56	9,87	2,3	0,84	78,2
37	579			610	625	695	895	1255	50	6,44	2,9	0,80	83,1

A5L 200 M32

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,55	m³/s	
stat. counterpressure	14	hPa	
fan	D08/S902		32 kg
moment of inertia	0,80	kgm²	
weight (IC 17)	510	kg	



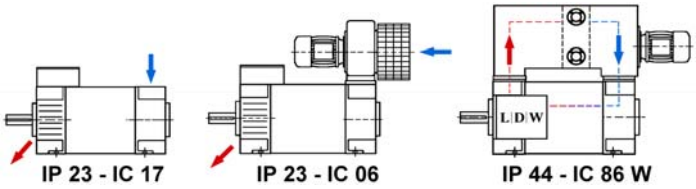
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
295	791	3560			4000	4000	4000	4000	573	0,92	4,2	0,84	95,3
-	-		-		-	-	-	-	-	-	-	-	-
-	-			-	-	-	-	-	-	-	-	-	-
253	819	2945			4000	4000	4000	4000	491	1,13	4,0	0,84	95,0
295	759		3710		4000	4000	4000	4000	462	0,84	4,3	0,83	95,2
-	-			-	-	-	-	-	-	-	-	-	-
220	838	2505			3445	3830	4000	4000	428	1,33	3,9	0,85	94,7
262	792		3155		4000	4000	4000	4000	408	1,01	4,2	0,84	95,1
-	-			-	-	-	-	-	-	-	-	-	-
200	880	2175			2850	3170	4000	4000	389	1,57	3,7	0,85	94,4
241	838		2745		3775	4000	4000	4000	373	1,20	3,9	0,85	94,9
267	671			3795	4000	4000	4000	4000	313	0,73	4,9	0,81	94,9
161	899	1715			2200	2445	3145	4000	317	1,98	3,7	0,85	93,5
198	875		2165		2850	3170	4000	4000	309	1,53	3,8	0,85	94,3
220	702			3000	4000	4000	4000	4000	259	0,93	4,7	0,81	94,7
131	888	1410			1830	2035	2615	3660	262	2,33	3,7	0,84	92,5
164	877		1780		2340	2600	3345	4000	258	1,83	3,8	0,84	93,6
190	735			2465	3870	4000	4000	4000	224	1,15	4,5	0,81	94,3
110	883	1190			1555	1730	2220	3110	225	2,69	3,7	0,84	91,4
138	874		1505		1985	2205	2840	3975	221	2,11	3,8	0,83	92,8
159	726			2090	3320	3685	4000	4000	191	1,32	4,5	0,80	93,7
98	907	1025			1305	1450	1865	2610	202	3,12	3,6	0,83	90,5
123	900		1300		1665	1850	2380	3330	199	2,45	3,7	0,83	92,0
147	778			1805	2670	2970	3820	4000	177	1,58	4,2	0,80	93,3
76	904	800			995	1105	1420	1985	163	3,85	3,6	0,82	88,4
96	905		1010		1290	1430	1840	2575	161	3,03	3,6	0,82	90,4
113	764			1410	2125	2360	3035	4000	141	1,93	4,3	0,78	91,9
59	871	650			825	915	1175	1645	134	4,48	3,6	0,80	86,1
75	874		820		1085	1205	1550	2170	133	3,52	3,8	0,80	88,6
92	765			1145	1730	1920	2470	3455	119	2,31	4,3	0,77	90,6
47	838	540			700	780	1000	1400	114	5,11	3,7	0,77	83,8
61	844		690		905	1010	1295	1815	113	4,02	3,8	0,77	86,7
72	715			960	1550	1720	2210	3095	100	2,59	4,6	0,73	88,9
40	828	460			585	650	840	1175	102	5,85	3,6	0,75	81,5
51	838		585		770	855	1095	1535	101	4,61	3,7	0,74	84,8
60	695			820	1365	1515	1945	2725	89	2,94	4,7	0,70	87,3

A5L 200 M36

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,55	m³/s	
stat. counterpressure	14	hPa	
fan	D08/S902		32 kg
moment of inertia	0,99	kgm²	
weight (IC 17)	585	kg	



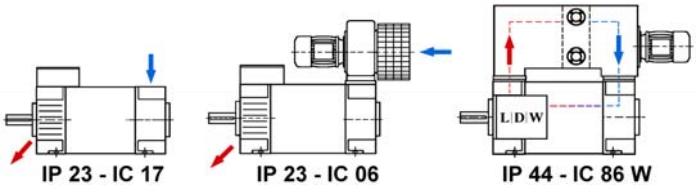
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
303	1032	2800			3600	3600	3600	3600	585	1,14	4,0	0,85	95,4
351	951		3530		3600	3600	3600	3600	547	0,85	4,4	0,83	95,7
-	-			-	-	-	-	-	-	-	-	-	-
256	1055	2315			3210	3565	3600	3600	497	1,39	4,0	0,85	95,0
304	992		2920		3600	3600	3600	3600	472	1,05	4,2	0,84	95,4
-	-			-	-	-	-	-	-	-	-	-	-
221	1073	1970			2680	2980	3600	3600	431	1,63	3,9	0,85	94,5
267	1027		2485		3535	3600	3600	3600	414	1,25	4,1	0,84	95,1
288	801			3435	3600	3600	3600	3600	341	0,75	5,2	0,80	95,2
200	1115	1710			2240	2490	3205	3600	389	1,91	3,7	0,85	94,0
245	1085		2160		2910	3230	3600	3600	379	1,48	3,8	0,85	94,8
277	887			2990	3600	3600	3600	3600	322	0,92	4,7	0,82	95,2
159	1127	1345			1745	1940	2495	3490	315	2,39	3,7	0,85	92,9
199	1115		1700		2230	2480	3185	3600	310	1,88	3,7	0,85	94,0
225	913			2360	3600	3600	3600	3600	263	1,16	4,6	0,82	94,7
129	1111	1105			1455	1615	2080	2910	260	2,82	3,8	0,84	91,7
162	1105		1400		1850	2055	2645	3600	257	2,22	3,8	0,84	93,0
193	948			1940	2990	3325	3600	3600	227	1,42	4,4	0,81	94,1
108	1104	935			1235	1375	1765	2475	223	3,26	3,8	0,83	90,5
136	1100		1180		1570	1745	2245	3145	221	2,56	3,8	0,83	92,1
160	930			1645	2580	2870	3600	3600	193	1,63	4,5	0,80	93,4
95	1129	805			1015	1130	1455	2035	200	3,77	3,6	0,83	89,4
120	1127		1020		1320	1470	1890	2645	197	2,97	3,7	0,83	91,2
147	992			1420	2090	2320	2985	3600	178	1,94	4,2	0,81	92,8
73	1118	625			780	870	1115	1565	160	4,63	3,6	0,82	87,0
93	1126		795		1005	1115	1435	2005	159	3,65	3,6	0,82	89,3
111	960			1105	1685	1870	2405	3365	140	2,34	4,3	0,78	91,3
57	1079	505			640	710	910	1275	133	5,40	3,6	0,80	84,4
74	1091		645		830	920	1180	1655	132	4,27	3,7	0,80	87,2
90	955			900	1375	1530	1965	2755	118	2,79	4,4	0,76	89,8
46	1035	420			535	590	760	1065	113	6,16	3,6	0,77	81,8
59	1052		540		700	780	1000	1405	112	4,87	3,7	0,77	85,1
70	892			755	1200	1335	1715	2400	99	3,13	4,5	0,73	87,9
38	1022	360			435	485	620	870	101	7,06	3,5	0,75	79,2
50	1044		460		585	650	835	1170	101	5,58	3,6	0,75	83,0
59	869			645	1040	1155	1485	2080	88	3,55	4,6	0,70	86,1

A5L 200 M40

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,55	m³/s	
stat. counterpressure	14	hPa	
fan	D08/S902		32 kg
moment of inertia	1,24	kgm²	
weight (IC 17)	675	kg	



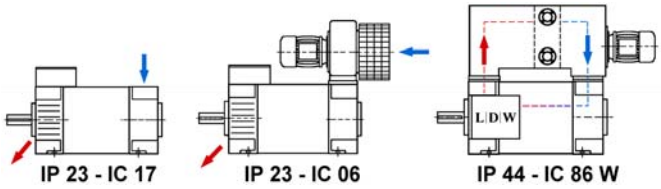
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
305	1321	2205			3090	3200	3200	3200	590	1,41	4,0	0,85	95,2
361	1241		2780		3200	3200	3200	3200	559	1,07	4,3	0,84	95,7
-	-			-	-	-	-	-	-	-	-	-	-
254	1332	1820			2535	2815	3200	3200	495	1,70	4,0	0,85	94,6
309	1285		2300		3200	3200	3200	3200	480	1,31	4,1	0,84	95,3
340	1020			3180	3200	3200	3200	3200	400	0,79	5,2	0,80	95,6
217	1340	1550			2140	2375	3055	3200	426	1,98	3,9	0,85	94,0
269	1315		1955		2755	3060	3200	3200	418	1,55	4,0	0,84	94,8
298	1050			2705	3200	3200	3200	3200	349	0,94	5,0	0,81	95,3
194	1379	1345			1805	2005	2580	3200	382	2,31	3,8	0,85	93,4
242	1362		1695		2310	2565	3200	3200	376	1,81	3,9	0,85	94,4
284	1152			2350	3200	3200	3200	3200	328	1,14	4,6	0,82	95,2
154	1395	1055			1405	1560	2005	2810	309	2,89	3,8	0,85	92,1
193	1379		1335		1795	1995	2565	3200	304	2,26	3,8	0,84	93,4
227	1170			1855	2940	3200	3200	3200	266	1,43	4,5	0,82	94,4
125	1371	865			1170	1300	1675	2345	255	3,40	3,9	0,84	90,8
158	1372		1100		1485	1650	2120	2965	253	2,69	3,9	0,84	92,3
193	1207			1525	2340	2600	3200	3200	228	1,76	4,4	0,81	93,7
104	1360	730			965	1075	1380	1935	219	3,93	3,8	0,83	89,4
132	1362		930		1260	1400	1800	2525	217	3,10	3,9	0,83	91,2
158	1170			1290	2045	2270	2920	3200	192	1,99	4,5	0,80	92,8
92	1391	630			805	895	1150	1610	196	4,54	3,6	0,83	88,1
117	1396		800		1035	1150	1480	2070	194	3,59	3,7	0,83	90,2
145	1240			1115	1665	1850	2375	3200	176	2,36	4,3	0,80	92,1
70	1371	490			610	675	870	1220	157	5,58	3,6	0,81	85,3
90	1385		620		795	880	1135	1590	156	4,41	3,7	0,81	88,0
109	1198			870	1340	1490	1920	2685	139	2,85	4,4	0,78	90,3
54	1319	395			485	540	695	975	130	6,52	3,5	0,79	82,4
71	1344		505		645	715	920	1290	130	5,17	3,7	0,79	85,6
88	1190			705	1060	1180	1515	2125	117	3,40	4,3	0,76	88,6
44	1268	330			390	435	560	780	112	7,46	3,4	0,77	79,3
57	1293		420		535	595	765	1075	111	5,89	3,7	0,77	83,2
69	1110			590	935	1040	1335	1870	99	3,81	4,5	0,73	86,5
36	1249	280			305	335	430	605	100	8,55	3,1	0,75	76,4
48	1282		355		435	485	625	870	99	6,75	3,5	0,74	80,8
57	1073			505	810	900	1155	1615	87	4,31	4,6	0,70	84,5

A5L 200 M44

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,55	m³/s	
stat. counterpressure	14	hPa	
fan	D08/S902		32 kg
moment of inertia	1,53	kgm²	
weight (IC 17)	780	kg	



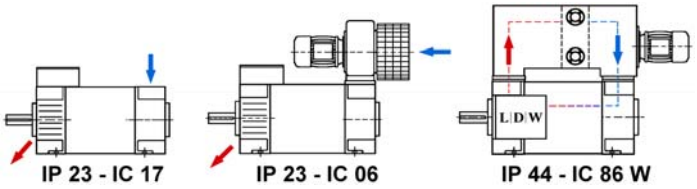
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
298	1612	1765			2525	2700	2700	2700	580	1,69	4,1	0,84	94,9
360	1545		2225		2700	2700	2700	2700	559	1,30	4,3	0,84	95,6
-	-			-	-	-	-	-	-	-	-	-	-
247	1615	1460			2085	2315	2700	2700	485	2,03	4,1	0,84	94,2
304	1575		1840		2695	2700	2700	2700	474	1,57	4,2	0,84	95,0
348	1305			2550	2700	2700	2700	2700	408	0,98	5,0	0,81	95,6
210	1617	1240			1765	1960	2525	2700	416	2,35	4,1	0,84	93,5
263	1603		1565		2250	2500	2700	2700	411	1,85	4,1	0,84	94,4
302	1331			2170	2700	2700	2700	2700	354	1,16	4,9	0,81	95,2
187	1664	1075			1490	1655	2125	2700	373	2,74	4,0	0,85	92,8
235	1651		1360		1900	2110	2700	2700	369	2,15	4,0	0,84	93,9
286	1450			1885	2700	2700	2700	2700	330	1,40	4,5	0,82	94,9
149	1682	845			1160	1285	1655	2315	302	3,43	3,9	0,84	91,2
187	1673		1070		1475	1640	2105	2700	298	2,70	3,9	0,84	92,7
226	1454			1485	2360	2620	2700	2700	266	1,74	4,5	0,82	94,0
120	1656	690			930	1035	1330	1860	251	4,06	3,8	0,83	89,7
152	1651		880		1225	1360	1750	2450	248	3,19	4,0	0,83	91,5
189	1475			1220	1910	2120	2700	2700	225	2,11	4,5	0,81	93,1
100	1633	585			785	870	1120	1565	214	4,66	3,8	0,83	88,1
127	1638		740		1015	1125	1445	2025	212	3,68	3,9	0,82	90,2
155	1434			1035	1660	1845	2375	2700	191	2,40	4,6	0,80	92,1
88	1668	500			645	715	920	1290	192	5,40	3,7	0,82	86,6
112	1678		640		840	935	1200	1680	190	4,26	3,8	0,82	89,0
141	1512			890	1360	1510	1940	2700	174	2,84	4,4	0,80	91,3
67	1647	385			475	525	675	945	154	6,66	3,5	0,81	83,4
86	1666		495		635	705	905	1265	153	5,26	3,7	0,81	86,5
105	1449			695	1065	1185	1520	2130	137	3,41	4,4	0,78	89,3
52	1576	315			365	405	520	725	128	7,77	3,3	0,79	80,0
67	1605		400		505	560	725	1010	127	6,14	3,6	0,79	83,8
85	1445			565	850	940	1210	1695	116	4,08	4,3	0,76	87,2
41	1501	260			275	305	390	550	109	8,86	3,0	0,76	76,6
54	1548		335		405	450	580	810	109	7,02	3,5	0,76	81,0
66	1344			470	740	820	1055	1480	97	4,57	4,5	0,72	84,9
34	1474	220			-	-	270	375	98	10,16	2,4	0,74	73,2
45	1523		285		315	350	450	635	97	8,03	3,2	0,74	78,4
55	1297			400	625	695	895	1255	86	5,17	4,5	0,69	82,6

A5L 250 M36

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,85	m³/s	
stat. counterpressure	14	hPa	
fan	D082/S902		36 kg
moment of inertia	2,4	kgm²	
weight (IC 17)	975	kg	



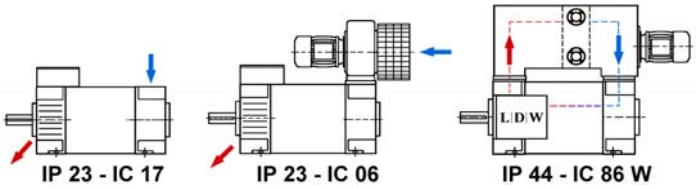
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
547	1700	3070			3400	3400	3400	3400	1018	0,73	4,0	0,87	96,2
-	-		-		-	-	-	-	-	-	-	-	-
-	-			-	-	-	-	-	-	-	-	-	-
485	1717	2700			3400	3400	3400	3400	905	0,83	3,9	0,87	96,0
-	-		-		-	-	-	-	-	-	-	-	-
-	-			-	-	-	-	-	-	-	-	-	-
433	1813	2280			2970	3300	3400	3400	804	1,01	3,7	0,88	95,8
499	1658		2875		3400	3400	3400	3400	746	0,75	4,1	0,87	96,0
-	-			-	-	-	-	-	-	-	-	-	-
392	1814	2065			2690	2985	3400	3400	731	1,11	3,7	0,88	95,6
457	1676		2600		3400	3400	3400	3400	683	0,83	4,1	0,87	95,9
-	-			-	-	-	-	-	-	-	-	-	-
355	1879	1800			2265	2515	3235	3400	662	1,29	3,6	0,88	95,3
417	1751		2275		3085	3400	3400	3400	622	0,97	3,9	0,87	95,7
459	1396			3140	3400	3400	3400	3400	520	0,59	5,0	0,83	95,7
299	1919	1485			1830	2035	2615	3400	561	1,56	3,5	0,88	94,6
354	1802		1875		2475	2750	3400	3400	530	1,18	3,8	0,87	95,3
400	1474			2595	3400	3400	3400	3400	451	0,73	4,7	0,84	95,6
257	1948	1260			1525	1695	2180	3055	486	1,83	3,5	0,88	94,0
308	1850		1590		2045	2270	2920	3400	463	1,38	3,7	0,87	94,8
347	1507			2200	3400	3400	3400	3400	391	0,85	4,6	0,84	95,3
224	1963	1090			1315	1460	1875	2625	428	2,09	3,4	0,88	93,3
269	1864		1380		1760	1955	2515	3400	408	1,58	3,6	0,87	94,3
312	1563			1910	2990	3320	3400	3400	353	0,99	4,5	0,84	95,0
201	1946	985			1195	1325	1705	2390	386	2,27	3,5	0,87	92,7
241	1854		1245		1595	1775	2280	3195	369	1,72	3,7	0,87	93,8
281	1559			1725	2705	3005	3400	3400	321	1,09	4,5	0,84	94,7
178	1993	855			990	1100	1410	1975	347	2,60	3,3	0,87	91,9
215	1903		1080		1350	1500	1930	2700	332	1,98	3,6	0,86	93,2
250	1596			1500	2295	2550	3280	3400	288	1,25	4,4	0,83	94,2
146	2001	695			795	880	1135	1585	291	3,09	3,3	0,87	90,5
177	1915		885		1075	1190	1535	2145	279	2,35	3,5	0,86	92,1
208	1620			1225	1850	2060	2645	3400	244	1,50	4,3	0,82	93,4
122	1998	585			655	730	935	1310	250	3,56	3,2	0,86	89,1
150	1930		740		885	985	1265	1770	241	2,73	3,4	0,85	90,9
173	1604			1030	1575	1750	2250	3150	209	1,72	4,4	0,81	92,4

A5L 250 M40

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,85	m³/s	
stat. counterpressure	14	hPa	
fan	D082/S902		36 kg
moment of inertia	3,0	kgm²	
weight (IC 17)	1120	kg	



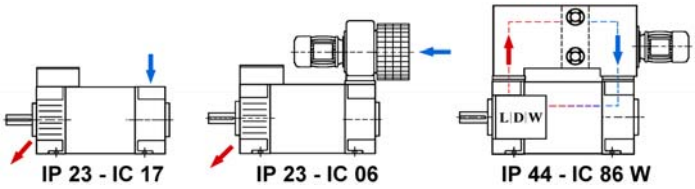
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
547	2160	2420			3400	3400	3400	3400	1018	0,89	4,1	0,87	96,2
619	1939		3050		3400	3400	3400	3400	933	0,65	4,6	0,86	96,4
-	-			-	-	-	-	-	-	-	-	-	-
485	2180	2125			2990	3320	3400	3400	905	1,01	4,0	0,87	96,0
559	1992		2680		3400	3400	3400	3400	840	0,75	4,4	0,86	96,3
-	-			-	-	-	-	-	-	-	-	-	-
431	2291	1795			2400	2670	3400	3400	801	1,23	3,8	0,88	95,6
499	2106		2265		3325	3400	3400	3400	746	0,91	4,2	0,87	96,1
538	1645			3125	3400	3400	3400	3400	615	0,55	5,5	0,82	96,0
388	2280	1625			2185	2425	3120	3400	725	1,35	3,8	0,88	95,4
456	2127		2050		2980	3310	3400	3400	683	1,01	4,2	0,87	95,9
500	1687			2830	3400	3400	3400	3400	570	0,61	5,4	0,83	96,0
351	2361	1420			1840	2045	2630	3400	657	1,56	3,7	0,88	94,9
412	2200		1790		2515	2795	3400	3400	618	1,17	4,0	0,87	95,6
460	1775			2475	3400	3400	3400	3400	520	0,72	5,1	0,83	95,9
294	2398	1170			1495	1660	2135	2990	555	1,89	3,7	0,88	94,2
350	2264		1475		2015	2240	2880	3400	526	1,42	3,9	0,87	95,0
399	1863			2045	3400	3400	3400	3400	449	0,88	4,9	0,84	95,6
252	2436	990			1245	1385	1780	2490	481	2,21	3,6	0,88	93,4
304	2323		1250		1665	1850	2380	3330	459	1,68	3,8	0,87	94,4
345	1901			1735	2905	3225	3400	3400	390	1,03	4,8	0,84	95,2
220	2453	855			1045	1165	1495	2095	424	2,52	3,5	0,88	92,6
265	2339		1085		1435	1590	2045	2865	405	1,92	3,8	0,87	93,8
308	1959			1500	2440	2715	3400	3400	350	1,20	4,6	0,84	94,8
196	2427	775			950	1055	1355	1895	383	2,74	3,5	0,87	92,0
238	2325		980		1300	1445	1860	2600	367	2,09	3,8	0,86	93,3
277	1953			1355	2210	2455	3160	3400	318	1,32	4,7	0,83	94,4
174	2477	670			800	885	1140	1595	342	3,13	3,4	0,87	91,1
210	2366		850		1085	1205	1550	2170	327	2,38	3,6	0,86	92,6
246	1989			1180	1890	2100	2700	3400	284	1,50	4,6	0,83	93,8
142	2483	545			635	705	905	1270	287	3,72	3,3	0,86	89,4
173	2384		695		865	965	1240	1735	276	2,84	3,6	0,85	91,2
204	2016			965	1525	1690	2175	3045	241	1,81	4,5	0,82	92,9
119	2473	460			520	580	745	1040	247	4,29	3,2	0,85	87,8
146	2400		580		710	790	1015	1425	239	3,30	3,5	0,85	89,9
169	1993			810	1295	1440	1855	2595	206	2,07	4,6	0,81	91,8

A5L 250 M44

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,85	m³/s	
stat. counterpressure	14	hPa	
fan	D082/S902		36 kg
moment of inertia	3,6	kgm²	
weight (IC 17)	1290	kg	



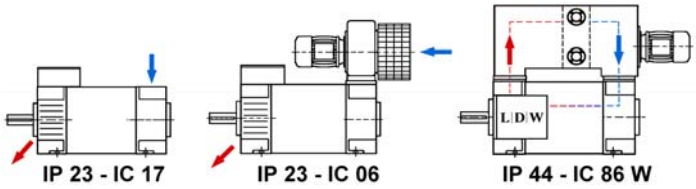
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
542	2568	2015			3000	3000	3000	3000	1010	1,03	4,4	0,87	96,1
615	2316		2540		3000	3000	3000	3000	929	0,75	4,9	0,85	96,4
-	-			-	-	-	-	-	-	-	-	-	-
478	2578	1770			2690	2990	3000	3000	894	1,16	4,3	0,87	95,8
552	2365		2230		3000	3000	3000	3000	833	0,86	4,8	0,86	96,2
-	-			-	-	-	-	-	-	-	-	-	-
421	2695	1495			2170	2410	3000	3000	789	1,42	4,2	0,87	95,3
493	2500		1885		2985	3000	3000	3000	740	1,06	4,5	0,86	95,9
539	1976			2605	3000	3000	3000	3000	615	0,64	5,9	0,82	96,1
381	2694	1350			1965	2185	2810	3000	718	1,55	4,2	0,87	95,0
448	2511		1705		2690	2990	3000	3000	675	1,16	4,5	0,86	95,6
497	2014			2355	3000	3000	3000	3000	567	0,71	5,8	0,82	96,0
343	2779	1180			1660	1845	2375	3000	648	1,80	4,0	0,88	94,5
405	2599		1490		2270	2520	3000	3000	611	1,35	4,4	0,87	95,2
454	2106			2060	3000	3000	3000	3000	515	0,83	5,5	0,83	95,8
287	2822	970			1350	1500	1925	2700	548	2,17	4,0	0,87	93,6
344	2674		1225		1820	2020	2600	3000	520	1,64	4,2	0,87	94,6
393	2209			1700	3000	3000	3000	3000	445	1,02	5,3	0,84	95,4
246	2854	820			1100	1225	1575	2200	473	2,53	3,8	0,88	92,7
297	2730		1040		1510	1675	2155	3000	453	1,93	4,1	0,87	93,9
338	2240			1440	2630	2920	3000	3000	385	1,19	5,2	0,84	94,8
214	2868	710			940	1045	1345	1880	416	2,89	3,8	0,87	91,8
259	2750		900		1270	1415	1815	2545	399	2,20	4,0	0,87	93,2
302	2308			1250	2210	2460	3000	3000	345	1,39	5,1	0,84	94,4
190	2836	640			850	945	1215	1700	376	3,14	3,8	0,87	91,1
232	2732		810		1150	1275	1640	2300	361	2,40	4,0	0,86	92,6
272	2300			1130	2005	2225	2865	3000	314	1,51	5,1	0,83	93,9
168	2892	555			710	790	1015	1425	337	3,59	3,7	0,87	90,0
205	2774		705		975	1080	1390	1945	323	2,74	3,9	0,86	91,7
240	2340			980	1710	1900	2445	3000	281	1,73	5,0	0,83	93,3
137	2882	455			565	625	805	1125	281	4,26	3,6	0,86	88,2
168	2792		575		775	860	1105	1550	272	3,27	3,8	0,85	90,2
199	2370			800	1355	1510	1940	2715	238	2,08	4,8	0,82	92,2
114	2865	380			455	505	650	910	242	4,91	3,4	0,85	86,3
141	2794		485		635	705	905	1270	235	3,78	3,8	0,84	88,8
164	2327			675	1155	1280	1650	2305	203	2,38	4,9	0,80	90,9

A5L 250 M48

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	0,85	m³/s	
stat. counterpressure	14	hPa	
fan	D082/S902		36 kg
moment of inertia	4,5	kgm²	
weight (IC 17)	1525	kg	



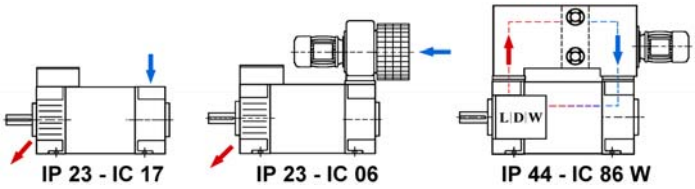
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
537	3264	1570			2480	2600	2600	2600	1006	1,27	4,5	0,87	95,8
621	2993		1980		2600	2600	2600	2600	936	0,94	5,0	0,86	96,3
-	-			-	-	-	-	-	-	-	-	-	-
472	3262	1380			2180	2420	2600	2600	888	1,44	4,5	0,87	95,4
554	3038		1740		2600	2600	2600	2600	836	1,08	4,9	0,86	96,0
589	2337			2405	2600	2600	2600	2600	683	0,64	6,6	0,81	96,2
412	3381	1165			1775	1970	2535	2600	778	1,74	4,4	0,87	94,9
489	3177		1470		2415	2600	2600	2600	737	1,31	4,7	0,86	95,6
542	2543			2035	2600	2600	2600	2600	618	0,80	6,1	0,82	96,1
371	3361	1055			1615	1795	2305	2600	704	1,90	4,4	0,87	94,4
445	3193		1330		2175	2415	2600	2600	673	1,44	4,7	0,86	95,2
499	2590			1840	2600	2600	2600	2600	570	0,89	5,9	0,83	95,8
332	3455	920			1345	1495	1920	2600	634	2,19	4,2	0,87	93,9
400	3287		1160		1845	2050	2600	2600	606	1,67	4,5	0,86	94,8
453	2690			1610	2600	2600	2600	2600	515	1,03	5,7	0,83	95,6
277	3494	755			1085	1205	1550	2165	534	2,64	4,1	0,87	92,9
335	3347		955		1490	1660	2130	2600	513	2,02	4,5	0,86	94,0
390	2804			1325	2550	2600	2600	2600	443	1,27	5,5	0,84	95,0
236	3527	640			895	995	1280	1795	461	3,07	4,0	0,87	91,8
289	3402		810		1215	1350	1735	2425	444	2,36	4,3	0,87	93,2
335	2841			1125	2135	2370	2600	2600	383	1,48	5,4	0,84	94,4
205	3530	555			765	850	1090	1525	405	3,50	3,9	0,87	90,8
250	3409		700		1040	1155	1485	2075	390	2,68	4,2	0,86	92,4
297	2910			975	1805	2005	2580	2600	342	1,71	5,3	0,83	93,8
183	3499	500			685	760	975	1370	367	3,81	3,9	0,86	89,9
224	3380		630		935	1040	1340	1875	354	2,92	4,2	0,86	91,7
267	2898			880	1635	1815	2335	2600	311	1,87	5,3	0,83	93,3
160	3550	430			570	635	815	1140	327	4,35	3,8	0,86	88,7
197	3435		550		790	875	1125	1575	316	3,34	4,1	0,86	90,7
235	2932			765	1380	1530	1970	2600	277	2,13	5,2	0,82	92,6
130	3542	350			440	490	630	880	275	5,17	3,6	0,85	86,6
161	3436		445		620	690	890	1245	265	3,97	4,0	0,85	89,0
194	2966			625	1100	1225	1575	2205	235	2,56	5,0	0,82	91,3
108	3509	295			345	385	495	690	236	5,96	3,4	0,84	84,5
135	3445		375		500	555	715	1000	230	4,61	3,8	0,84	87,3
160	2904			525	935	1040	1335	1870	201	2,93	5,1	0,80	89,9

A5L 315 M40

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	1,6	m³/s
stat. counterpressure	16	hPa
fan	D092/S915	75 kg
moment of inertia	9,3	kgm²
weight (IC 17)	1940	kg



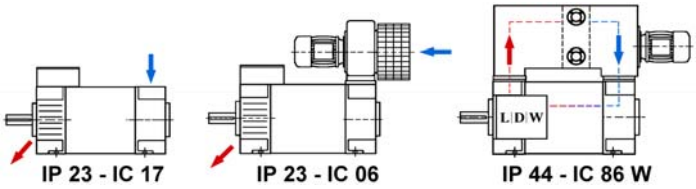
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1004	3947	2430			3065	3410	4000	4000	1838	0,48	3,6	0,88	96,8
1046	3265		3060		4000	4000	4000	4000	1578	0,33	4,4	0,85	96,7
-	-			-	-	-	-	-	-	-	-	-	-
863	4274	1930			2250	2500	3210	4000	1572	0,63	3,3	0,89	96,5
939	3693		2430		3275	3640	4000	4000	1388	0,45	3,9	0,87	96,7
1062	3028			3350	4000	4000	4000	4000	1190	0,28	4,8	0,83	96,5
761	4287	1695			1970	2190	2815	3940	1391	0,72	3,3	0,89	96,3
840	3756		2135		2835	3145	4000	4000	1242	0,51	3,8	0,87	96,5
986	3198			2945	4000	4000	4000	4000	1093	0,33	4,6	0,84	96,6
671	4473	1430			1595	1775	2280	3190	1230	0,87	3,2	0,89	95,9
747	3954		1805		2275	2525	3250	4000	1103	0,62	3,6	0,87	96,3
901	3457			2490	3675	4000	4000	4000	987	0,41	4,2	0,85	96,6
607	4466	1295			1445	1610	2065	2895	1118	0,96	3,2	0,89	95,6
674	3936		1635		2070	2300	2955	4000	999	0,68	3,6	0,87	96,0
830	3516			2255	3270	3635	4000	4000	910	0,45	4,1	0,85	96,5
542	4566	1135			1235	1375	1765	2470	1004	1,11	3,1	0,89	95,1
611	4087		1430		1740	1935	2485	3480	908	0,80	3,5	0,87	95,7
763	3697			1970	2720	3020	3885	4000	833	0,53	3,9	0,86	96,3
453	4625	935			1005	1120	1440	2015	849	1,34	3,1	0,88	94,4
505	4091		1180		1435	1595	2050	2875	759	0,95	3,5	0,87	95,1
647	3796			1630	2190	2430	3125	4000	711	0,65	3,8	0,86	95,9
388	4670	790			830	920	1185	1655	736	1,56	3,0	0,88	93,6
437	4172		1000		1195	1325	1705	2390	663	1,12	3,4	0,87	94,5
565	3904			1380	1805	2005	2580	3610	624	0,77	3,7	0,86	95,5
337	4687	685			710	790	1015	1420	648	1,78	3,0	0,88	92,8
384	4234		865		1005	1115	1435	2005	589	1,29	3,3	0,86	93,8
494	3939			1200	1550	1725	2220	3105	551	0,88	3,7	0,85	95,1
265	4706	540			545	605	780	1090	521	2,21	2,9	0,87	91,2
307	4303		680		765	850	1095	1535	479	1,61	3,2	0,86	92,6
399	4046			940	1185	1320	1695	2375	451	1,10	3,6	0,85	94,1
218	4728	440			-	480	620	870	437	2,62	2,8	0,87	89,7
247	4244		555		625	695	895	1255	395	1,89	3,2	0,85	91,2
331	4096			770	940	1045	1340	1875	380	1,32	3,5	0,84	93,2
183	4728	370			-	395	505	710	375	3,02	2,7	0,86	88,1
211	4304		470		510	570	730	1025	343	2,20	3,1	0,85	89,9
282	4151			650	770	855	1100	1540	329	1,53	3,4	0,84	92,2

A5L 315 M44

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	1,6	m³/s	
stat. counterpressure	16	hPa	
fan	D092/S915		75 kg
moment of inertia	11,3	kgm²	
weight (IC 17)	2200	kg	



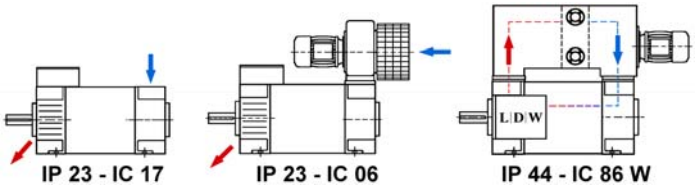
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1015	4971	1950			2515	2790	3590	4000	1856	0,58	3,7	0,88	96,8
1073	4172		2455		3770	4000	4000	4000	1608	0,40	4,4	0,86	96,9
1163	3280			3385	4000	4000	4000	4000	1342	0,24	5,7	0,81	96,6
865	5335	1550			1860	2065	2655	3715	1577	0,76	3,4	0,89	96,4
951	4659		1950		2680	2980	3830	4000	1403	0,54	3,9	0,87	96,7
1105	3923			2690	4000	4000	4000	4000	1224	0,34	4,8	0,84	96,9
762	5349	1360			1630	1810	2325	3255	1396	0,87	3,4	0,89	96,1
846	4713		1715		2330	2585	3325	4000	1250	0,62	3,9	0,87	96,4
1012	4088			2365	3790	4000	4000	4000	1114	0,40	4,6	0,85	96,8
669	5561	1150			1325	1470	1890	2645	1230	1,05	3,3	0,89	95,6
749	4941		1450		1875	2085	2680	3755	1106	0,75	3,7	0,88	96,1
914	4365			2000	3000	3335	4000	4000	998	0,49	4,3	0,86	96,6
603	5534	1040			1205	1340	1720	2410	1115	1,15	3,3	0,89	95,3
672	4896		1310		1715	1905	2450	3430	999	0,82	3,7	0,87	95,8
842	4442			1810	2670	2965	3815	4000	920	0,55	4,2	0,86	96,5
536	5634	910			1035	1145	1475	2065	998	1,32	3,2	0,88	94,8
608	5064		1145		1450	1610	2070	2900	905	0,95	3,6	0,87	95,5
768	4638			1580	2235	2485	3190	4000	839	0,64	4,0	0,86	96,2
447	5703	750			825	915	1175	1645	844	1,60	3,1	0,88	93,9
501	5060		945		1195	1330	1710	2395	757	1,14	3,6	0,87	94,7
649	4742			1305	1805	2005	2580	3610	713	0,78	3,9	0,86	95,7
383	5762	635			685	760	980	1370	732	1,87	3,1	0,88	93,0
432	5142		800		980	1090	1400	1960	659	1,34	3,5	0,87	94,0
566	4874			1110	1490	1655	2130	2980	626	0,92	3,8	0,86	95,3
332	5771	550			585	650	835	1170	644	2,13	3,0	0,87	92,1
380	5215		695		830	925	1190	1665	586	1,54	3,4	0,86	93,3
493	4894			960	1285	1430	1840	2575	551	1,05	3,8	0,85	94,7
260	5757	430			450	500	640	895	515	2,62	3,0	0,87	90,4
301	5272		545		635	705	910	1270	474	1,92	3,3	0,86	91,9
396	5005			755	965	1075	1380	1930	450	1,32	3,7	0,85	93,7
212	5769	350			355	390	505	705	432	3,11	2,9	0,87	88,7
242	5194		445		515	575	740	1035	392	2,25	3,3	0,85	90,4
326	5041			620	775	860	1105	1545	377	1,57	3,6	0,84	92,6
178	5768	295			-	315	405	570	371	3,59	2,8	0,86	86,9
206	5262		375		420	465	595	835	340	2,61	3,2	0,85	88,9
279	5126			520	630	700	900	1255	328	1,83	3,5	0,84	91,5

A5L 315 M48

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	1,6	m³/s	
stat. counterpressure	16	hPa	
fan	D092/S915		75 kg
moment of inertia	14,0	kgm²	
weight (IC 17)	2560	kg	



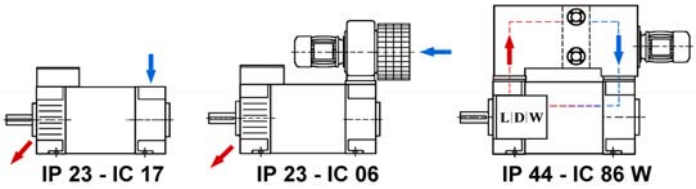
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1022	6350	1535			2050	2275	2930	3570	1868	0,72	3,8	0,88	96,6
1093	5392		1935		3040	3375	3570	3570	1632	0,50	4,5	0,86	96,9
1238	4430			2670	3570	3570	3570	3570	1403	0,31	5,6	0,82	97,0
863	6758	1220			1530	1695	2180	3055	1577	0,94	3,6	0,89	96,1
962	5981		1535		2175	2415	3105	3570	1417	0,67	4,0	0,87	96,6
1140	5137			2120	3570	3570	3570	3570	1253	0,43	4,8	0,85	96,9
759	6772	1070			1340	1490	1915	2680	1396	1,06	3,6	0,89	95,7
848	5999		1350		1905	2120	2725	3570	1255	0,76	4,0	0,87	96,2
1032	5292			1865	3050	3385	3570	3570	1131	0,50	4,7	0,85	96,8
663	7008	905			1095	1215	1560	2185	1226	1,29	3,5	0,89	95,2
747	6257		1140		1545	1715	2205	3085	1106	0,93	3,9	0,88	95,8
925	5608			1575	2430	2700	3470	3570	1008	0,61	4,4	0,86	96,5
596	6951	820			980	1090	1400	1960	1108	1,40	3,4	0,89	94,8
670	6197		1035		1410	1570	2015	2825	999	1,01	3,9	0,87	95,5
848	5677			1425	2175	2415	3105	3570	927	0,68	4,4	0,86	96,3
530	7081	715			835	930	1195	1670	992	1,62	3,3	0,88	94,2
602	6380		900		1195	1330	1710	2395	903	1,17	3,8	0,87	95,1
770	5903			1245	1825	2030	2610	3570	842	0,79	4,2	0,86	96,0
442	7163	590			675	750	960	1345	839	1,95	3,3	0,88	93,2
495	6349		745		970	1080	1390	1945	752	1,39	3,7	0,87	94,2
647	6003			1030	1485	1650	2120	2970	713	0,96	4,1	0,86	95,4
375	7183	500			560	625	800	1120	723	2,27	3,2	0,88	92,2
426	6448		630		805	895	1150	1610	655	1,64	3,6	0,86	93,4
561	6139			870	1230	1365	1760	2460	624	1,13	4,0	0,86	94,8
324	7170	430			480	530	685	960	635	2,58	3,2	0,87	91,3
373	6515		545		685	760	975	1365	580	1,88	3,6	0,86	92,6
488	6159			755	1040	1155	1485	2080	550	1,29	3,9	0,85	94,2
252	7130	340			360	400	515	725	508	3,18	3,1	0,87	89,3
295	6578		430		515	575	740	1035	470	2,34	3,5	0,86	91,0
391	6293			595	785	875	1120	1570	448	1,62	3,8	0,85	93,0
206	7142	275			280	310	400	560	426	3,77	2,9	0,87	87,3
237	6460		350		415	465	595	835	388	2,74	3,4	0,85	89,3
320	6303			485	625	695	895	1250	375	1,92	3,7	0,84	91,8
172	7118	230			-	245	310	435	366	4,35	2,7	0,86	85,3
200	6489		295		335	370	475	670	335	3,17	3,2	0,85	87,7
273	6375			410	505	560	720	1010	324	2,23	3,5	0,84	90,6

A5L 315 M52

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	1,6	m³/s	
stat. counterpressure	16	hPa	
fan	D092/S915	75	kg
moment of inertia	17,4	kgm²	
weight (IC 17)	3010	kg	



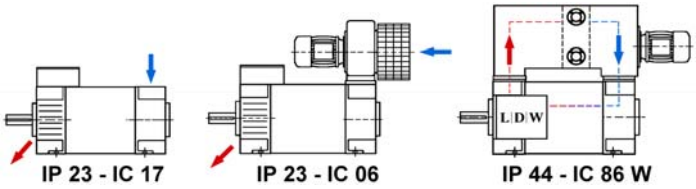
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1023	8076	1210			1695	1880	2420	2690	1874	0,89	4,0	0,88	96,4
1107	6934		1525		2485	2690	2690	2690	1651	0,62	4,7	0,86	96,7
1296	5882			2105	2690	2690	2690	2690	1451	0,40	5,6	0,83	97,0
853	8490	960			1275	1420	1825	2555	1567	1,15	3,8	0,89	95,8
963	7599		1210		1800	2000	2570	2690	1422	0,83	4,2	0,87	96,3
1162	6645			1670	2690	2690	2690	2690	1272	0,54	5,0	0,85	96,8
748	8478	845			1105	1230	1580	2210	1383	1,30	3,7	0,89	95,3
845	7593		1065		1580	1760	2260	2690	1255	0,94	4,3	0,87	95,9
1045	6797			1470	2490	2690	2690	2690	1144	0,62	4,9	0,85	96,6
649	8719	710			900	1000	1290	1805	1208	1,57	3,6	0,89	94,7
741	7880		900		1285	1430	1840	2575	1103	1,14	4,1	0,87	95,4
927	7135			1240	2005	2230	2690	2690	1012	0,76	4,6	0,86	96,3
584	8669	645			815	910	1165	1635	1095	1,72	3,6	0,88	94,2
664	7801		815		1160	1285	1655	2315	996	1,24	4,1	0,87	95,0
849	7220			1125	1795	1995	2565	2690	930	0,84	4,6	0,86	96,0
518	8804	560			695	775	995	1390	978	1,97	3,5	0,88	93,5
595	8002		710		980	1090	1400	1960	897	1,44	3,9	0,87	94,5
767	7469			980	1515	1685	2165	2690	842	0,98	4,4	0,86	95,6
427	8813	465			565	625	805	1125	820	2,36	3,5	0,88	92,4
485	7921		585		810	900	1155	1615	745	1,70	3,9	0,87	93,6
641	7555			810	1215	1350	1735	2430	711	1,18	4,3	0,86	95,0
362	8830	390			465	520	665	930	707	2,74	3,4	0,88	91,3
417	8038		495		665	740	950	1330	649	2,00	3,8	0,86	92,6
553	7696			685	1000	1115	1430	2005	620	1,39	4,2	0,85	94,3
312	8795	340			395	440	565	790	620	3,12	3,3	0,87	90,2
363	8082		430		565	630	805	1130	573	2,29	3,8	0,86	91,7
481	7717			595	855	955	1225	1715	546	1,59	4,1	0,85	93,6
242	8728	265			290	325	415	585	496	3,84	3,1	0,87	87,9
286	8121		335		425	470	605	845	463	2,85	3,6	0,85	89,9
383	7840			465	645	715	920	1285	444	1,99	3,9	0,84	92,2
197	8713	215			215	240	310	435	416	4,56	2,9	0,86	85,7
228	7925		275		335	375	480	670	381	3,32	3,5	0,84	87,9
313	7841			380	505	560	720	1010	371	2,35	3,8	0,84	90,8
164	8673	180			-	-	230	325	358	5,25	2,6	0,86	83,4
191	7935		230		265	290	375	525	329	3,84	3,3	0,84	86,1
265	7886			320	400	440	570	795	320	2,72	3,5	0,83	89,4

A5L 400 M42

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	3,2	m³/s	
stat. counterpressur	17	hPa	
fan	L 160	180	kg
moment of inertia	24,8	kgm²	
weight (IC 17)	3700	kg	



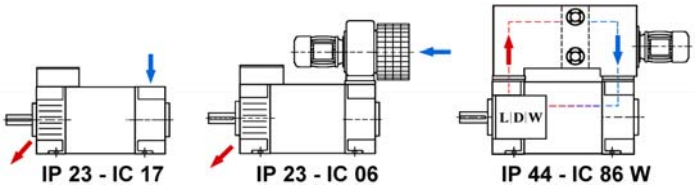
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1567	8517	1755			1915	2130	2740	3000	2826	0,62	3,1	0,89	96,9
1717	7412		2210		2870	3000	3000	3000	2471	0,43	3,7	0,89	97,1
-	-			-	-	-	-	-	-	-	-	-	-
1287	8802	1395			1475	1640	2105	2950	2346	0,80	3,0	0,89	96,4
1444	7840		1760		2160	2400	3000	3000	2080	0,56	3,5	0,89	96,8
1755	6907			2425	3000	3000	3000	3000	1856	0,36	4,1	0,88	97,0
1084	8954	1155			1200	1335	1715	2400	1995	0,97	3,0	0,88	96,0
1233	8077		1460		1735	1930	2480	3000	1784	0,69	3,4	0,89	96,4
1540	7315			2010	2690	2990	3000	3000	1622	0,46	3,8	0,88	96,9
938	9092	985			1005	1120	1440	2015	1740	1,15	2,9	0,88	95,5
1072	8243		1240		1450	1610	2070	2900	1559	0,82	3,3	0,89	96,1
1364	7598			1715	2210	2455	3000	3000	1438	0,55	3,7	0,89	96,7
820	9159	855			-	950	1220	1710	1534	1,31	2,9	0,88	94,9
945	8364		1080		1240	1380	1775	2480	1383	0,94	3,3	0,89	95,7
1219	7814			1490	1865	2075	2665	3000	1289	0,64	3,6	0,89	96,4
731	9236	755			-	830	1065	1490	1377	1,48	2,8	0,88	94,4
851	8519		955		1075	1195	1540	2155	1253	1,07	3,2	0,89	95,3
1095	7940			1315	1625	1805	2320	3000	1162	0,72	3,5	0,88	96,2
656	9275	675			-	735	945	1325	1245	1,65	2,8	0,88	93,9
768	8590		855		955	1060	1365	1910	1137	1,20	3,2	0,88	94,9
995	8056			1180	1435	1590	2045	2865	1061	0,81	3,5	0,88	95,9
544	9343	555			-	595	765	1070	1048	1,98	2,7	0,87	92,8
635	8625		705		770	855	1100	1540	952	1,43	3,1	0,88	94,0
830	8155			970	1170	1295	1670	2335	894	0,98	3,4	0,88	95,3
463	9385	470			-	495	635	890	905	2,31	2,7	0,87	91,8
539	8636		595		645	720	925	1295	818	1,66	3,1	0,88	93,1
715	8274			825	975	1085	1395	1950	777	1,15	3,4	0,88	94,7
401	9399	405			-	420	540	760	794	2,62	2,7	0,87	90,7
470	8704		515		550	610	785	1100	724	1,90	3,0	0,87	92,3
628	8394			715	820	910	1170	1635	690	1,32	3,3	0,87	94,1
312	9356	320			-	320	410	575	635	3,22	2,6	0,87	88,6
372	8809		405		415	460	595	830	588	2,37	2,9	0,87	90,6
498	8489			560	625	695	895	1255	559	1,64	3,2	0,87	92,8
252	9295	260			-	-	320	445	529	3,79	2,5	0,86	86,5
301	8739		330		330	370	475	665	489	2,79	2,9	0,86	88,8
405	8469			455	505	560	720	1010	466	1,93	3,2	0,86	91,5

A5L 400 M46

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	3,2	m³/s
stat. counterpressur	17	hPa
fan	L 160	180 kg
moment of inertia	30,4	kgm²
weight (IC 17)	4210	kg



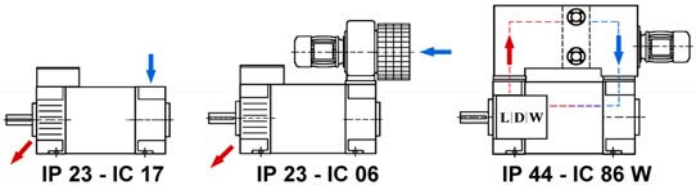
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1565	10732	1395			1580	1755	2260	2700	2826	0,75	3,2	0,89	96,8
1722	9377		1755		2350	2615	2700	2700	2479	0,52	3,8	0,89	97,1
2032	8021			2420	2700	2700	2700	2700	2169	0,33	4,6	0,87	97,2
1279	11040	1105			1220	1360	1745	2445	2334	0,96	3,2	0,89	96,2
1443	9879		1395		1775	1970	2535	2700	2080	0,68	3,6	0,89	96,7
1777	8822			1925	2700	2700	2700	2700	1874	0,44	4,1	0,88	97,1
1074	11198	915			995	1110	1425	1995	1980	1,17	3,1	0,89	95,7
1224	10115		1155		1435	1595	2050	2700	1773	0,83	3,6	0,89	96,3
1545	9252			1595	2205	2450	2700	2700	1627	0,55	3,9	0,88	96,9
927	11352	780			825	915	1175	1645	1723	1,37	3,0	0,88	95,1
1063	10319		985		1200	1330	1715	2400	1550	0,98	3,5	0,89	95,8
1362	9574			1360	1815	2015	2595	2700	1438	0,66	3,8	0,89	96,6
811	11432	675			705	785	1010	1410	1519	1,57	3,0	0,88	94,5
934	10439		855		1030	1145	1470	2060	1372	1,13	3,4	0,89	95,4
1212	9802			1180	1540	1710	2200	2700	1285	0,77	3,7	0,88	96,3
720	11497	600			615	685	880	1235	1360	1,77	2,9	0,88	93,9
842	10643		755		880	975	1255	1755	1243	1,29	3,3	0,89	94,9
1085	9928			1045	1345	1495	1920	2690	1155	0,87	3,7	0,88	95,9
645	11515	535			545	605	780	1095	1227	1,97	2,9	0,88	93,4
758	10716		675		775	865	1110	1555	1128	1,44	3,3	0,88	94,4
986	10082			935	1185	1315	1695	2370	1055	0,98	3,6	0,88	95,6
534	11591	440			-	490	630	880	1033	2,36	2,9	0,88	92,2
623	10697		555		635	705	905	1270	940	1,71	3,3	0,88	93,5
822	10200			770	950	1055	1360	1900	889	1,18	3,5	0,88	94,9
453	11622	370			-	405	520	730	890	2,75	2,8	0,87	91,0
529	10718		470		530	590	760	1060	810	1,99	3,2	0,88	92,5
705	10304			655	795	880	1135	1585	771	1,38	3,5	0,88	94,2
391	11618	320			-	340	440	615	780	3,12	2,7	0,87	89,8
460	10782		410		450	500	645	900	714	2,27	3,2	0,87	91,6
617	10421			565	675	750	965	1350	682	1,58	3,4	0,87	93,6
304	11584	250			-	255	325	455	627	3,85	2,6	0,87	87,5
363	10886		320		335	375	480	670	580	2,84	3,0	0,87	89,7
487	10501			445	515	570	735	1030	552	1,96	3,3	0,86	92,2
246	11536	205			-	-	245	345	525	4,56	2,4	0,86	85,1
292	10755		260		265	295	375	530	481	3,32	2,9	0,86	87,7
396	10466			360	410	455	590	825	460	2,31	3,3	0,86	90,7

A5L 400 M50

Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	3,2	m³/s
stat. counterpressur	17	hPa
fan	L 160	180 kg
moment of inertia	37,6	kgm²
weight (IC 17)	4880	kg



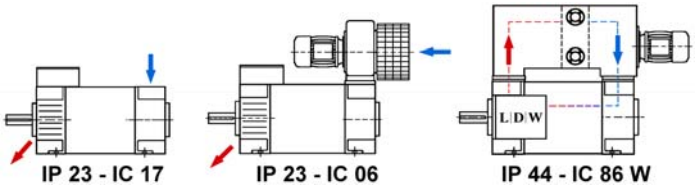
IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1557	13582	1095			1310	1455	1875	2300	2819	0,91	3,4	0,89	96,5
1731	11979		1380		1925	2140	2300	2300	2494	0,64	4,0	0,89	96,9
2075	10413			1905	2300	2300	2300	2300	2207	0,41	4,7	0,87	97,3
1263	13873	870			1005	1120	1440	2015	2310	1,16	3,3	0,89	95,9
1435	12499		1095		1465	1630	2095	2300	2074	0,83	3,8	0,89	96,5
1795	11327			1515	2270	2300	2300	2300	1892	0,55	4,3	0,88	97,0
1056	14012	720			820	910	1170	1640	1950	1,41	3,3	0,89	95,3
1213	12755		910		1190	1320	1700	2300	1763	1,01	3,7	0,89	96,0
1547	11780			1255	1810	2010	2300	2300	1632	0,68	4,1	0,88	96,7
909	14165	610			685	760	980	1370	1693	1,66	3,2	0,89	94,6
1051	12972		775		980	1090	1405	1965	1537	1,20	3,6	0,89	95,4
1355	12112			1070	1500	1665	2140	2300	1434	0,81	4,0	0,89	96,4
792	14226	530			590	655	840	1175	1489	1,89	3,2	0,88	94,0
922	13118		670		840	930	1200	1680	1360	1,38	3,6	0,89	94,9
1201	12359			930	1275	1420	1825	2300	1277	0,94	3,9	0,88	96,0
703	14303	470			510	570	730	1025	1333	2,14	3,1	0,88	93,3
828	13335		595		725	805	1035	1450	1229	1,57	3,5	0,89	94,4
1075	12514			820	1115	1235	1590	2225	1149	1,06	3,9	0,88	95,6
629	14319	420			450	500	645	905	1203	2,37	3,1	0,88	92,7
743	13387		530		640	715	915	1285	1112	1,74	3,5	0,88	93,9
974	12669			735	970	1075	1385	1935	1046	1,19	3,8	0,88	95,2
519	14386	345			360	400	515	720	1010	2,84	3,0	0,88	91,4
612	13386		435		520	580	745	1040	930	2,08	3,4	0,88	92,8
808	12759			605	785	875	1125	1575	879	1,43	3,7	0,88	94,5
440	14430	290			295	330	420	590	872	3,31	2,9	0,88	90,0
516	13333		370		435	485	620	870	797	2,40	3,4	0,88	91,7
692	12883			515	655	725	935	1310	762	1,67	3,6	0,87	93,7
379	14377	250			-	275	355	495	763	3,75	2,8	0,87	88,7
450	13437		320		365	405	520	730	705	2,75	3,3	0,87	90,6
605	13022			445	555	615	790	1110	674	1,91	3,6	0,87	92,9
293	14288	195			-	195	255	355	614	4,63	2,6	0,87	86,1
353	13511		250		265	295	380	535	571	3,43	3,1	0,87	88,5
475	13072			345	420	465	600	840	544	2,37	3,5	0,86	91,3
236	14196	160			-	-	180	255	514	5,48	2,3	0,86	83,4
283	13305		205		205	225	290	410	474	4,02	2,9	0,86	86,3
385	12993			285	330	370	475	665	453	2,79	3,3	0,85	89,7

A5L 400 M54

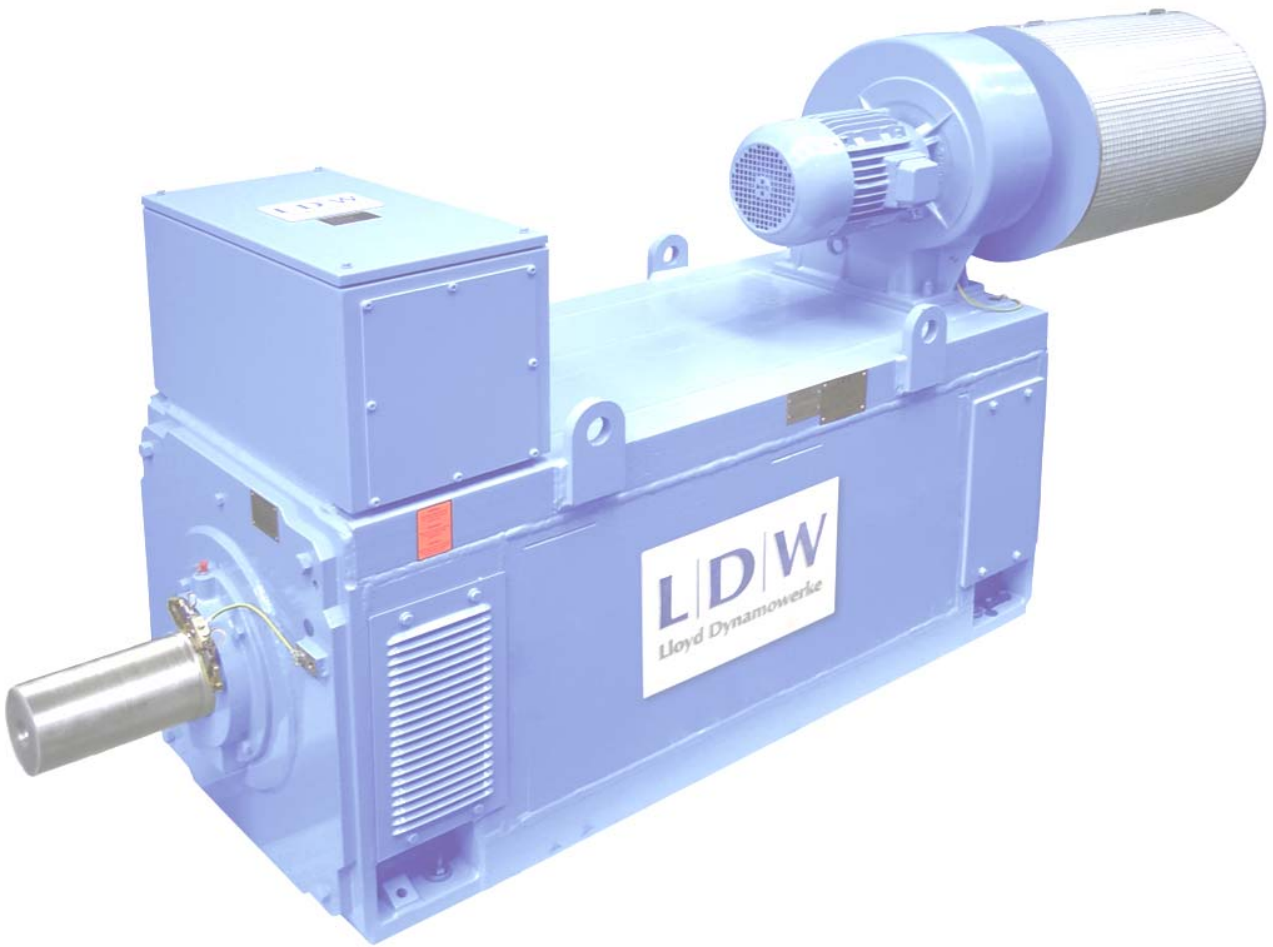
Supply through pulse-controlled inverter connected to 400 V, 500 V, 690 V mains

rate of coolant air	3,2	m³/s
stat. counterpressur	17	hPa
fan	L 160	180 kg
moment of inertia	46,1	kgm²
weight (IC 17)	5660	kg



IP 23 - IC 17 IP 23 - IC 06 IP 44 - IC 86 W

rated output	rated torque	rated speed [1/min] at fundamental voltage [V]			flow weakening speed at short-time load up to x M				rated current	rated slip	stall torque	cos φ	η
		370	465	640	2,0	1,8	1,4	1,0					
[kW]	[Nm]								[A]	[%]	[M n]		[%]
1524	16641	875			1115	1240	1595	2000	2766	1,09	3,6	0,89	96,3
1727	14963		1100		1620	1800	2000	2000	2494	0,78	4,2	0,89	96,7
2117	13287			1520	2000	2000	2000	2000	2245	0,51	4,8	0,88	97,2
1234	16971	695			865	960	1235	1725	2261	1,39	3,6	0,89	95,5
1421	15495		875		1245	1380	1775	2000	2062	1,01	4,1	0,89	96,2
1798	14197			1210	1905	2000	2000	2000	1898	0,67	4,5	0,88	96,9
1031	17157	575			700	780	1000	1400	1909	1,68	3,5	0,89	94,8
1201	15824		725		990	1100	1415	1985	1753	1,23	3,9	0,89	95,6
1543	14711			1000	1520	1690	2000	2000	1632	0,83	4,3	0,88	96,5
885	17297	490			585	650	835	1170	1654	1,97	3,4	0,89	94,1
1036	16024		615		830	920	1185	1655	1524	1,45	3,8	0,89	95,0
1345	15055			855	1265	1405	1810	2000	1429	0,99	4,2	0,88	96,1
770	17365	425			500	555	715	1000	1455	2,25	3,4	0,89	93,4
907	16172		535		705	785	1010	1415	1345	1,66	3,8	0,89	94,4
1188	15313			740	1065	1185	1520	2000	1270	1,14	4,1	0,88	95,6
684	17473	375			430	480	620	865	1303	2,54	3,3	0,88	92,6
809	16328		475		615	680	875	1225	1209	1,88	3,7	0,89	93,8
1063	15499			655	925	1030	1320	1850	1142	1,29	4,0	0,88	95,2
611	17465	335			380	425	545	760	1176	2,82	3,3	0,88	91,9
726	16404		425		540	600	775	1080	1094	2,09	3,7	0,88	93,2
960	15642			585	815	905	1165	1635	1037	1,44	4,0	0,88	94,8
503	17512	275			300	335	430	600	987	3,38	3,1	0,88	90,4
596	16369		350		435	485	625	870	914	2,49	3,6	0,88	92,0
793	15698			480	665	735	945	1325	869	1,72	3,9	0,88	93,9
425	17527	230			245	270	345	485	851	3,93	3,0	0,88	88,9
504	16349		295		360	400	515	720	786	2,89	3,5	0,88	90,8
676	15797			410	550	610	785	1100	751	2,01	3,8	0,87	93,0
365	17462	200			-	220	285	400	746	4,46	2,8	0,87	87,4
437	16401		255		300	330	425	600	693	3,30	3,4	0,87	89,6
591	15959			355	465	515	660	925	665	2,30	3,7	0,87	92,1
282	17312	155			-	-	195	270	600	5,51	2,5	0,87	84,4
341	16419		200		215	235	305	425	561	4,10	3,1	0,87	87,2
464	16040			275	345	385	495	690	538	2,86	3,6	0,86	90,3
225	17093	125			-	-	125	175	501	6,51	2,0	0,86	81,4
272	16146		160		-	170	220	310	466	4,81	2,7	0,86	84,6
374	15855			225	270	300	385	535	447	3,36	3,4	0,85	88,5



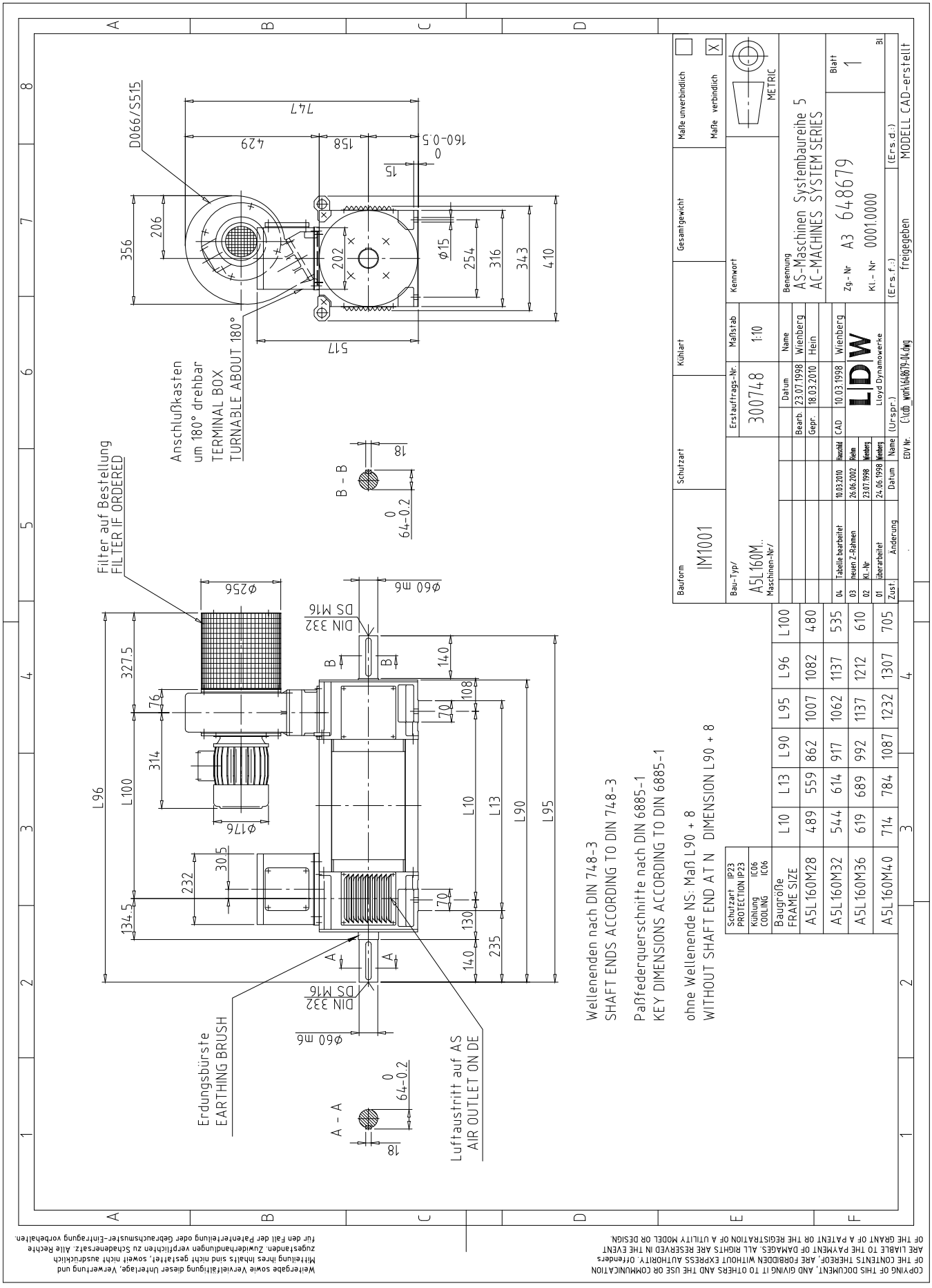
Dimension drawings

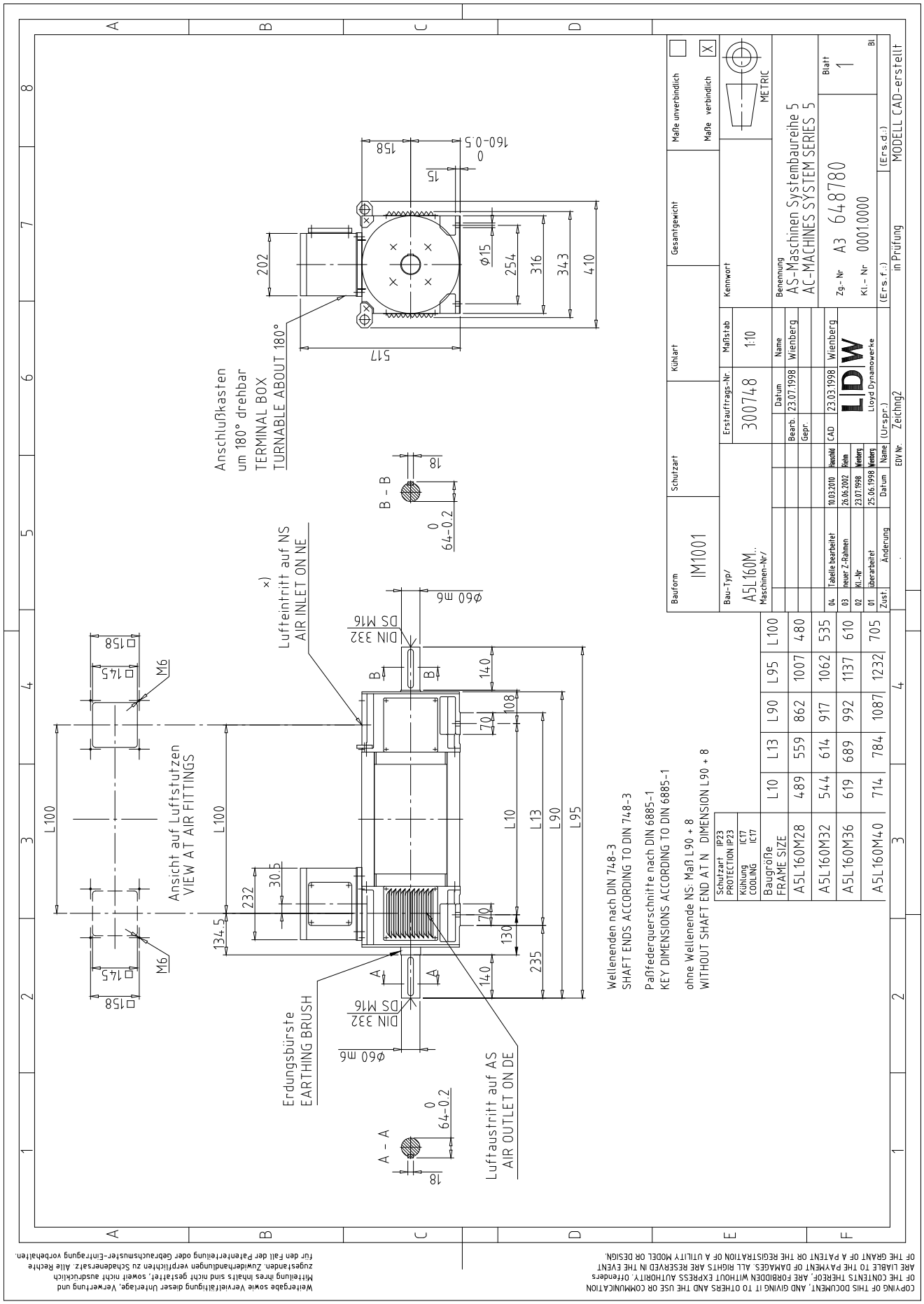
Overview of the Basic Dimension drawings

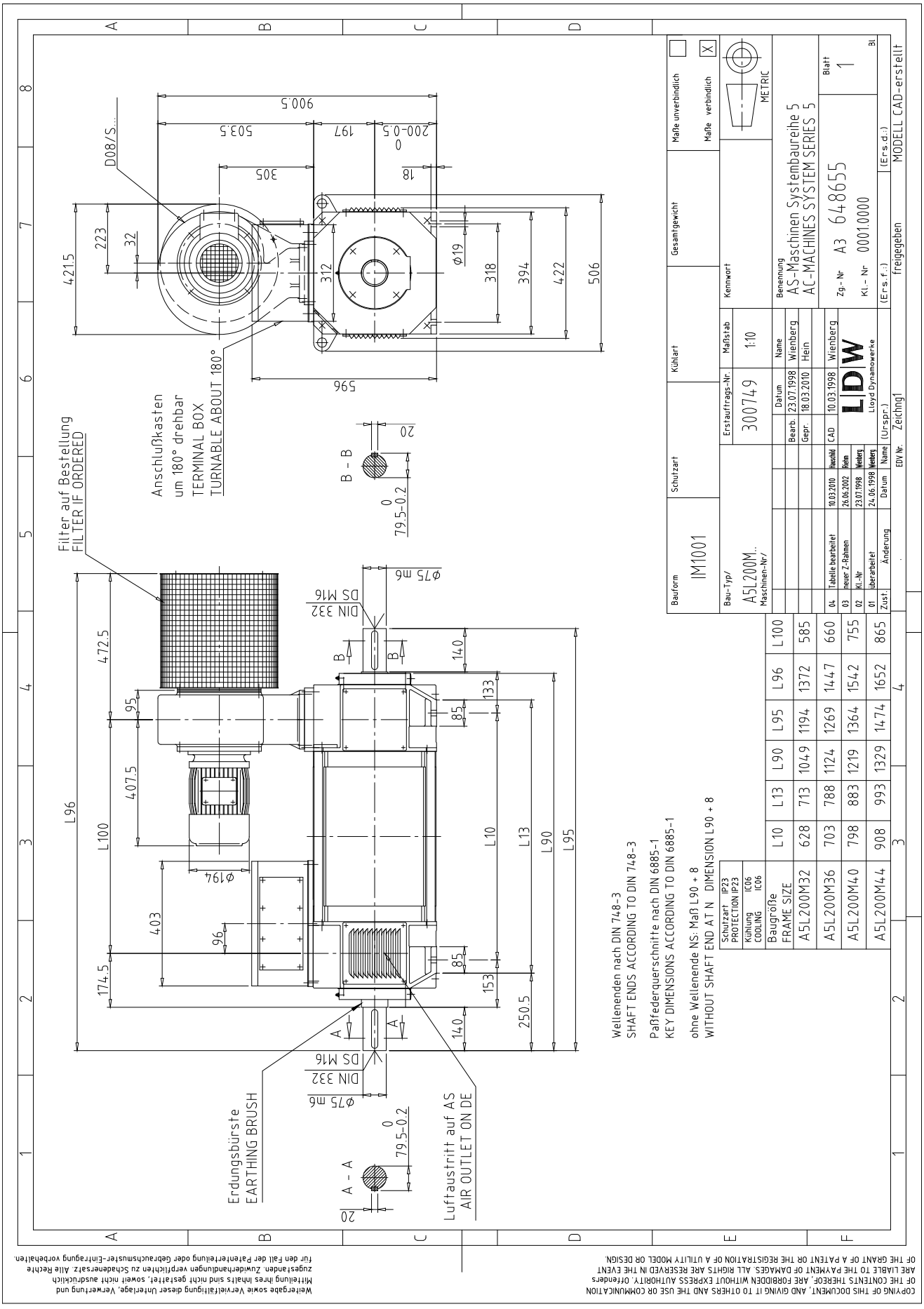
Table 1 Type of construction IM1001 (IMB3) and IM2001 (IMB35)

Type of construction		IM1001 (IMB3)		IM2001 (IMB35)	
Type Type of protection – Type of cooling Terminal position		A5L IP 23 – IC 06 top, right, left	A5L IP 23 – IC 17 top, right, left	A5L IP 23 – IC 06 top, right, left	A5L IP 23 – IC 17 top, right, left
A5L160	M28 M32 M36 M40	Page 3/1 (648679)	Page 3/2 (648780)	Page 3/11 (649183)	Page 3/12 (649278)
A5L200	M32 M36 M40 M44	Page 3/3 (648655)	Page 3/4 (648781)	Page 3/13 (649184)	Page 3/14 (649279)
A5L250	M36 M40 M44 M48	Page 3/5 (648578)	Page 3/6 (648782)	Page 3/15 (649185)	Page 3/16 (649280)
A5L315	M40 M44 M48 M52	Page 3/7 (667424)	Page 3/8 (667408)	Page 3/17 (667348)	Page 3/18 (667409)
A5L400	M42 M46 M50 M54	Page 3/9 (667767)	Page 3/10 (667779)	Page 3/19 (667768)	Page 3/20 (667780)

The numbers of the dimension drawings are specified in parentheses.

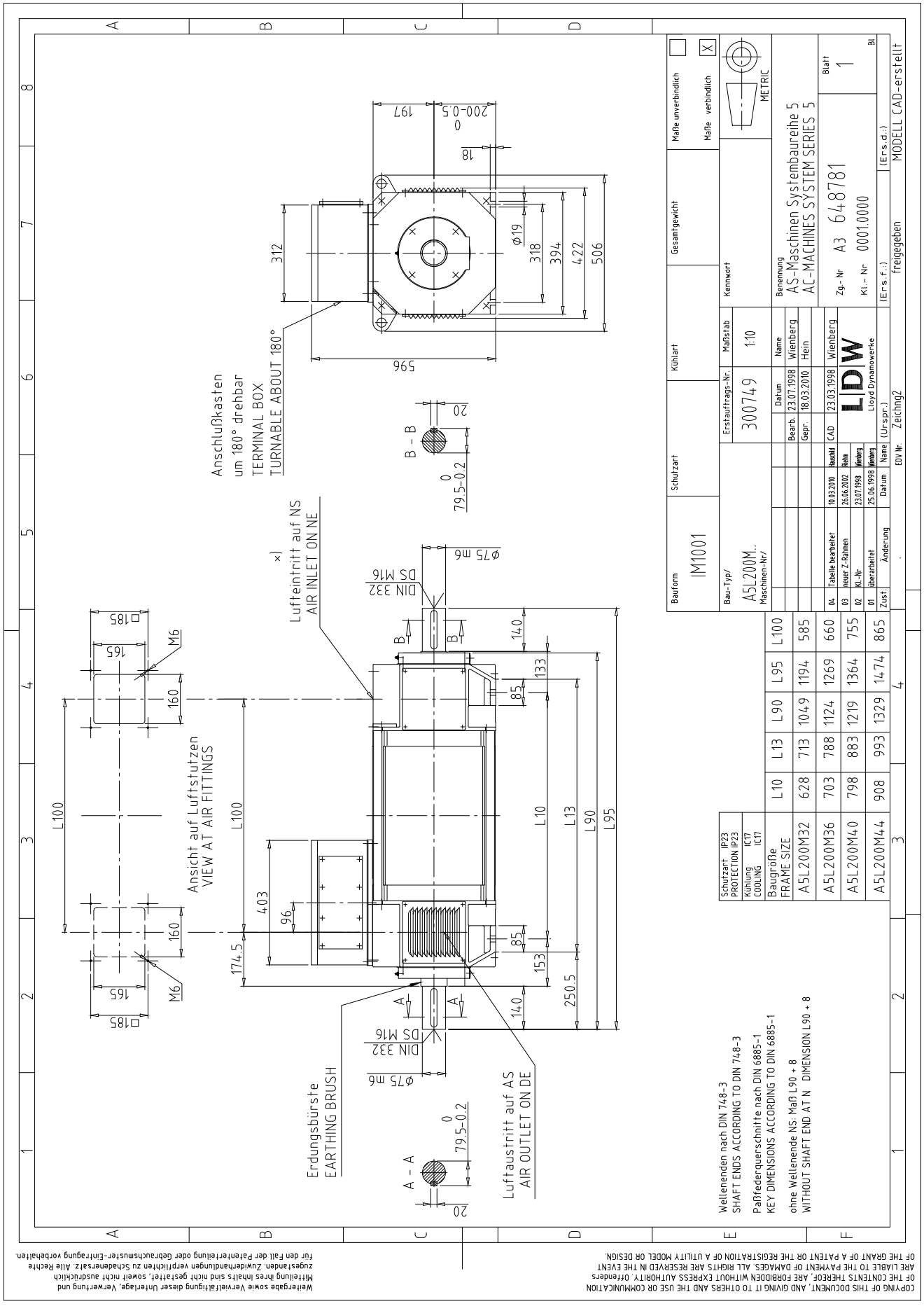






Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L200M32	628	713	1049	1194	1372	585
A5L200M36	703	788	1124	1269	1447	660
A5L200M40	798	883	1219	1364	1542	755
A5L200M44	908	993	1329	1474	1652	865

Schutzart IP23 PROTECTION IP23
Kühlung IC06 COOLING IC06


Anschlußkasten
um 180° drehbar
TERMINAL BOX
TURNABLE ABOUT 180°
Ansicht auf Luftstutzen
VIEW AT AIR FITTINGS
Lufteintritt auf NS
AIR INLET ON NE
Luftaustritt auf AS
AIR OUTLET ON DE
Erdungsbürste
EARTHING BRUSH
Wellenenden nach DIN 748-3
SHAFT ENDS ACCORDING TO DIN 748-3
Paßfederquerschnitte nach DIN 6885-1
KEY DIMENSIONS ACCORDING TO DIN 6885-1
ohne Wellenende NS: Maß L90 + 8
WITHOUT SHAFT END AT N DIMENSION L90 + 8
Bauform IM1001
Schutzart
Kühlart
Gesamtgewicht
Maße unverbindlich
Maße verbindlich
METRIC
Bau-Typ/ A5L200M...
Maschinen-Nr/
Erstauftrags-Nr. 300749
Maßstab 1:10
Kennwort
Benennung
AS-Maschinen Systembaureihe 5
AC-MACHINES SYSTEM SERIES 5
Zg.-Nr A3 648781
Kl.-Nr 0001.0000
Blatt 1
LDW
Lloyd Dynamowerke
Bearb. 23.07.1998 Wienberg
Gepr. 18.03.2010 Hein
CAD 23.03.1998 Wienberg
04. Tabelle bearbeitet 10.03.2010 Hanchki
03 neuer Z-Rahmen 26.06.2002 Rehn
02 Kl.-Nr 23.07.1998 Wienberg
01 überarbeitet 25.06.1998 Wienberg
Zust. Änderung Datum Name
(Urspr.) Zeichng2
(Ers.f.:) freigegeben
(Ers.d.:) MODELL CAD-erstellt
Schutzart IP23
PROTECTION IP23
Kühlung IC17
COOLING IC17
Baugröße FRAME SIZE
A5L200M32 628 713 788 1124 1269 660
A5L200M36 703 788 1124 1269 1364 755
A5L200M40 798 883 1219 1364 1474 865
A5L200M44 908 993 1329 1474 1585
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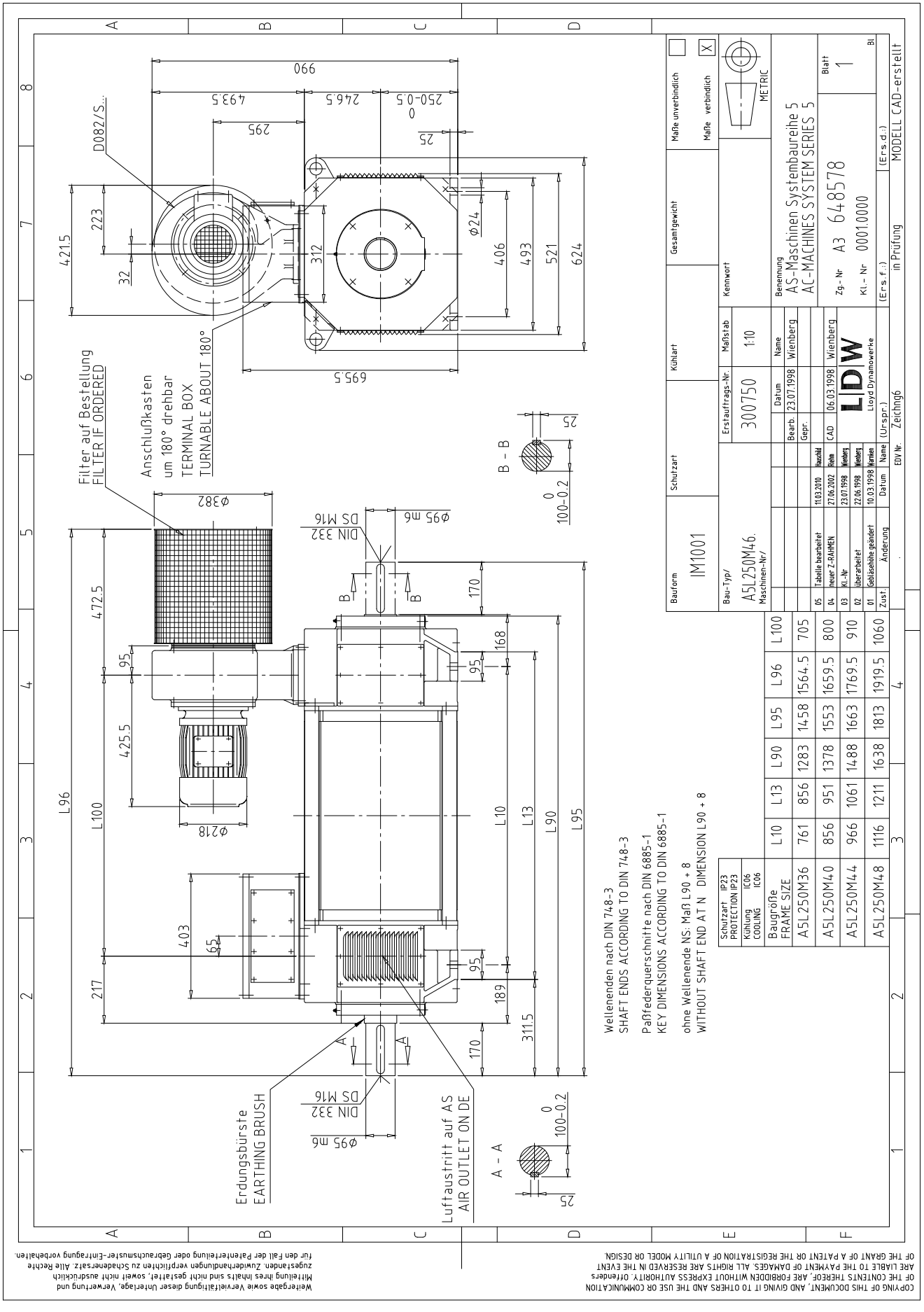
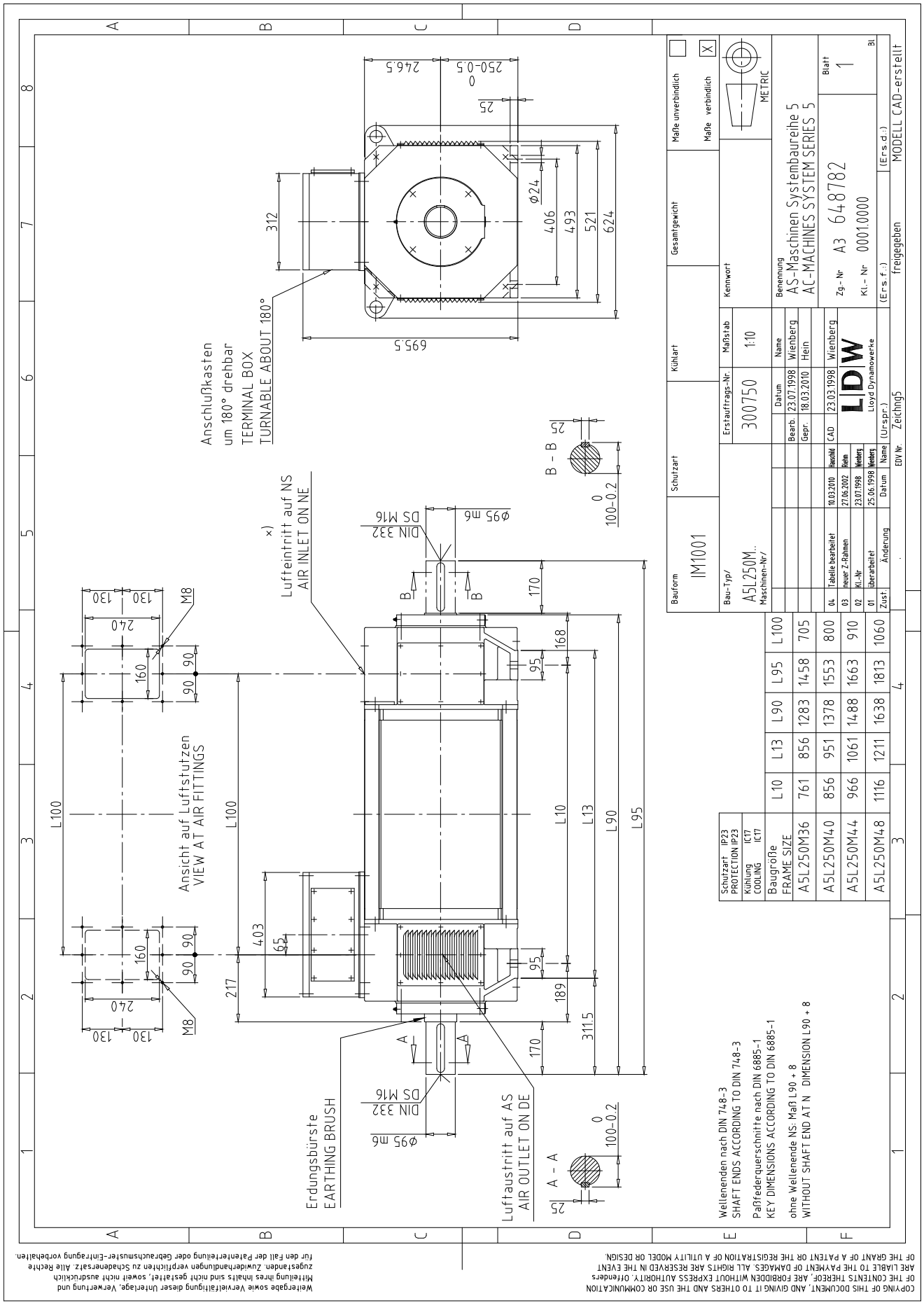
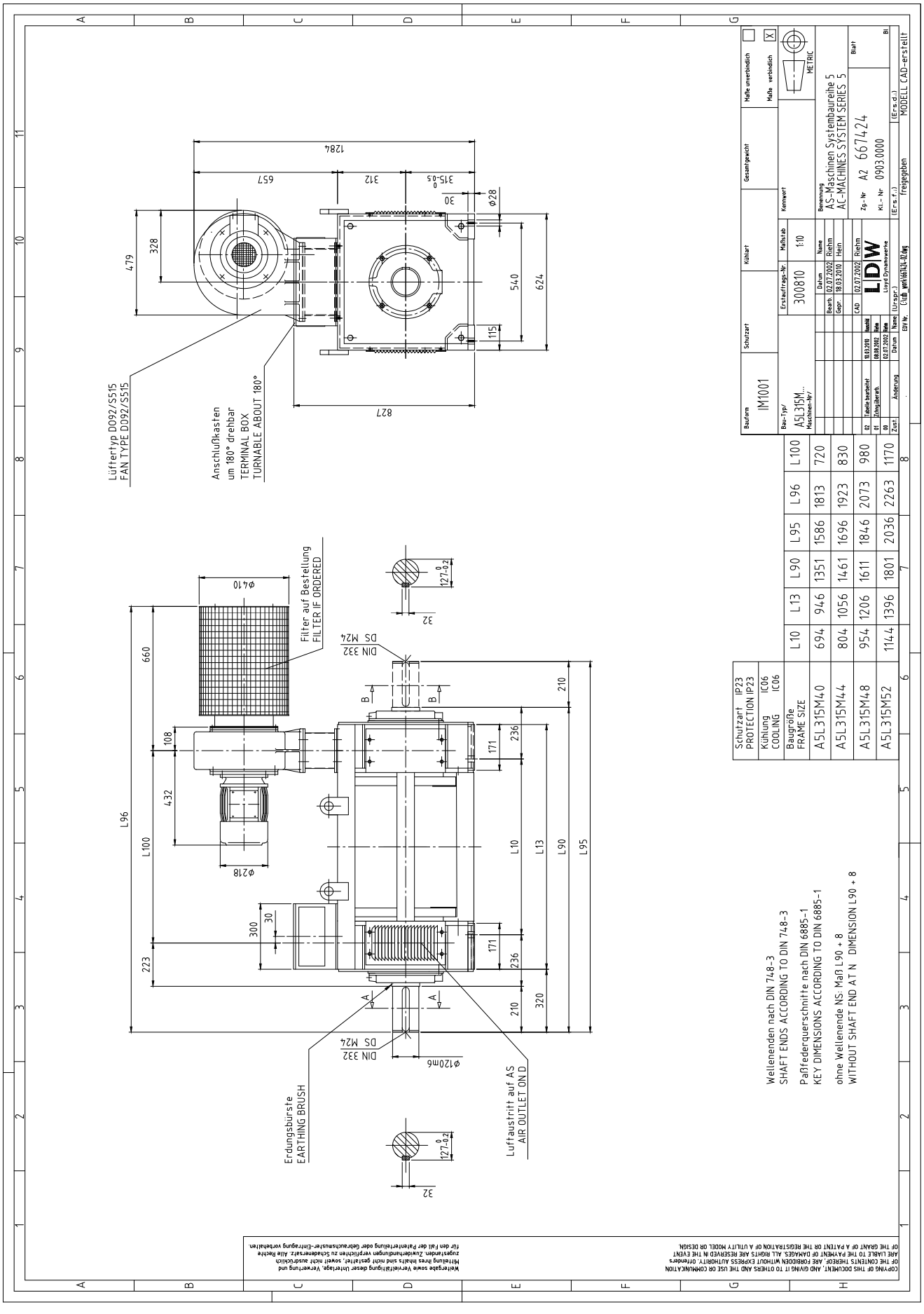


Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L250M36	761	856	1283	1458	1564.5	705
A5L250M40	856	951	1378	1553	1659.5	800
A5L250M44	966	1061	1488	1663	1769.5	910
A5L250M48	1116	1211	1638	1813	1919.5	1060

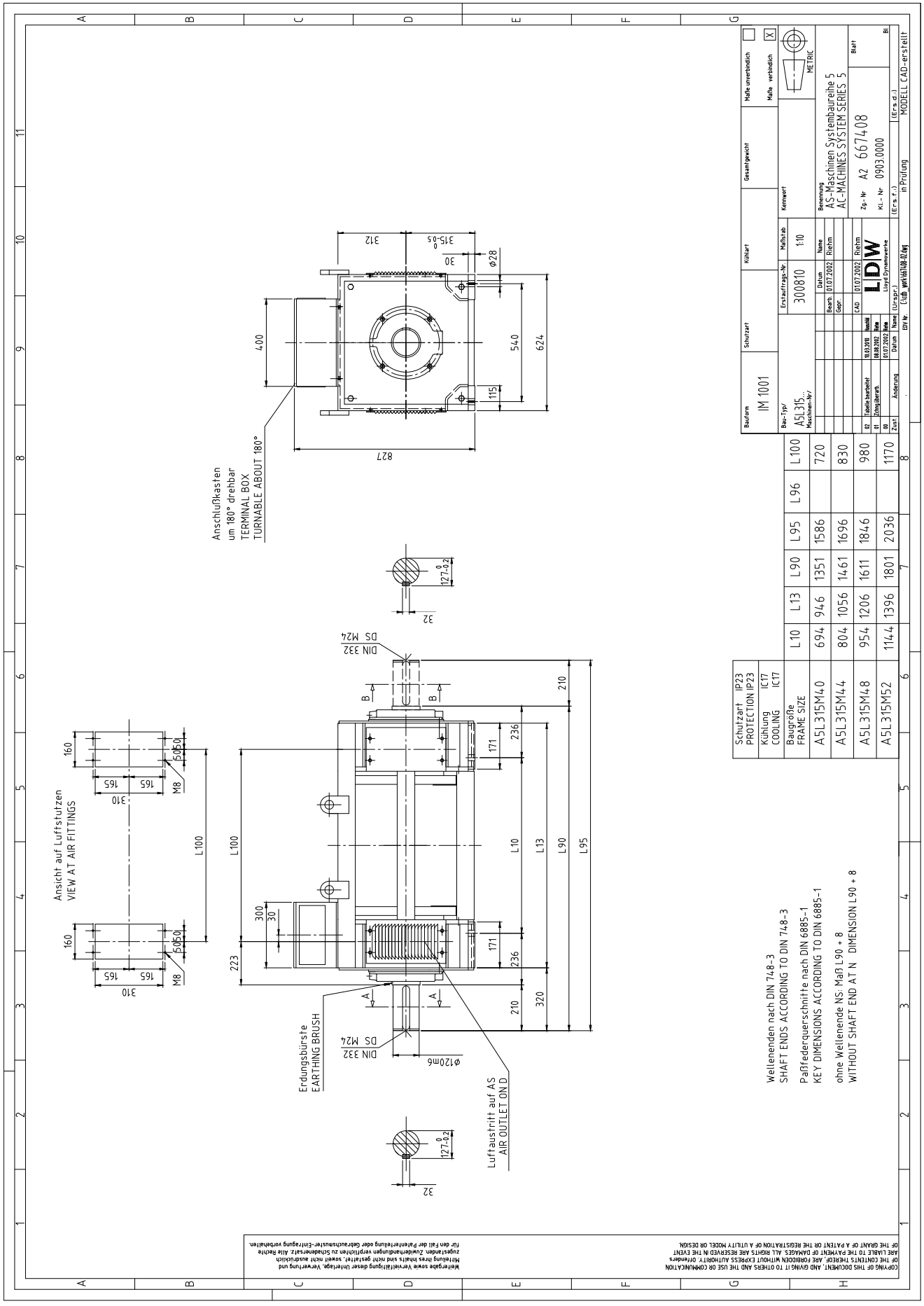
Schutzart IP23 PROTECTION IP23
Kühlung IC06 COOLING IC06



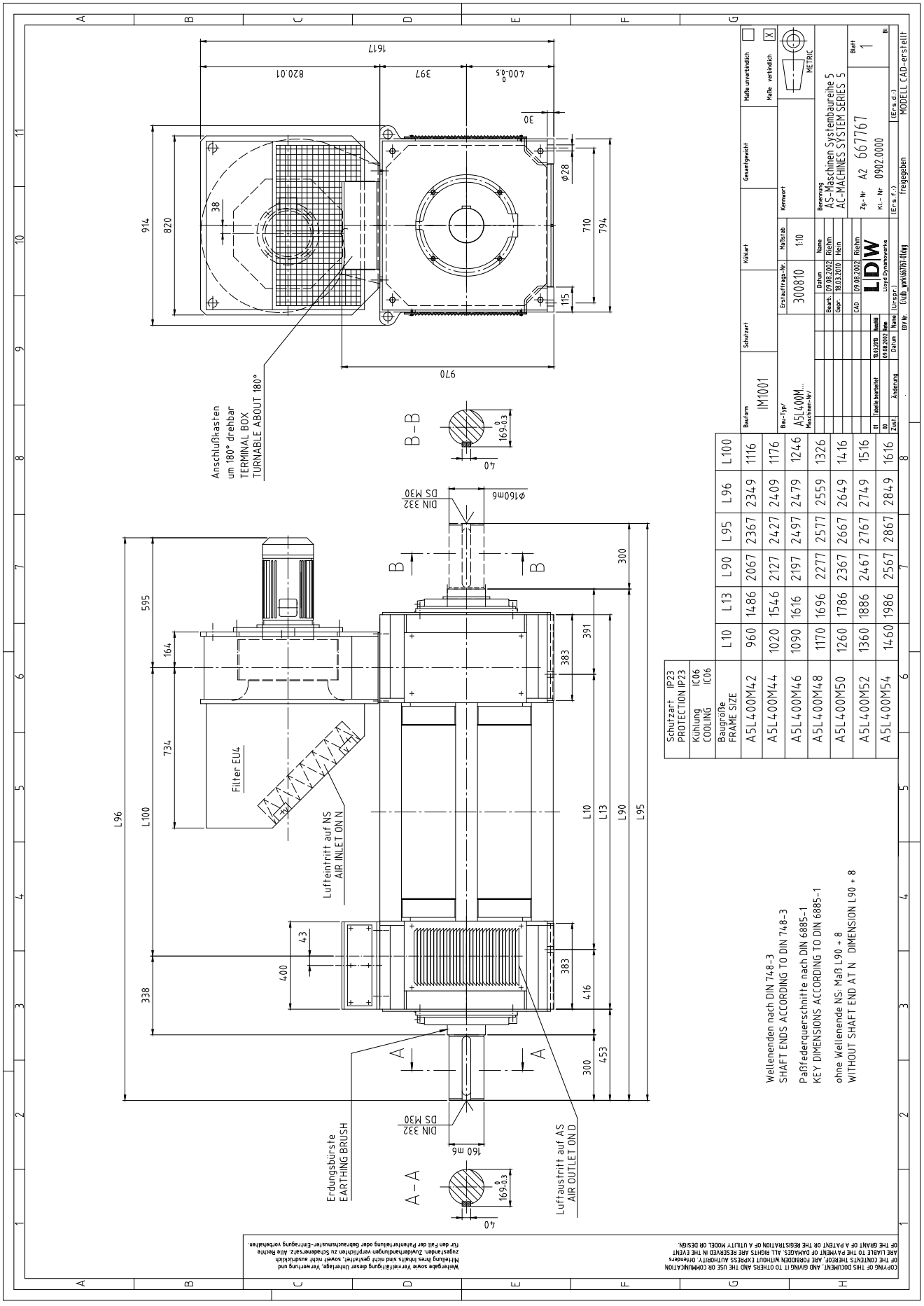
Baugröße FRAME SIZE	L10	L13	L90	L95	L100
A5L250M36	761	856	1283	1458	705
A5L250M40	856	951	1378	1553	800
A5L250M44	966	1061	1488	1663	910
A5L250M48	1116	1211	1638	1813	1060

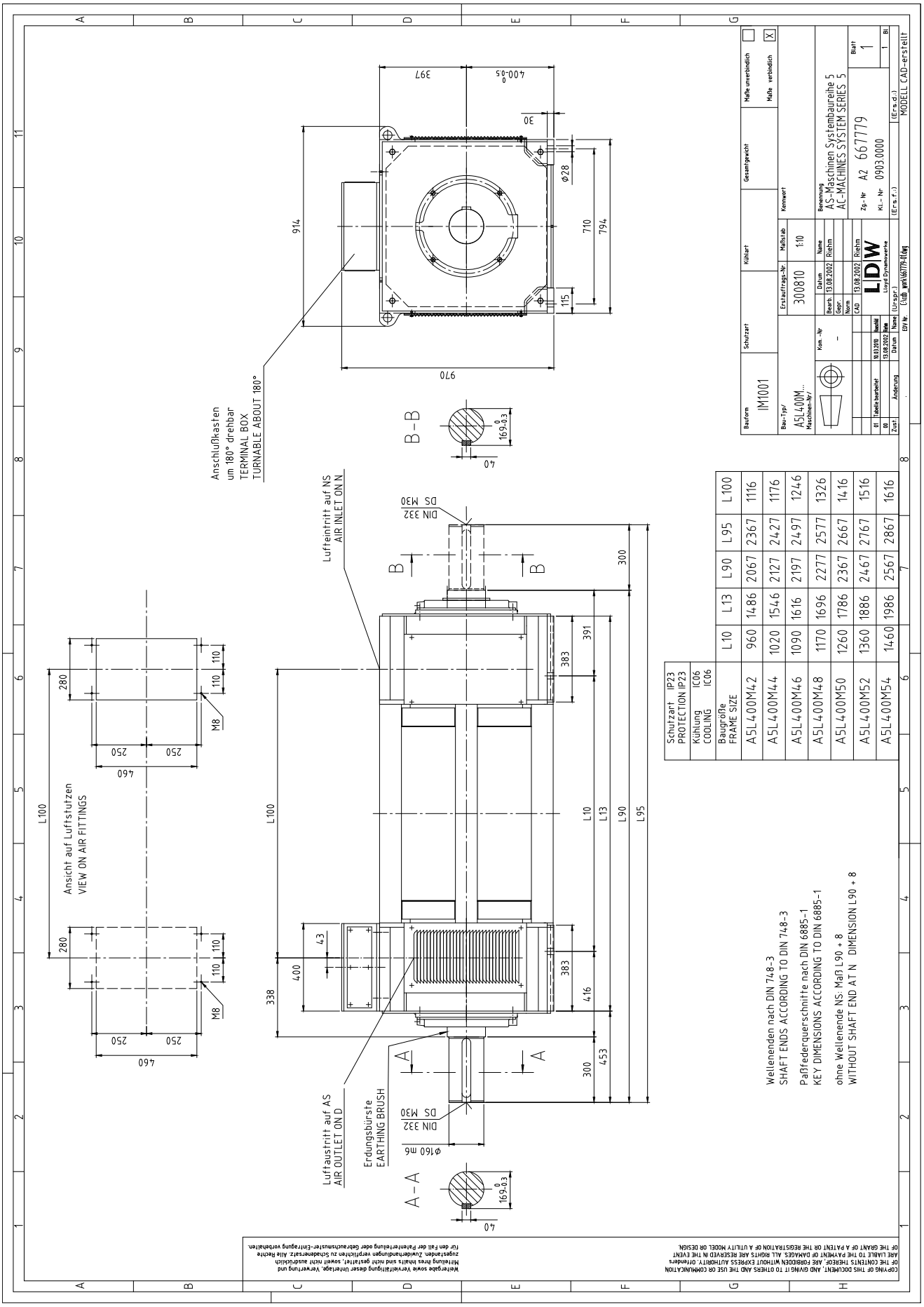


Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L315M40	694	946	1351	1586	1813	720
A5L315M44	804	1056	1461	1696	1923	830
A5L315M48	954	1206	1611	1846	2073	980
A5L315M52	1144	1396	1801	2036	2263	1170

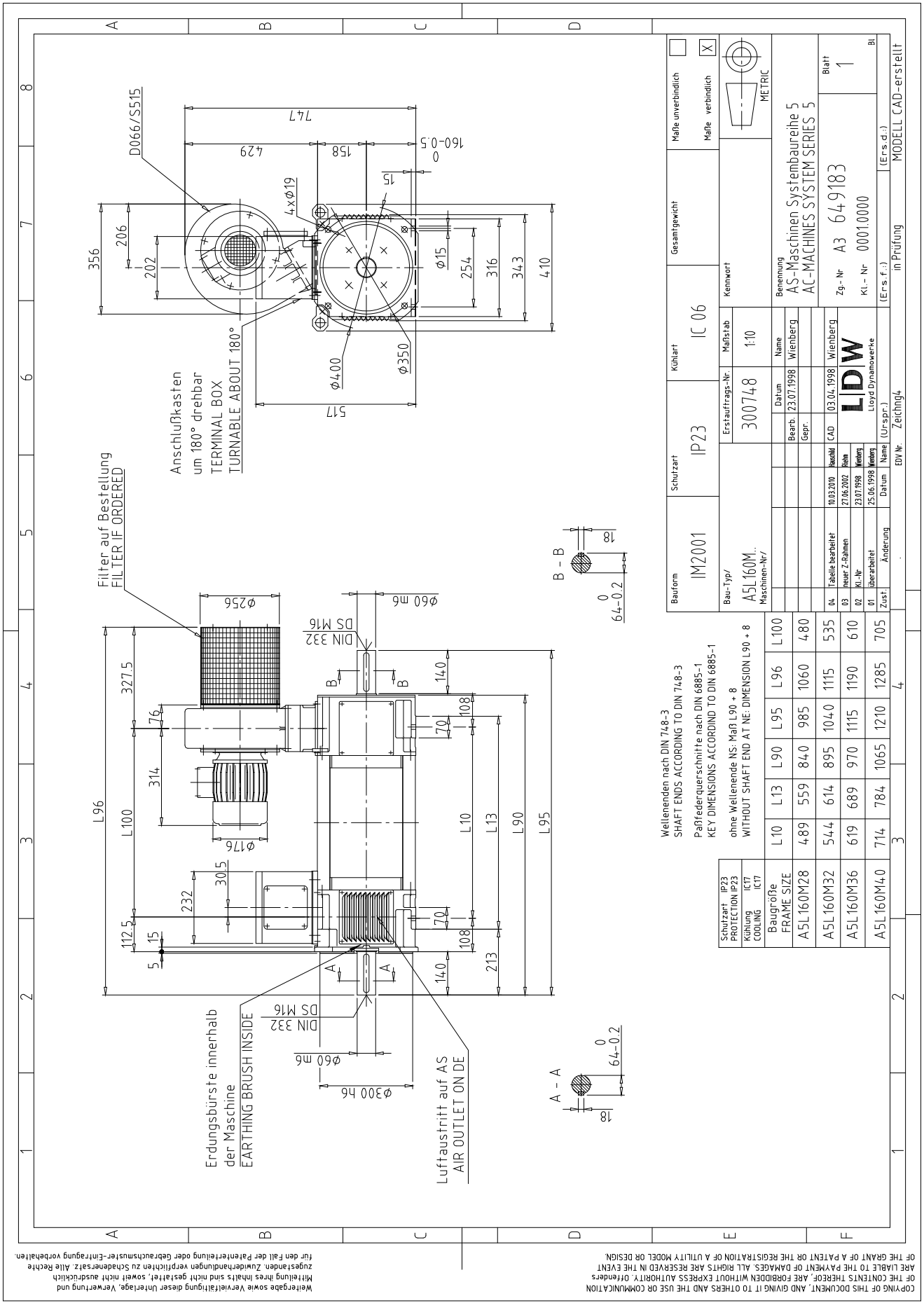


Schutzart IP23 PROTECTION IP23								
Kühlung IC17 COOLING IC17								
Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100		
A5L315M40	694	946	1351	1586		720		
A5L315M44	804	1056	1461	1696		830		
A5L315M48	954	1206	1611	1846		980		
A5L315M52	1144	1396	1801	2036		1170		

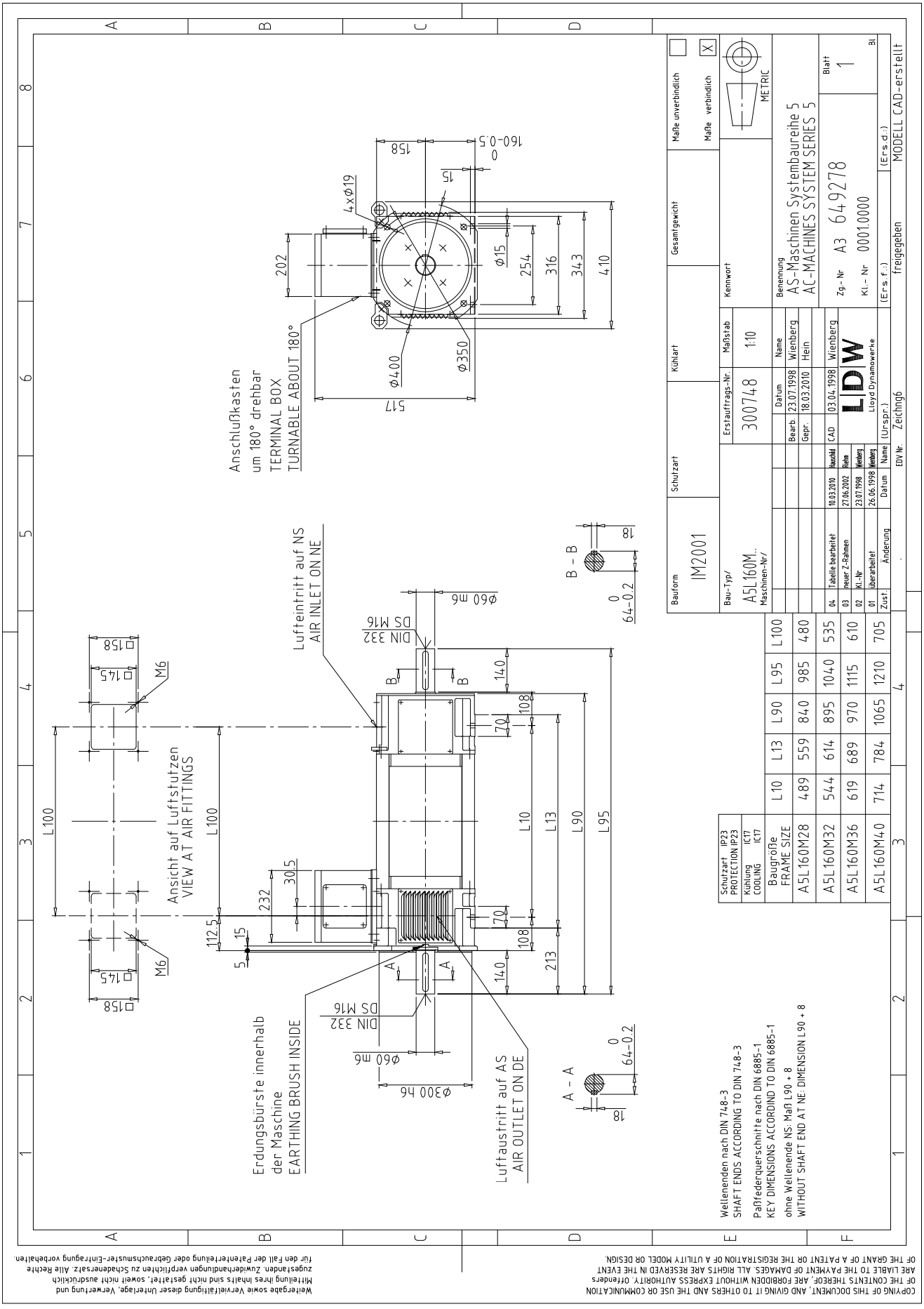




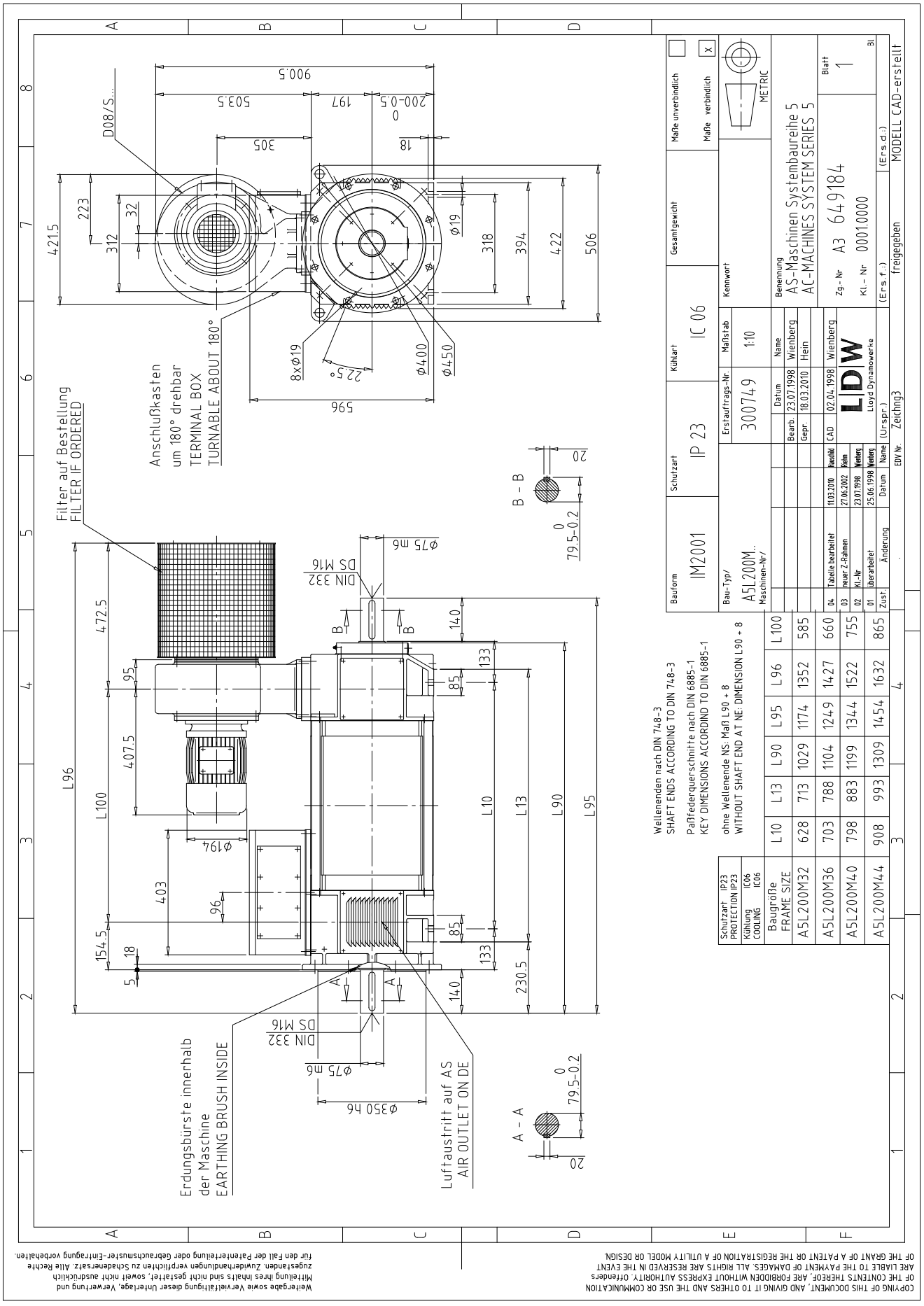
Schutzart IP23 PROTECTION IP23							
Kühlung IC06 COOLING IC06							
Baugröße FRAME SIZE	L10	L13	L90	L95	L100		
A5L400M42	960	1486	2067	2367	1116		
A5L400M44	1020	1546	2127	2427	1176		
A5L400M46	1090	1616	2197	2497	1246		
A5L400M48	1170	1696	2277	2577	1326		
A5L400M50	1260	1786	2367	2667	1416		
A5L400M52	1360	1886	2467	2767	1516		
A5L400M54	1460	1986	2567	2867	1616		



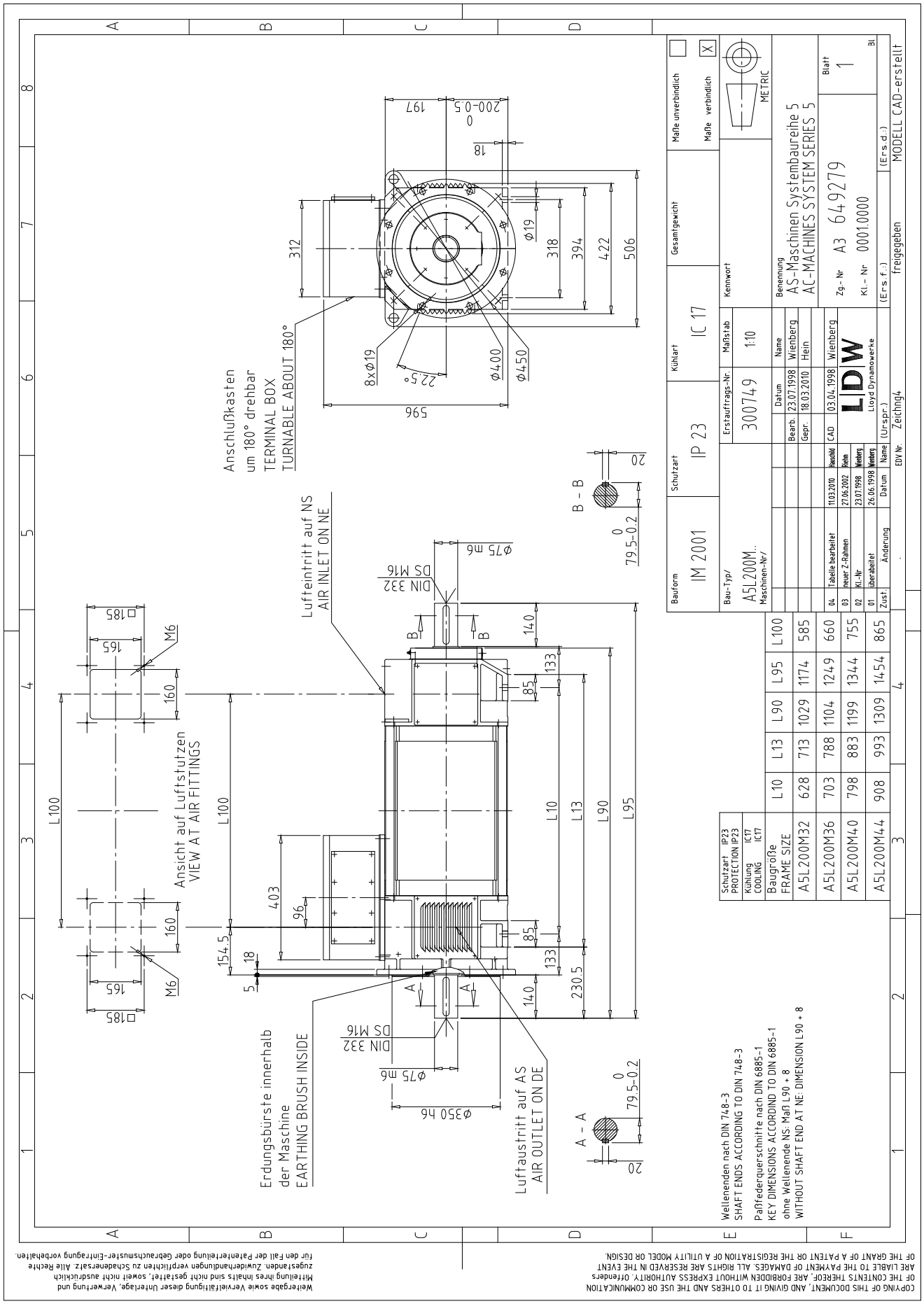
Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L160M28	489	559	840	985	1060	480
A5L160M32	544	614	895	1040	1115	535
A5L160M36	619	689	970	1115	1190	610
A5L160M40	714	784	1065	1210	1285	705

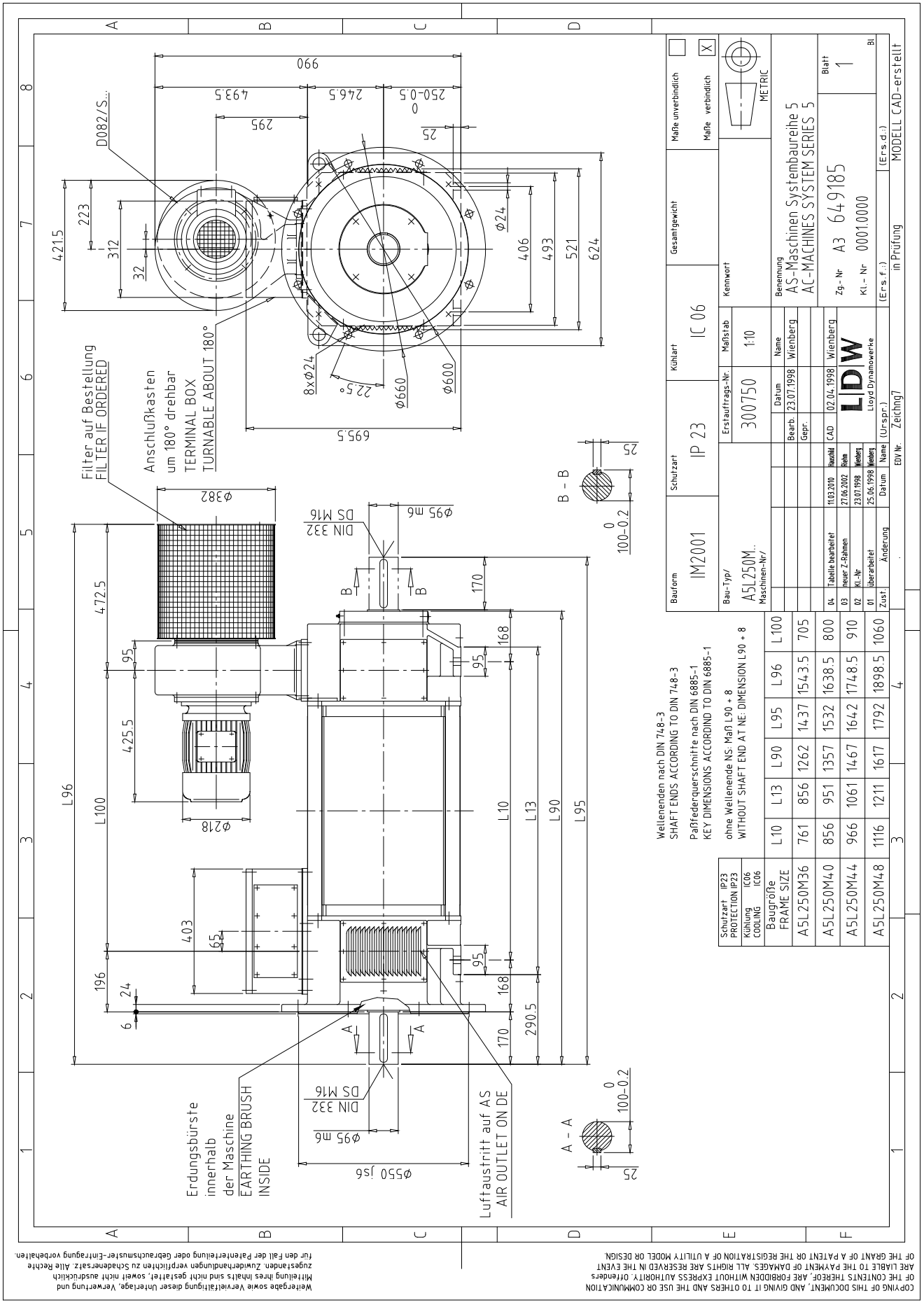


Baugröße FRAME SIZE	L10	L13	L90	L95	L100
A5L160M28	489	559	840	985	480
A5L160M32	544	614	895	1040	535
A5L160M36	619	689	970	1115	610
A5L160M40	714	784	1065	1210	705

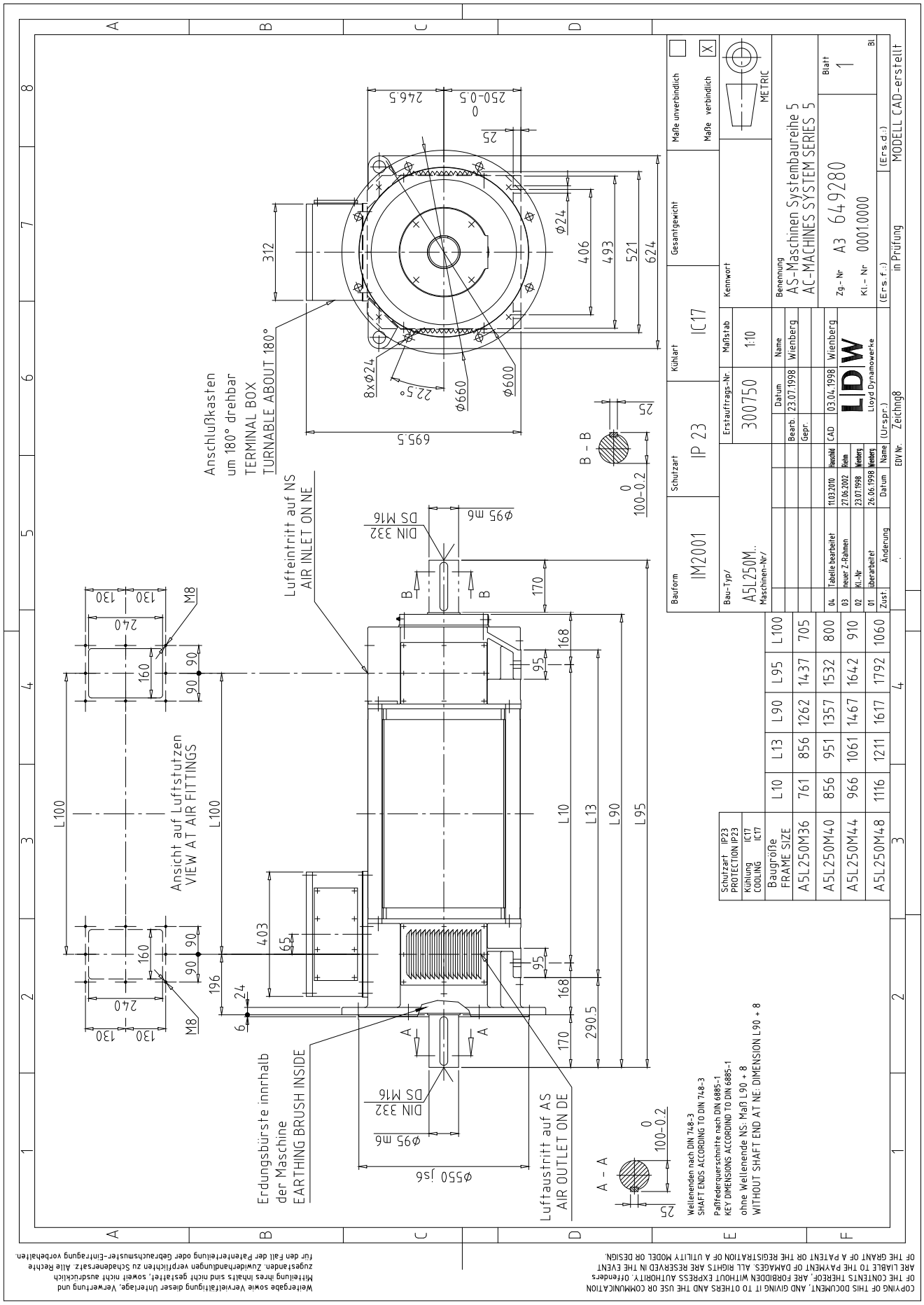


Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L200M32	628	713	1029	1174	1352	585
A5L200M36	703	788	1104	1249	1427	660
A5L200M40	798	883	1199	1344	1522	755
A5L200M44	908	993	1309	1454	1632	865

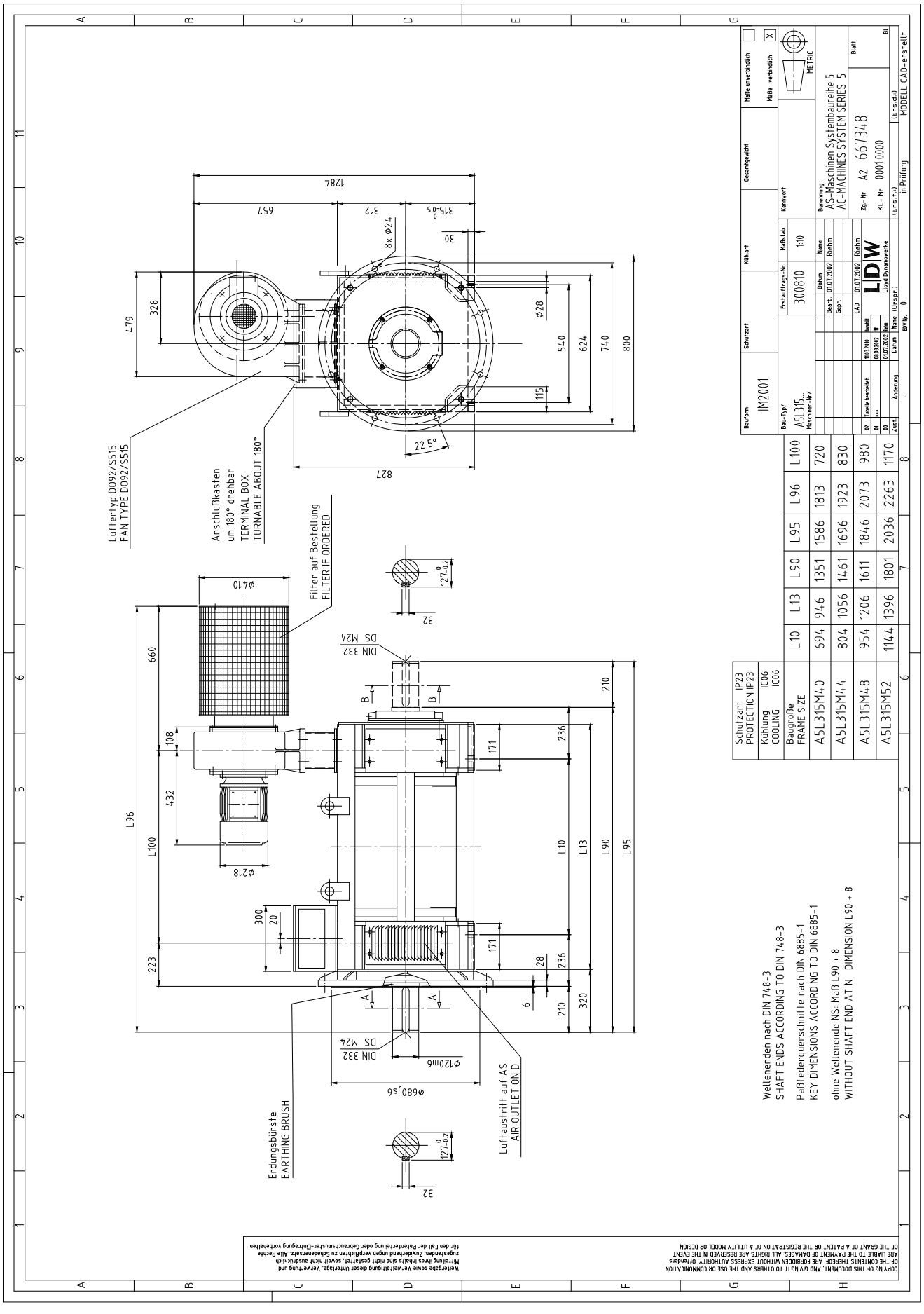




Schutzart IP23 PROTECTION IP23							
Kühlung IC06 COOLING IC06							
Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100	
A5L250M36	761	856	1262	1437	1543.5	705	
A5L250M40	856	951	1357	1532	1638.5	800	
A5L250M44	966	1061	1467	1642	1748.5	910	
A5L250M48	1116	1211	1617	1792	1898.5	1060	



Schutzart IP23 PROTECTION IP23 / Kühlung IC17 COOLING IC17	L10	L13	L90	L95	L100
Baugröße FRAME SIZE					
A5L250M36	761	856	1262	1437	705
A5L250M40	856	951	1357	1532	800
A5L250M44	966	1061	1467	1642	910
A5L250M48	1116	1211	1617	1792	1060


Lüftertyp D092/S515
FAN TYPE D092/S515
Anschlußkasten
um 180° drehbar
TERMINAL BOX
TURNABLE ABOUT 180°
Filter auf Bestellung
FILTER IF ORDERED
Erdungsbürste
EARTHING BRUSH
Luftaustritt auf AS
AIR OUTLET ON D
Wellenenden nach DIN 748-3
SHAFT ENDS ACCORDING TO DIN 748-3
Paßfederquerschnitte nach DIN 6885-1
KEY DIMENSIONS ACCORDING TO DIN 6885-1
ohne Wellenende NS: Maß L90 + 8
WITHOUT SHAFT END AT N DIMENSION L90 + 8
Schutzart IP23
PROTECTION IP23
Kühlung IC06
COOLING IC06
Baugröße
FRAME SIZE
A5L315M40
A5L315M44
A5L315M48
A5L315M52
L10 694 804 954 1144
L13 946 1056 1206 1396
L90 1351 1461 1611 1801
L95 1586 1696 1846 2036
L96 1813 1923 2073 2263
L100 720 830 980 1170
Bauform IM2001
Schutzart
Bau-Typ/ A5L315...
Maschinen-Nr/
Ersatzauftrags-Nr 300810
Kühlart
Maßstab 1:10
Gesamtgewicht
Kennwert
Maße unverbindlich
Maße verbindlich
METRIC
Bezeichnung
AS-Maschinen Systembaureihe 5
AC-MACHINES SYSTEM SERIES 5
Zg.-Nr A2 667348
Kt.-Nr 000100000
Blatt
Bearb. 01.07.2002 Richm
Gepr.
CAD 01.07.2002 Richm
LDW
Lloyd Dynamowerke
in Prüfung
MODELL CAD-erstellt
EDV Nr. 0
02 Tabelle überarbeitet 1103.2010 Hemkhl
01 xxx 08.08.2002 Hm
00 Zust. Änderung Datum Name (Ursprung)
(Ers.f.) (Ers.d.)
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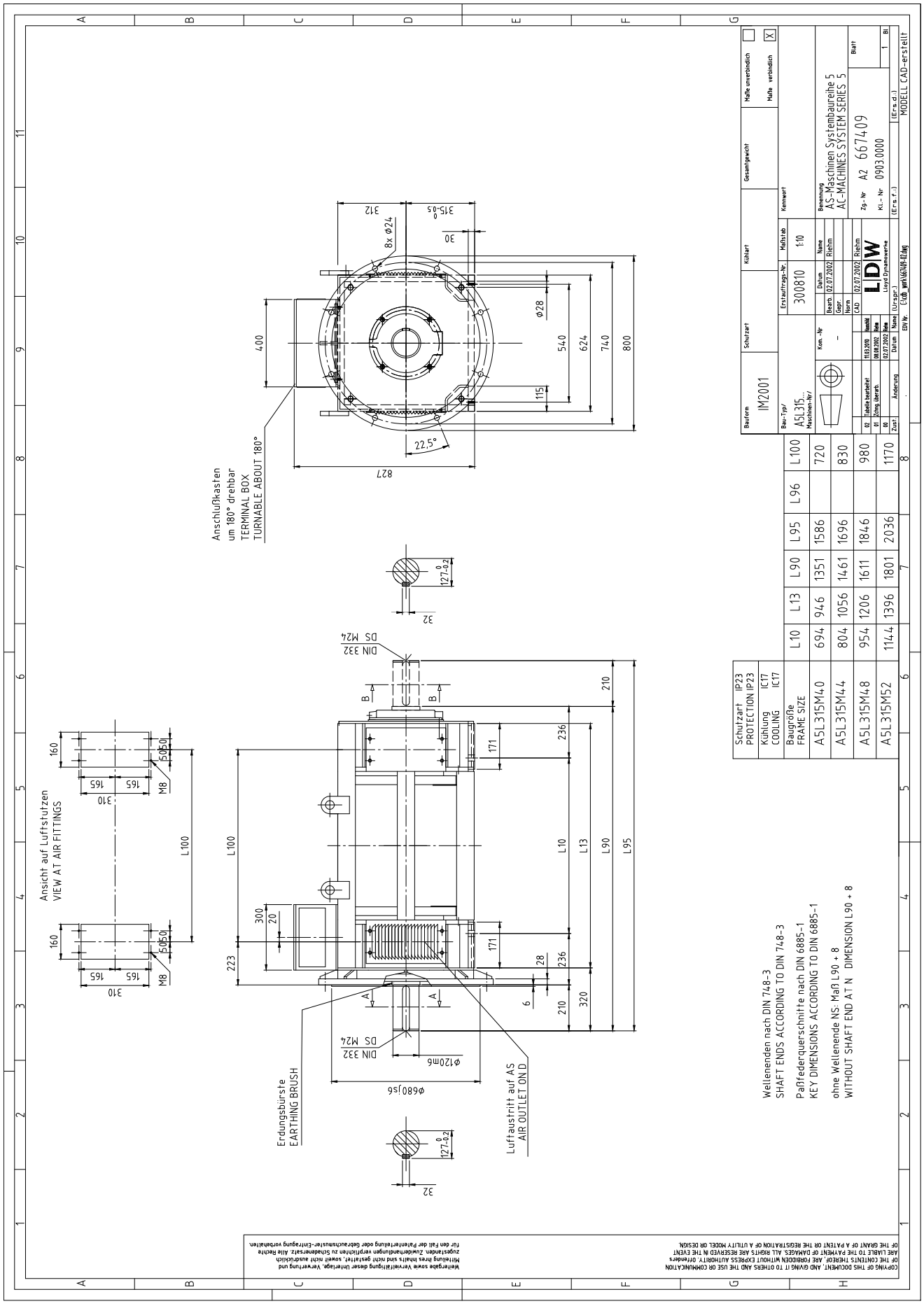
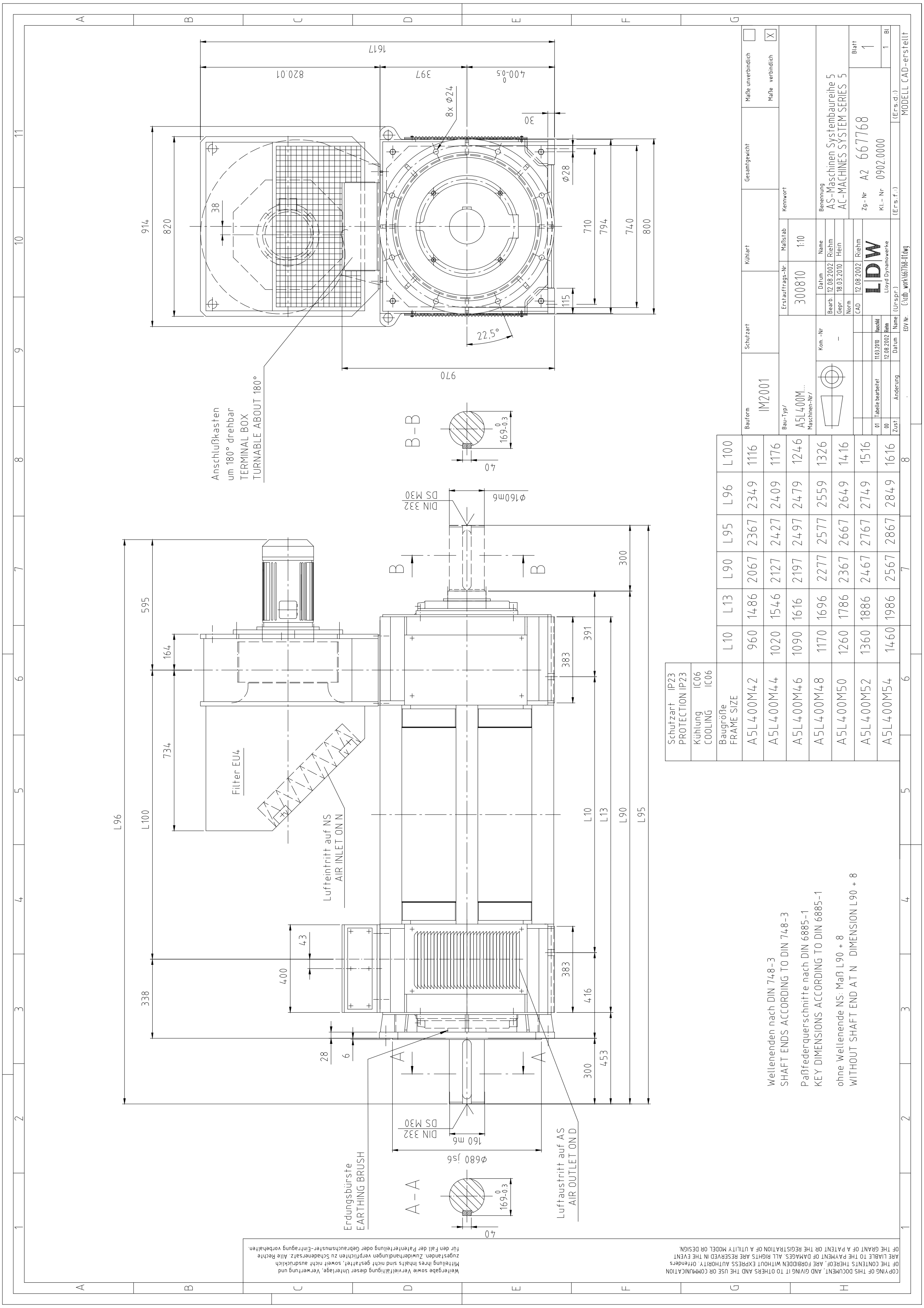
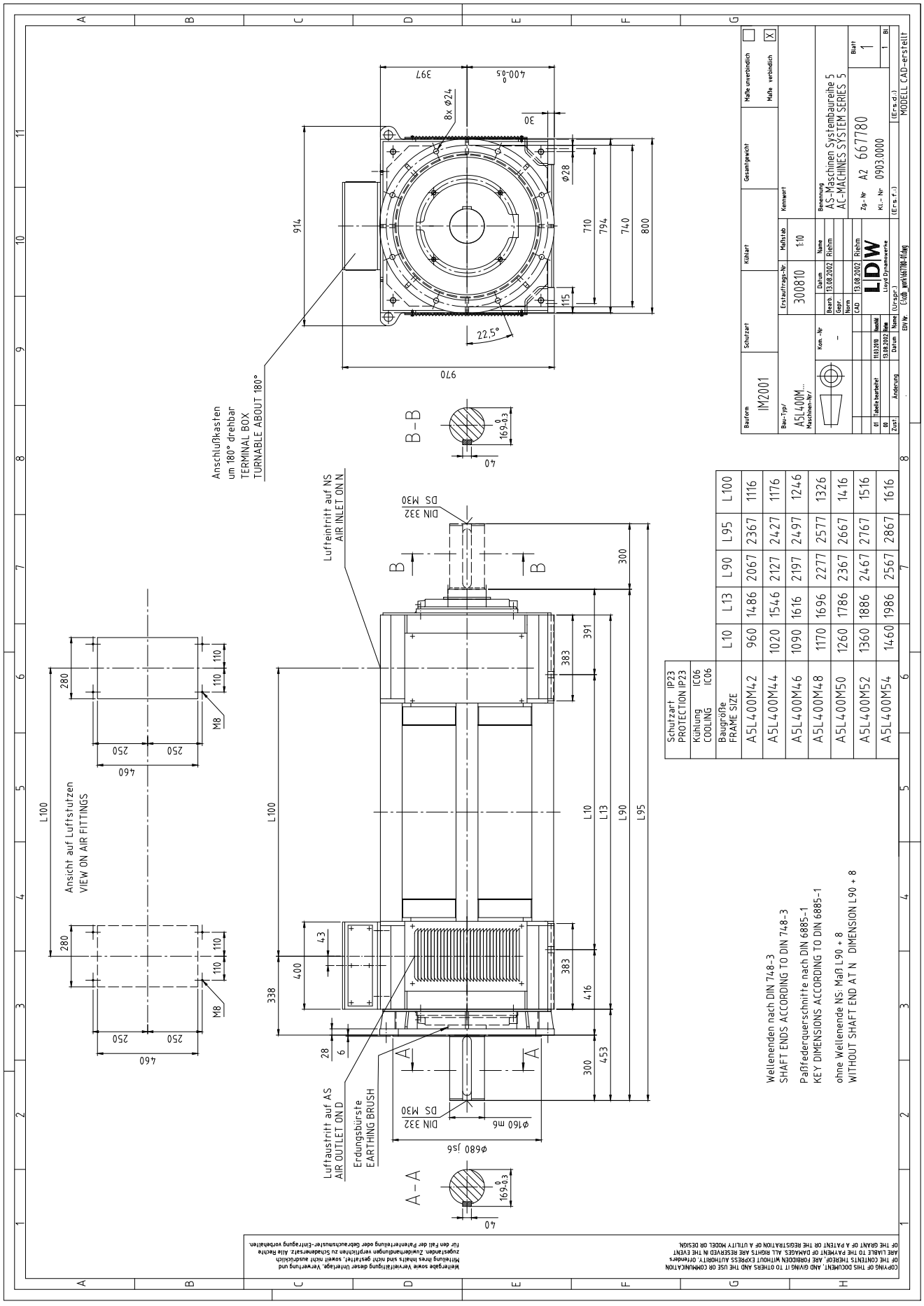


Schutzart IP23 PROTECTION IP23									
Kühlung IC17 COOLING IC17									
Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100			
A5L315M40	694	946	1351	1586		720			
A5L315M44	804	1056	1461	1696		830			
A5L315M48	954	1206	1611	1846		980			
A5L315M52	1144	1396	1801	2036		1170			



Schutzart PROTECTION IP23 / Kühlung COOLING IC06 / Baugröße FRAME SIZE	L10	L13	L90	L95	L96	L100
A5L400M42	960	1486	2067	2367	2349	1116
A5L400M44	1020	1546	2127	2427	2409	1176
A5L400M46	1090	1616	2197	2497	2479	1246
A5L400M48	1170	1696	2277	2577	2559	1326
A5L400M50	1260	1786	2367	2667	2649	1416
A5L400M52	1360	1886	2467	2767	2749	1516
A5L400M54	1460	1986	2567	2867	2849	1616



Schutzart IP23 PROTECTION IP23							
Kühlung IC06 COOLING IC06							
Baugröße FRAME SIZE	L10	L13	L90	L95	L100		
A5L400M42	960	1486	2067	2367	1116		
A5L400M44	1020	1546	2127	2427	1176		
A5L400M46	1090	1616	2197	2497	1246		
A5L400M48	1170	1696	2277	2577	1326		
A5L400M50	1260	1786	2367	2667	1416		
A5L400M52	1360	1886	2467	2767	1516		
A5L400M54	1460	1986	2567	2867	1616		

Die Hochleistungs-Kompakt-Asynchronmotoren von LDW verfügen über eine hohe Leistungsdichte und ein eckiges, mantelloses Gehäuse. Sie wurden speziell für drehzahlgeregelte Antriebe und für die Speisung durch Frequenzumrichter entwickelt. Äußerlich ähnelt diese Baureihe sehr den Gleichstrommaschinen – sie dient auch zu deren Substitution.

Die Maschinen sind fremdbelüftet. Durch die drehzahlunabhängige Fremdkühlung können die Maschinen das volle Drehmoment im gesamten Drehzahlstellbereich und auch im Stillstand dauernd abgeben.

Unsere Asynchronmaschinen entsprechen den IEC- und DIN-EN-Normen sowie den EU-Richtlinien, repräsentieren also zum Zeitpunkt der Fertigung immer dem Stand der Technik. Durch ein flexibles Plattformsystem ist eine Anpassung der Maschinenausführung an vorgegebene Betreiber-Spezifikationen fast immer möglich.

High-performance compact asynchronous motors from LDW are characterized by their high power density and their angular design. They were developed specifically for RPM-regulated drives and for supply by frequency converters. Externally this series resembles direct current machines – and it is capable of replacing them.

The machines are forced ventilated. Due to RPM-independent cooling, the machines can deliver the full torque in the entire RPM adjusting range as well as during standstill.

Our asynchronous machines are built in compliance with IEC and DIN-EN norms as well as EU-directives, so they always represent the state of the art. A flexible modular system allows the adaption of the machine design to almost all required specifications.

Weitere Informationen:
Wir beraten Sie gerne und erstellen ein Angebot für Ihren individuellen Bedarfsfall.

Ask us for additional information and a quote for your individual solution!

Lloyd Dynamowerke GmbH & Co. KG
Hastedter Osterdeich 250
28207 Bremen

Telefon +49 (0) 421 4589-0
Telefax +49 (0) 421 4589-260

E-Mail: vertrieb@LDW.de
Internet: www.LDW.de

L|D|W
Lloyd Dynamowerke

Mitglied der
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Kirloskar Electric Group

AEG

Services in Automation

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LDW 5.016/0410 en