



with ALLSPEED Controller

Screw Pumps SERIES EMTEC®

HIGH-TECH FOR EMULSION

Applications

For handling liquids with good, limited or poor lubricating properties as well as abrasive liquids in cooling lubricant technology or process technology, e.g. cutting, grinding and deep hole drilling oils, oil-in-water emulsions, cooling lubricant solutions. The pumped liquids may not attack the materials.

Allowable cooling lubricants:

- Solutions (inorganic substances in water; organic and synthetic substances in water)
- Oil-in-water emulsions (oil content 2 % to 20 %)
- Cutting and grinding oils (without additives; with polar, physically effective additives; with mild-effect EP* additives that create a lubricating film; with polar and mild-effect additives; with active chemical EP* additives; with polar and active EP* additives).

* EP = Extreme Pressure (high pressure additives)

Main fields of application

EMTEC® pumps are an essential element of modern metalworking centres, transfer lines and both grinding and deep hole drilling machines.

Design and operating mode

Three-screw, self-priming, flange-mounted pump (DIN ISO 3019-2) with special surface-hardened drive and idler screws. The idler screws are hydraulically driven and the axial thrust is completely neutralised hydrostatically.

The drive screw is fixed in position with external, permanently lubricated groove ball bearing. The large overall length with its many chambers results in little surface pressure, low pressure differences and thus reduced wear.

The rotor housing has been optimised to ensure maximum resistance to wear. The material used is specially hardened grey cast iron (EN-GJL) that is part of a special safety concept. The housing surface in contact area to the screws shows a ceramic-like hardness. Additionally, unlike with other materials - such as SiC - wear, shocks, vibration or aeration cannot lead to sudden failure of the pump unit.

The design and choice of materials minimize wear, improve controllability, and increase efficiency. ALLSPEED Controller is an optional highly dynamic electronic pump controller that can reduce energy expenditures by up to 75%.

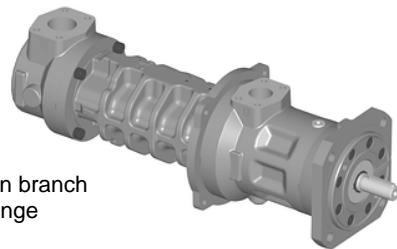
Installation

With pump bracket for in-tank installation, with pump bracket for tank top installation and arrangement of the delivery branch above the tank cover or with pump bracket and mounting foot for dry installation. With the vertical installation "delivery branch above the tank cover" (tank top installation) EMTEC® is especially easy and economical to install.

20 DQ
axial suction branch with
pipe thread



140 D8.6
radial suction branch
with SAE flange



Submersible design (in-tank installation) saves space, maintenance and costs compared with the dry installation. Any leakage remains in the tank.

At dry installation with mounting foot (well suited for operation with suction pressure and easily accessible for maintenance) a silicon carbide mechanical seal ensures a long service life.

Construction and materials result in little wear, good controllability and high efficiency.

The motor bracket can be equipped at additional cost with an inspection window and protective grid.

Performance data ①

Capacity	Q	10	to	1000	l/min
Liquid temperature	t		to	80	°C
Suction-/inlet pressure	p _s		to	10	bar
Differential pressure	Δp		to	100	bar (emulsion)
			to	120	bar (oil)
Outlet pressure	p _d		to	130	bar ②
Viscosity range	v	1	to	2000	mm ² /s
Dirt load level			to	250	mg/l ③
Filter fineness			to	100	μm ③

① For other performance data further pump series are available.

② Inlet pressure plus differential pressure plus pressure rise caused by the hydraulic system must not exceed the pump outlet pressure.

③ Pressure, dirt load level and filter fineness have to be matched to each other.

The performance data are to be considered as a product and performance abstract only. The exact operating limits can be taken from the quotation or order confirmation.

Shaft sealing/Connections

Design DQ:

Shaft sealing with shaft seal ring. Inlet pressure up to 1 bar. Axial inlet with pipe thread connection (DIN EN ISO 228-1) ④. Radial delivery branch with high-pressure flange according to SAE (SAE J518C, hole pattern 3000 PSI). At sizes 20 to 140 additionally with pipe thread connection (DIN EN ISO 228-1).

Design D8.6

Shaft sealing with maintenance-free highly wear-resistant mechanical seal according to EN 12 756. Radial inlet and delivery branch with high-pressure flange according to SAE (SAE J518C, hole pattern 3000 PSI) ④.

④ As standard, the inlet of the other version can be chosen as an option.

Overload protection

The pump has no pressure relief valve. Thus the overload protection must be provided in the control system or as a pipeline valve.

Abbreviation

EMTEC - A	80	R	46	D	8.6	W110221
Series						
Development status						
Size ①						
Direction of screw pitch R = right						
Screw pitch angle (degree)						
Design feature ②						
Shaft sealing/Connections ③						
Material code						

① theoret. capacity at 1450 1/min and 46° screw pitch angle

② D = external antifriction bearing, shaft seal unheated, uncooled

③ shaft seal/connections

Abbreviation	Type
Q	shaft seal ring/axial inlet, pipe thread ④
8.6	mechanical seal/radial inlet, SAE ④
④ in standard	

Materials

Denomination	Part No.	Materials W 110221		
Rotor housing (basic material)	2	EN-GJL-250	GG25	cast iron
Rotor housing (active surfaces in the spindle bores)		specially hardened	basic hardness	62 HRC
			surface hardness	1200 HV
Suction casing	4	EN-GJL-250	GG25	cast iron + Stop disc made of carbide (only sizes 20 and 40)
Discharge casing	1	EN-GJL-250	GG25	cast iron
Screw set (basic material)	13	1.7139	16MnCrS5	special steel nitrided 62 HRC
Screw set (surface)	13	specially treated (PVD)		1200 HV
Pump cover	3	EN-GJL-250	GG25	cast iron
Mechanical seal	186	Q1Q1VGG	SiC/SiC, FPM, 1.4571	silicon carbide, fluoroelastomere, stainless steel
Shaft seal ring	183	FPM		Fluoroelastomere
Static gaskets	140	FPM		Fluoroelastomere

Operation limits

The liquid's composition, oil content (ability to provide lubrication), and cooling effect determine the pump maintenance intervals and maximum permissible performance data.

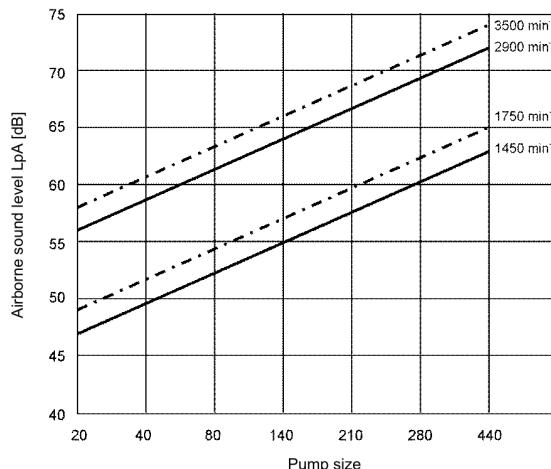
Cooling lubricants according to DIN 51 385 are divided into three groups according to the contents of water and oil. EMTEC® pumps also pump cooling lubricants with a very low lubricating effect but very high cooling performance ("main group L"):

Cooling lubricant main group	Sub group	Effect at the processing spot
L Solutions	Solutions of inorganic materials in water	Higher cooling effect, lower lubricating effect
	Solutions, dispersions of organic (synthetic) materials in water	
E Emulsions	Oil-in-water emulsions (Oil content E 2 % ... E 20 %)	Cooling-lubricating effect
S Petroleum-based cutting and grinding oils (natural and synthetic)	Cutting oils without additives (pure)	Higher lubricating effect, lower cooling effect
	Cutting oils with polar (physically effective) additives	
	Cutting oils with mild-effect (lubricating film forming) EP additives	Better surface adhesion provides protection against corrosion
	Cutting oils with polar and mild-effect EP additives	
	Cutting oils with active (chemical) EP additives	
	Cutting oils with polar and active EP additives	Higher temperature and pressure resistance

EP = „Extreme Pressure“

Noise/Pulsation

EMTEC® construction design allows gentle, even, virtually pulsation-free and low-noise pumping. The noise emission lies, dependent on speed, pump size and installation, between 48 and 75 dB_A. EMTEC® pumps operate significantly quieter than rotary lobe and centrifugal pumps with comparable performance.



The provided data are reference values.

The actual airborne sound level depends especially on the installation conditions. In normal situations, the motor determines the airborne sound level.

Wide pumping range

Many pump sizes and screw pitch angles; fine adjustment of capacity across the entire output range.

Long service life

Highly wear resistant, PVD-coated spindles extend the pump's service life; long effector system minimizes the surface load.

Tolerant of dirt

External ball bearing, grease lubricated for lifetime. Labyrinth seal protects against wash-out.

Convenient service

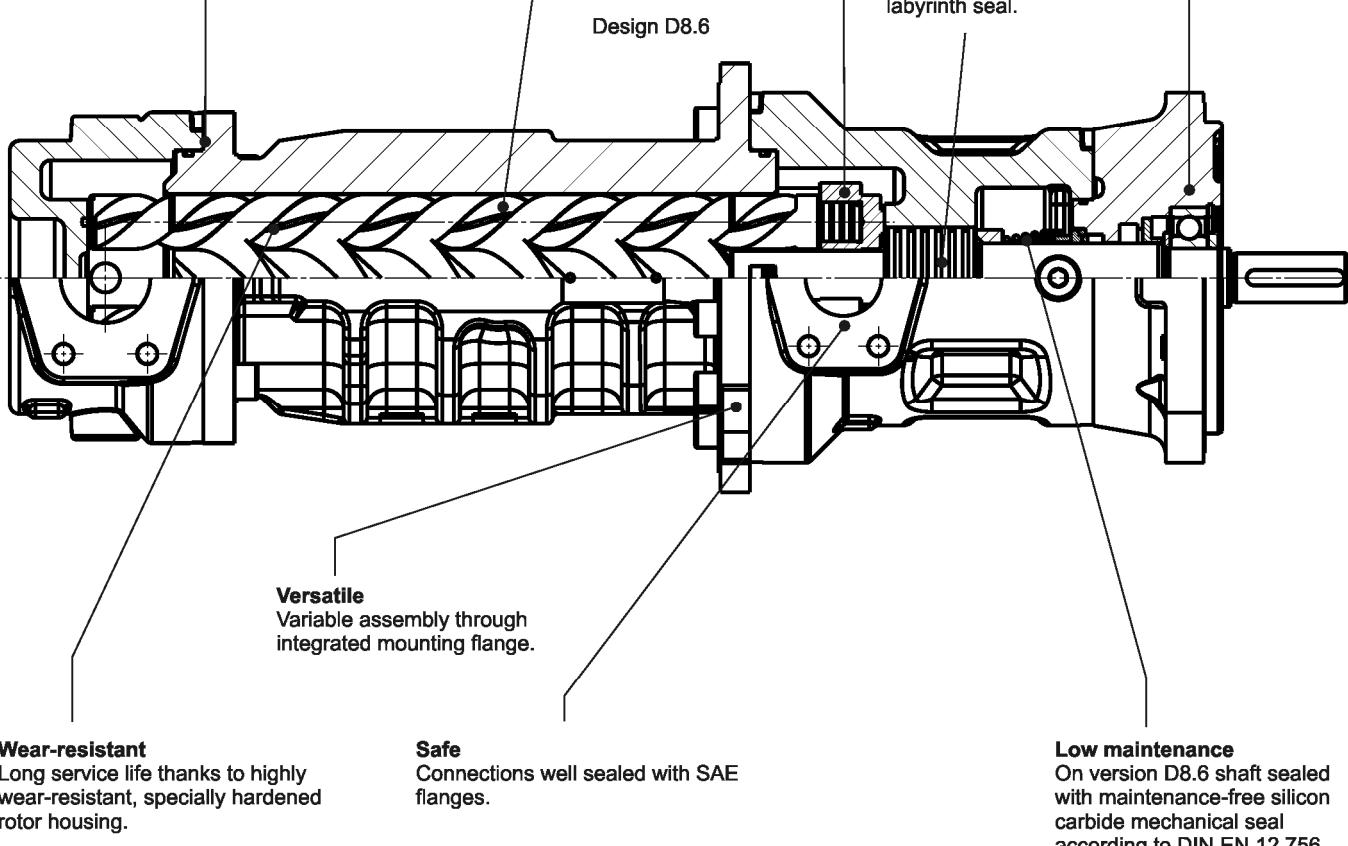
Service-friendly pump design; simple assembly and disassembly.

High load capacity

Complete, vibration-free hydrostatic axial thrust balancing with special pressure-compensation bushings.

High pressure resistance

Extra long pressure-compensation piston with labyrinth seal.

**Wear-resistant**

Long service life thanks to highly wear-resistant, specially hardened rotor housing.

Safe

Connections well sealed with SAE flanges.

Low maintenance

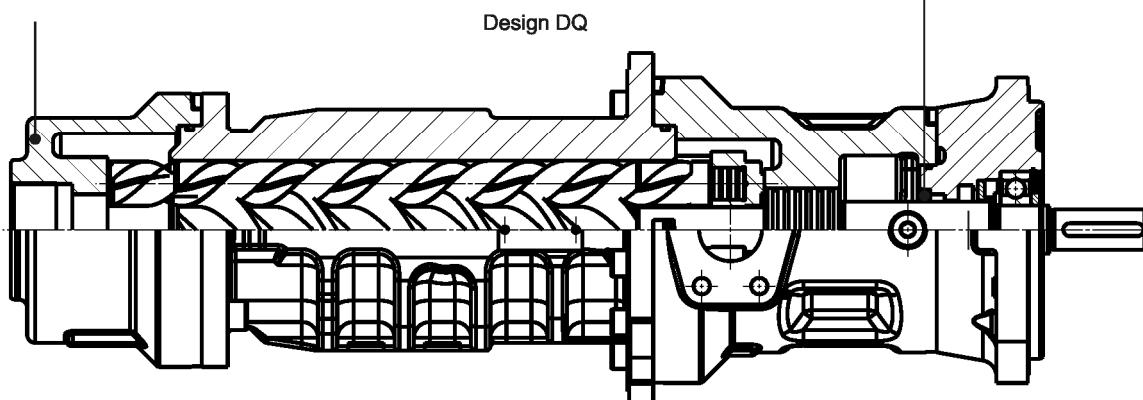
On version D8.6 shaft sealed with maintenance-free silicon carbide mechanical seal according to DIN EN 12 756.

Flexible

On the DQ version, liquid inlet is axial. Extension length can be easily varied as needed.

Affordable

A shaft seal ring is used in place of a mechanical seal.



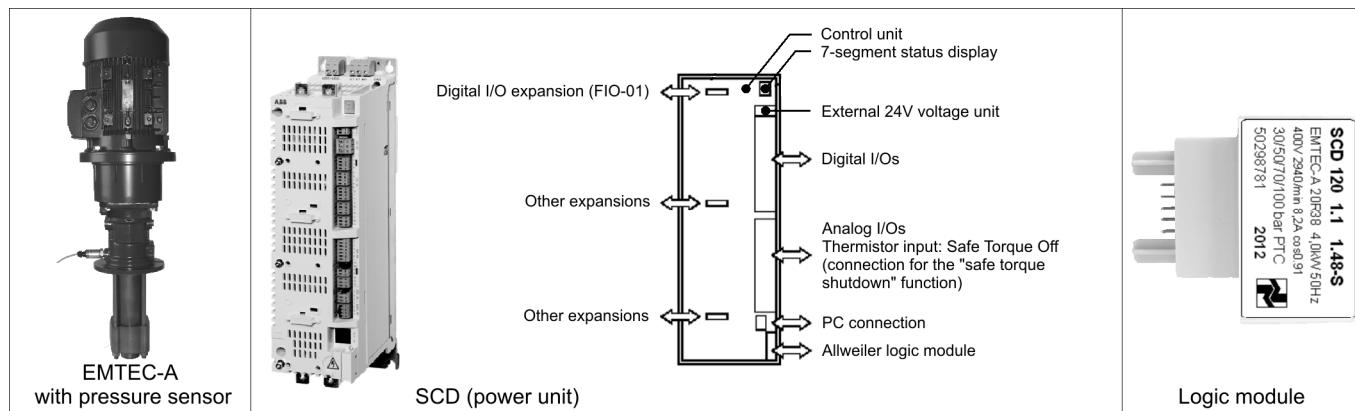
ALLSPEED Controller

Benefits and usage

When equipped with the ALLSPEED Controller, the EMTEC system can reduce energy costs by up to 75%. This is made possible by a highly dynamic electronic pump controller with adaptive control. This also provides a high-pressure supply of cooling lubricant without the need for valves, which greatly reduces the costs associated with pump, motor, valve, and cooling components. Elimination of valves also helps avoid capacity losses and pressure surges. In addition, the "Smart" concept provides for automatic monitoring of operational limits. Activation occurs through specification of the desired working pressure.

System design

Depiction of individual system components



Design, installation, and parameterization

The EMTEC system with ALLSPEED Controller employs a high-output converter with integrated ALLWEILER logic module. The converter is air-cooled and designed for installation in a switch cabinet. The engine monitoring via PTC may be made by the inverter. This galvanic isolation is required. The pluggable ALLWEILER logic module contains the software for precise and highly dynamic pump control. It can be easily and conveniently replaced when operating conditions or pumping tasks change or if program updates are available.

A sensor for monitoring pressure is attached directly to the pump unit.

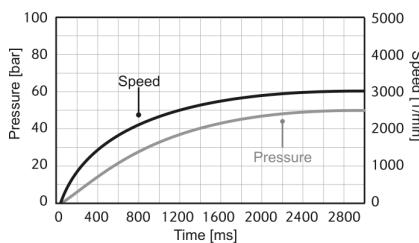
The plug-and-play functionality of the controller eliminates the need to adjust parameters or program the tool during startup. Instead, a one-time identification run at $n = 0$ 1/min is all that is needed.

Modes of operation

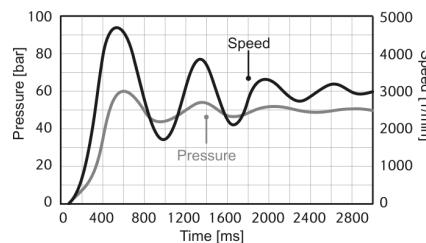
- Single-screw mode: The pump system supplies exactly one screw of the machine tool. Speed and pressure go from 0 to their operating points very quickly. Pump sizes 20 and 40 are suitable for this mode of operation.
- Multi-spindle mode (all sizes): In this case, one pump system simultaneously supplies several spindles. Pump pressure is fully adjustable and constant. Capacity adapts dynamically to current requirements (pressure control valve not necessary). The pump operates with low pressure pulsation; pulsation remains below 20% even when the capacity varies greatly (up to 30% of total capacity).

Control behavior

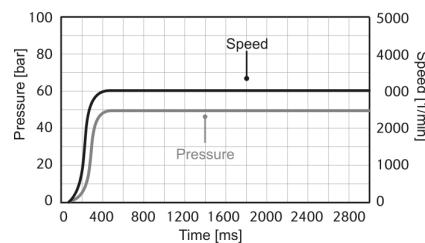
PID pressure control behavior compared to control with ALLSPEED controller



PID control "too soft". Too much time is needed to achieve the desired equilibrium.



PID control "too hard". Equilibrium is reached faster, but speed comes at the expense of undesirable oscillation.



ALLSPEED: Adaptive control. Oscillation is suppressed. Control automatically adapts to the tool to achieve equilibrium quickly.

ALLSPEED Controller

Short designation, parameters

Series	SCD	1	2	0	+ Pump type, size
Hardware version ①					Rated output of motor
Functional scope ②					Rated voltage
State of development					Rated frequency
					Motor current (nominal operating point)
					$\cos \varphi$
					Nominal speed
					Max. speed
					Max. pressure
					Viscosity

① Hardware version

1 = Converter IP20 for installation
in a switch cabinet2 = Converter IP20 with
push-through fan IP54

② Scope of functions:

- 1 = If there is a signal at the analog input AI1 (infinitely selectable from 0-10V), the pump will react very quickly and the corresponding pressure set point will be approached within 500 ms.
- 2 = Digital pressure selection via four customer-selected pressure stages. If there is a signal at one of the digital inputs (FIO-01 DIO1-4), the corresponding pressure set point will be approached within 500 ms.
- 3 = Analog pressure selection via a signal at input AI1. Low pressures are achieved with a very high level of precision.

Controller inputs and outputs

Analog inputs:	AI1	Pressure set point (0-10 V) (version SCD x1x, x3x)
	AI2	Pressure sensor connection
Digital inputs:	DI1	Standby (magnetization)
	DI2	Hold pressure (10 bar)
	DI3	Acknowledge warning, alarm
	DI4	Vent
	DI5	Initialize
	DI6	Acceleration mode
Digital I/O expansion: (version SCD x2x)	FIO-01	DIO1 pressure stage 1
	FIO-01	DIO2 pressure stage 2
	FIO-01	DIO3 pressure stage 3
	FIO-01	DIO4 pressure stage 4 (max.)
Digital outputs:	DIO1	Pressure OK
	DIO2	Warning
	DIO3	Minimum volume
Analog outputs:	AO1	Capacity (4-20 mA)
	AO2	Actual pressure (0-10 V)
Relay output:	RO	Alarm (24 V)

Descriptions of controller inputs and outputs

Inputs

AI1 Pressure set point: (on version SCD x1x, x3x)

If there is a signal in standby mode, the pump will run up to the proper pressure (5% tolerance). During run-up, the pressure corridor will be no more than 20% above and 10% below the set point.

0 – 1 V \triangleq 0 bar10 V \triangleq max. discharge pressure
(as specified by customer)

FIO-01 digital I/O expansion: (on version SCD x2x)
Four digital inputs that the customer can use for freely selectable pressure stages. Pressure stages are documented in the data sheet and on the logic module.

DIO1-DIO4: If there is a signal at one of these inputs, the corresponding preset pressure will be approached within 500 ms.
The pump's maximum pressure is set at the fourth input DIO4.

AI2 Pressure sensor connection: Connection of pressure sensor.

DI1 Stand-by: Magnetization of motor for rapid run-up when there is a pressure signal.

DI2 Hold pressure: The pump generates 10 bar static pressure, even against a closed piping system, such as for activating a measuring sensor. The operating point is approached softly.

DI3 Acknowledge: Alarm and warning disappear only once acknowledged.

DI4 Vent: Pump vents the piping at limited speed and limited pressure.

DI5 Initialize: The converter adopts the precise motor parameters at speed 0. Takes approximately 30 seconds.

Pump then turns to directional control with a speed of 100 1/min.

DI6 Acceleration mode:

Normal: Adequate for achieving all required pressures within 1000 ms. Capacities of less than 40% of maximal capacity are achieved within 500 ms.

Fast: Capacities of greater than 40% of maximal capacity are achieved within 500 ms. Not permissible for capacities of less than 25% of maximal capacity.

Outputs

DIO1 Pressure OK: The system is active. At least 90% of the required pressure has been achieved.

DIO2 Warning: The system's limits (motor power consumption, speed limit) have been reached.

If an operational point is achieved that is above the permissible limits but within an internal tolerance range, a warning will be emitted. The operating point will be approached with the display "Pressure OK".

If an operating point outside of the internal tolerance range is approached, the pump will independently return to a permissible operating point. The "Pressure OK" display is not shown.

The pump will continue to operate despite warnings.

DIO3 minimum volume: This output is activated if there is a required pressure and the pump's capacity is below the permissible minimum volume.

AO1 Actual capacity: Estimated capacity is calculated from pump parameters, pressure, and speed. The deviation corresponds to the tolerance of the pump's characteristic curve.

4 mA \triangleq 0 l/min20 mA \triangleq max. capacity (see data sheet)

AO2 Actual pressure: Displays current pressure.

0 V \triangleq 0 bar10 V \triangleq max. discharge pressure
(as specified by customer)

RO Alarm: Converter, pump, or motor fault.
24V rated voltage shut off during alarm.

The pump can be brought back into operation only after acknowledging the alarm. (DI3)

Note: When initializing (DI5) RO is also activated, but after reset automatically.

Safe Torque Off: This function switches the power semiconductor's control voltage off, thereby preventing the inverter from generating the AC voltage required by the motor. This function makes it possible to perform short tasks (like cleaning) and/or maintenance tasks on non-electrified parts of the machine without switching off the frequency converter's AC voltage supply.

ALLSPEED Controller

Mandatory conditions of the cooling lubrication system for installation of the ALLSPEED controller

Volume meters can make the system sluggish:

Please remove volume meters with hydraulic sluggishness (such as measurement turbines) or place them in front of the pump. The ALLSPEED controller provides capacity measurement via the AO1 analog output.

Improperly switched stop valves can result in warning and alarm conditions in the controller:

When using stop valves, maintain adequate amounts of time for starting and shutting down the pump - 100 ms when starting and 1 to 2 seconds when shutting down.

A stop valve is not necessary when running without backpressure. If no pressure is required, the ALLSPEED controller switches the EMTEC to speed and capacity of zero.

Existing pressure regulation valves or pressure relief valves may control against the system:

The ALLSPEED controller does not need a valve to control pressure.

An existing pressure regulation valve or pressure relief valve can be used as a safety valve and should be set at least 10% higher than the maximum control pressure.

A large number of sharp bends in pipe fittings will lead to pressure losses in the line:

High pressure losses should be avoided. Otherwise, the control parameter for the pressure at the ALLSPEED controller may have to be increased to compensate for the loss.

Volume measurement through the analog output AO1 gives you the ability to set the required pressure in the most optimal way possible with the desired capacity.

Improperly laid pipes and excessive lengths can allow air to penetrate the pipe when idled:

A large volume of air in the pipe can extend the start-up and shut-down times of the system.

Under normal conditions, the ALLSPEED controller automatically compensates for disturbances caused by air inclusions.

If higher pressure pulsations occur during start-up, you can vent the pipe in advance by activating the DI4 input.

When operating with multiple consumers, very strong volume fluctuations can lead to pressure pulsations:

Please ensure that the switching time (especially when switching off consumers during operation) is at least 100 ms. Capacity fluctuations should not exceed 30% of the maximum volume.

Under these conditions, the ALLSPEED controller can adjust the required capacity with a maximum pressure pulsation of 20%.

Faster switching times and higher volume jumps can cause the safety valve to trigger briefly.

Pumping very small volumes may lead to pump damage:

The minimum volume limits are documented in the characteristic curves (starting on page 15) and in the selection program. Falling below the minimum capacity should occur only rarely and briefly.

If the volume falls below the minimum amount, the controller will activate the DIO3 digital output. This can be used as needed to activate a bypass valve in order to elevate capacity.

Converter specifications and operational limits

Rated output [kW]	Size	Rated input current I _{IN} [A] ①	Mains choke type ②	EMC filter type	
0,75	A	1,9	CHK-01	JFI-02	
1,10		2,6			
1,50		3,3			
2,20		4,6	CHK-02		
3,00		5,8			
4,00		7,9	CHK-03	JFI-03	
5,50	B	10			
7,50		14	CHK-04		
11,00	C④	20	CHK-05	JFI-05	
15,00		27			
18,50		33	CHK-06		
22,00		39			
30,00	D	55	CHK-07	JFI-07	
37,00		65	CHK-08		
45,00		78			
55,00	E	107	-	-	
75,00		131			
90,00		171			
110,00		205			
160,00③		254			

① Rated input current (eff.) with mains choke at 40 °C (104 °F)

② Mains choke needed due to the high system dynamics

③ Water-cooled version

④ Size available with hardware version SCD 2xx

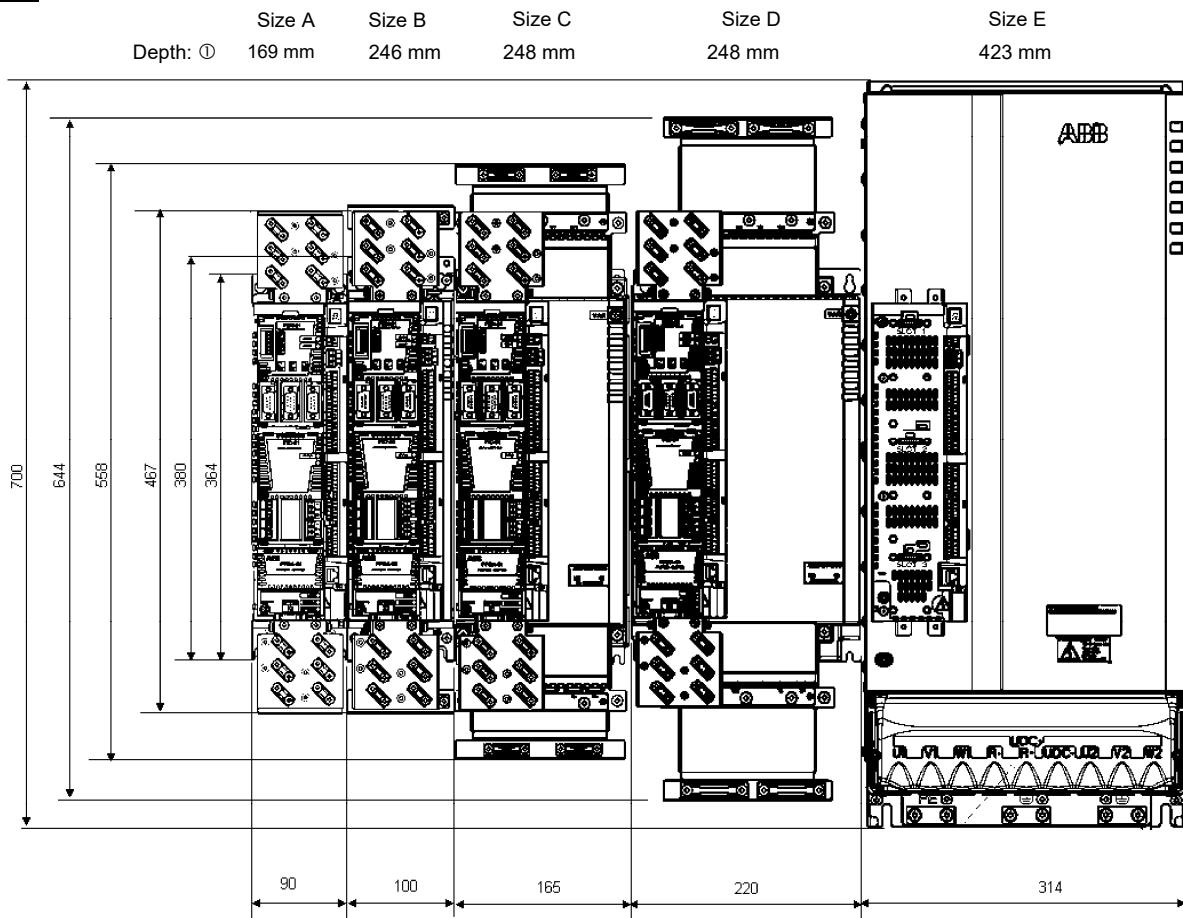
Mains connection	
Voltage range:	3-phase 380 V to 480 V +10/15%
Frequency:	50 to 60 Hz ± 5%
Distortion (THD):	In accordance with EN 61000-3-2, IEC 61000-3-12, IEC 61000-3-4 with mains choke for compliance with limit values
DC connection	
Voltage level:	485 to 648 V DC ± 10 %
Load control:	Integrated
Bus bar:	Upon request
Motor connection	
Motor types:	All standard asynchronous motors suitable for use with frequency converter
Switching frequency:	2 to 16 kHz, 4 kHz as standard; Output current reduction over 4 kHz
Operating conditions	
Protection type:	IP 20 according to EN 60529; Open type according to UL 508
Temperature:	-10 to +55 °C; performance lower above 40 °C
Altitude range:	0 to 4000 m above sea level, performance lower above 1000 m
Relative humidity:	Max. 95%
Climate:	Class 3K3, 3C2 according to EN 60721-3-3, oil mist, icing, condensed moisture, dripping water, spray water, splash waster, and jets of water not permitted (EN 60204, part 1)
Vibration:	Class 3M4 according to EN 60721-3-3
EMC: (according to EN61800-3)	With mains filter: category C2
Functional stability:	Stable torque support (function: Safe Torque-Off STO according to EN 61800-5-2); IEC 61508 (SIL3); EN 954-1 (category 4); IEC 62061 (SILCL 3); EN ISO 13849-1 (PL e certification from TÜV)
Labeling:	CE, UL, cUL, CSA, C-Tick, GOST R

ALLSPEED Controller

Main dimensions – Converter, mains filter, and mains choke

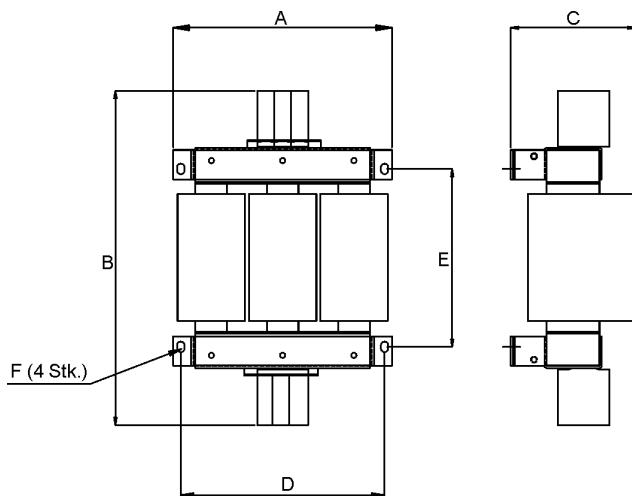
The modules can be installed directly next to each other. The following figure shows the major dimensions of the frequency converter modules. The internal fan provides ventilation from the bottom upward.

Converter



① Dimensions of hardware version SCD 1xx, hardware version SCD 2xx upon request.

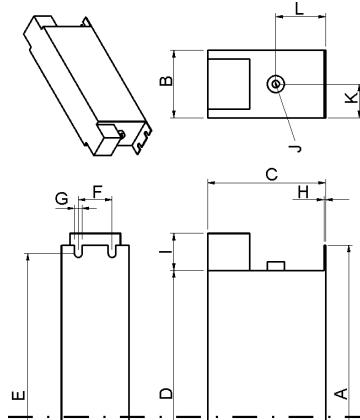
Mains choke



Dimensions in mm

Parameter	Dimensions for each throttle type							
	CHK-01	CHK-02	CHK-03	CHK-04	CHK-05	CHK-06	CHK-07	CHK-08
A	120	150	150	150	207	207	249	249
B	146	175	175	175	272	326	326	346
C	79	86	100	100	154	154	167	167
D	77	105	105	105	193	193	235	235
E	114	148	148	148	118	169	125	147
F (Schraube)	M5	M5	M5	M5	M6	M6	M6	M8

Mains filter



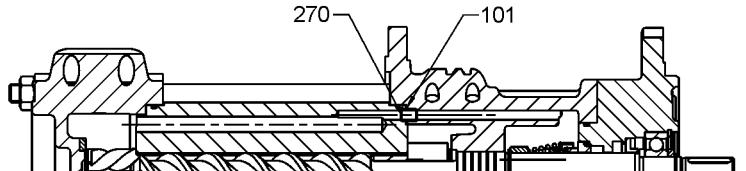
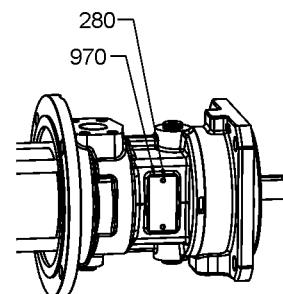
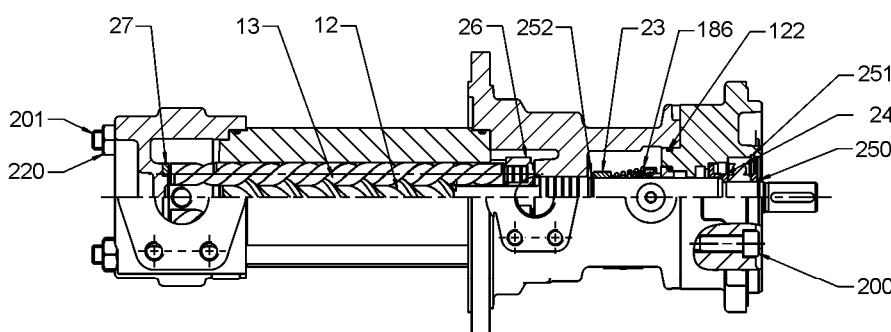
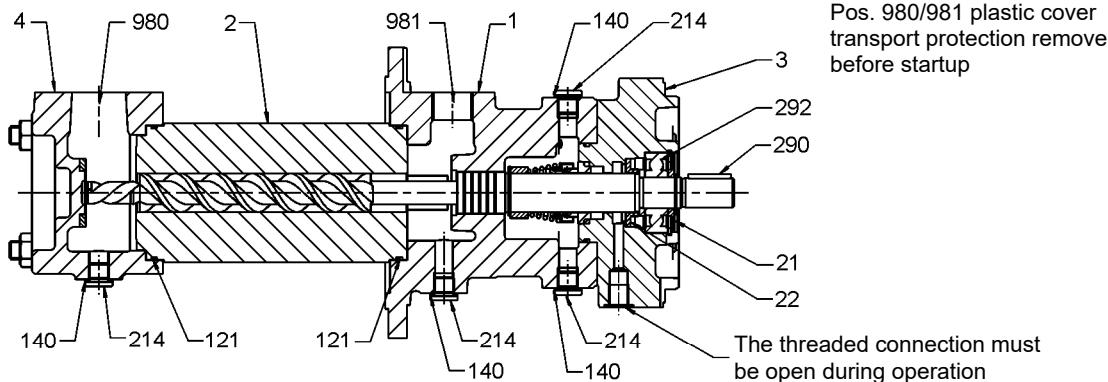
Parameter	EMC filter for each filter type			
	JFI-02	JFI-03	JFI-05	JFI-07
A	250	250	250	270
B	45	50	85	90
C	70	85	90	150
D	220	240	220	240
E	235	255	235	255
F	25	30	60	65
G	5,4	5,4	5,4	6,5
H	1	1	1	1,5
I	22	25	39	45
J	M5	M5	M6	M10
K	22,5	25	42,5	45
L	29,5	39,5	26,5	64

Sectional drawing

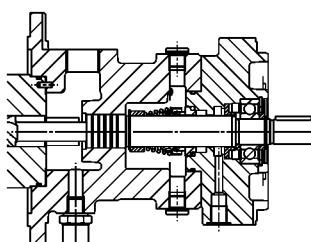
EMTEC-A

D 8.6

SAE flange on suction side

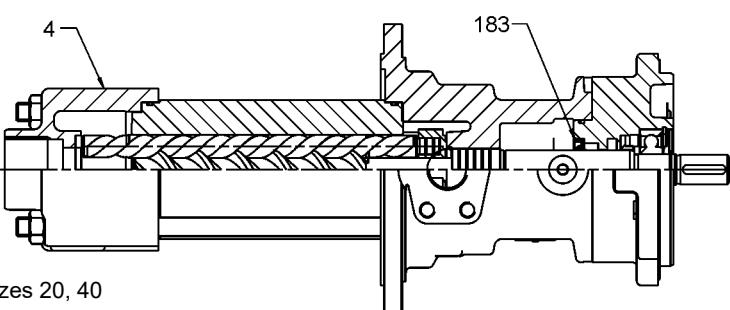


Detail view of pressure sensor



361 Tightening torque
max. 30 Nm

Sizes 20 - 80



Sizes 20, 40

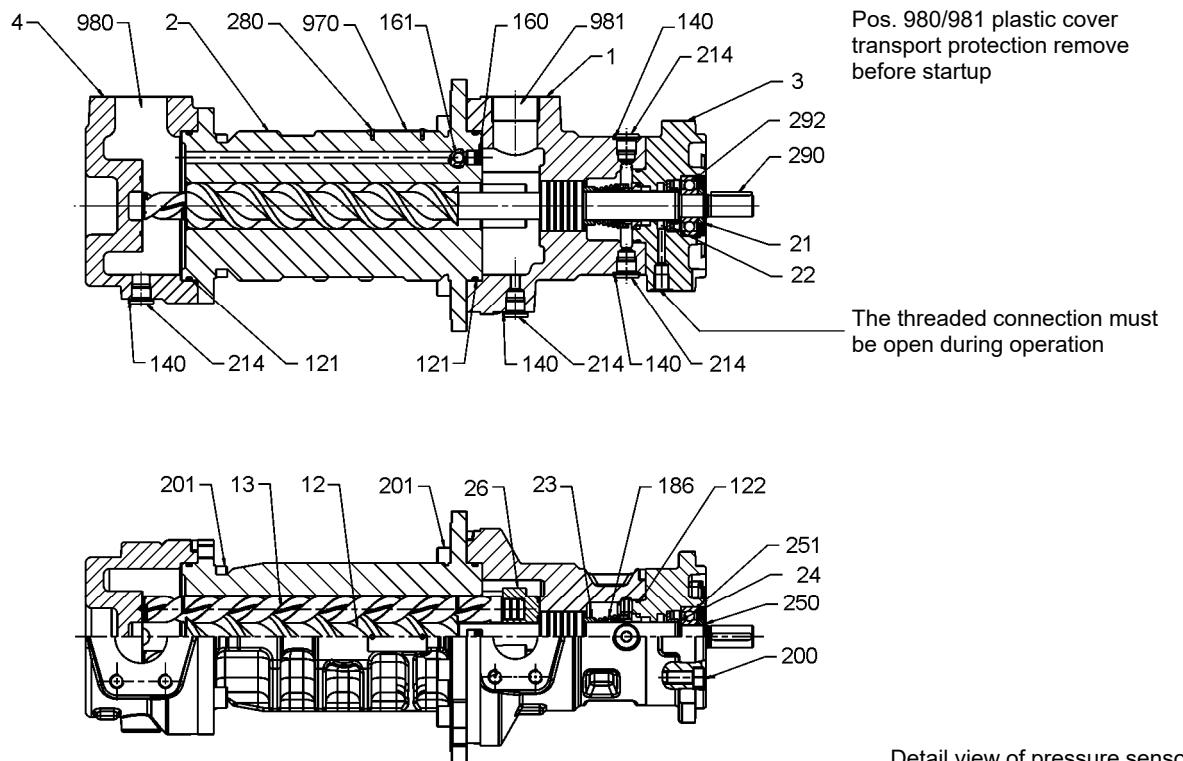
Denomination	Part No.	Denomination	Part No.	Denomination	Part No.
Discharge casing	1	O-ring	101	Circlip	252
Rotor housing	2	O-ring	121	Support ring	270
Pump cover	3	O-ring	122	Rivet	280
Suction casing	4	Seal ring	140	Key	290
Drive screw	12	Shaft seal ring	183	Groove ball bearing	292
Idler screw	13	Mechanical seal	186	Pressure sensor	360
Labyrinth ring	21	Socket head cap screw	200	Angled plug with cable	361
Labyrinth ring	22	Stud bolt	201	Rating plate	970
Spacer ring	23	Screw plug	214	Plastic cover	980
Spacer ring	24	Hexagon nut	220	Plastic cover	981
Balance bush	26	Circlip	250		
Stop disc	27	Circlip	251		

Sectional drawing

EMTEC-A

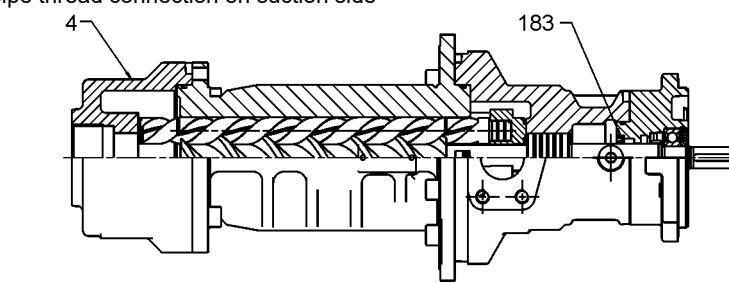
D 8.6

SAE flange on suction side



DQ

with axial pipe thread connection on suction side



Sizes 80,140

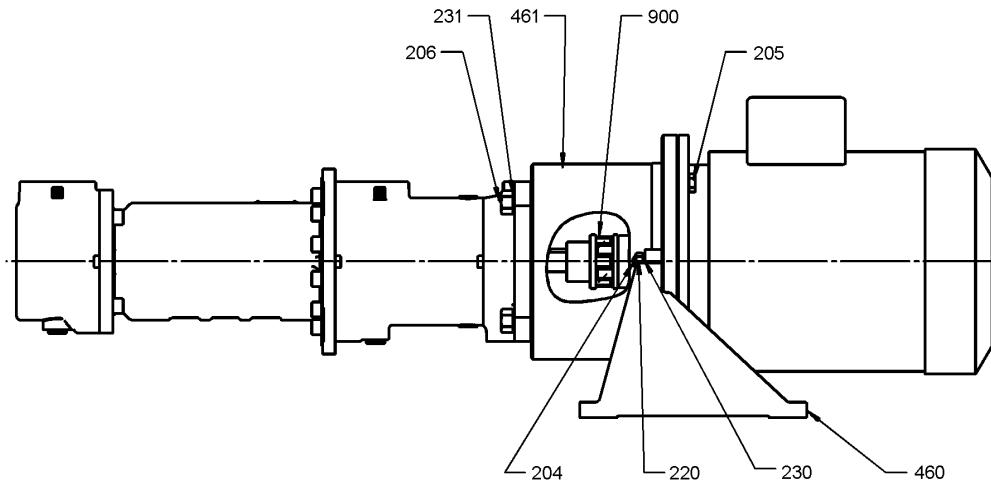
Sizes 80,140

Denomination	Part No.	Denomination	Part No.	Denomination	Part No.
Discharge casing	1	O-ring	122	Circlip	250
Rotor housing	2	O-ring	129	Circlip	251
Pump cover	3	O-ring	130	Support ring	270
Suction casing	4	Seal ring	140	Rivet	280
Drive screw	12	Joint plug	160	Key	290
Idler screw	13	Joint plug	161	Groove ball bearing	292
Labyrinth ring	21	Bolt	162	Pressure sensor	360
Labyrinth ring	22	Shaft seal ring	183	Angled plug with cable	361
Spacer ring	23	Mechanical seal	186	Threaded adapter ①	400
Ring	24	Socket head cap screw	200	Rating plate	970
Balance bush	26	Socket head cap screw	201	Plastic cover	980
O-ring	121	Screw plug	214	Plastic cover	981

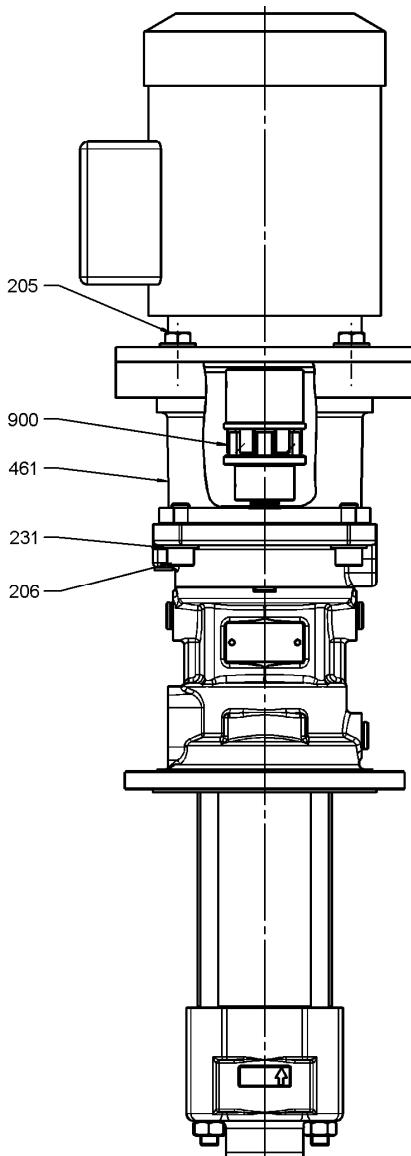
① Accessories for sizes 80 to 440 for connecting an ALLSPEED pressure sensor

Aggregates
EMTEC-A

Aggregate design with mounting foot

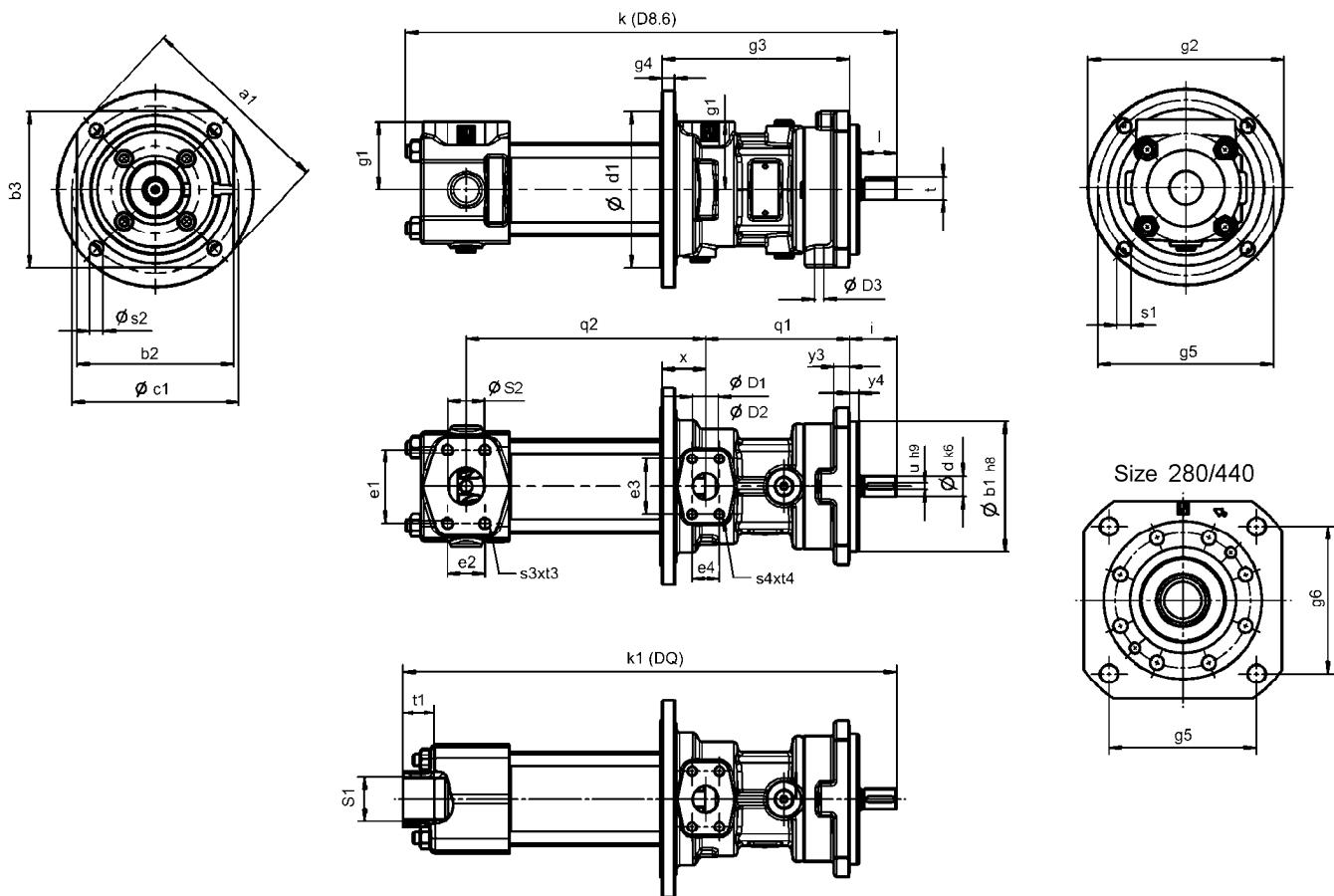


Aggregate design for in-tank installation and tank top installation



Denomination	Part No.
Socket head cap screw	204
Hexagon head bolt	205
Hexagon head bolt	206
Hexagon nut	220
Lock washer	230
Lock washer	231
Pump foot	460
Pump bracket	461
Coupling	900

With some of the sizes, an intermediate ring (part no. 462, not shown) is installed between the pump bracket and motor.

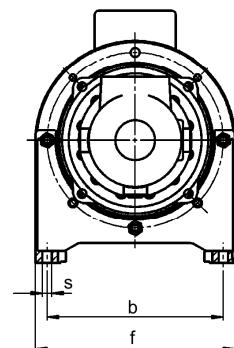
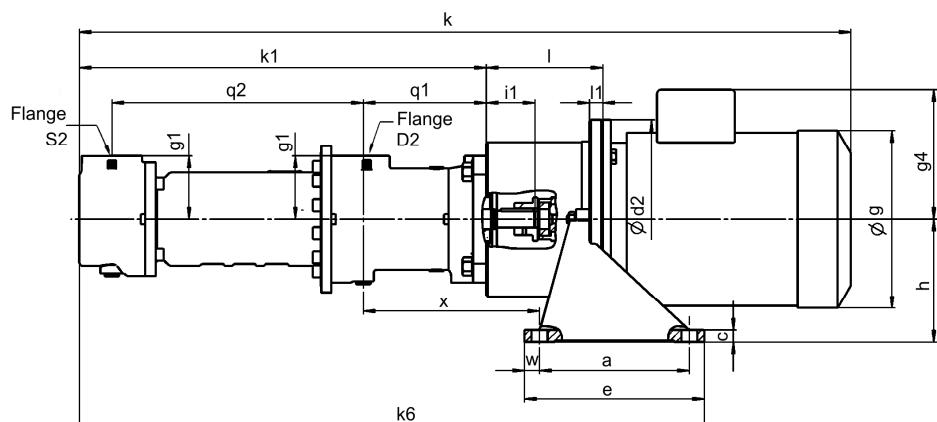
Pump dimensions
EMTEC-A


Dimensions in mm.
Subject to alterations

Pump size	Pump dimensions												Shaft end				Flange cover (DIN ISO 3019-2)									
	k	k1	i	q1	q2	x	g1	g2	g3	g4	g5	g6	d1	s1	d	l	u	t	a1	b1	b2	b3	c1	s2	y3	y4
EMT-A 20	471	471	45	138	230	42	65	188	180	12	168	-	150	13,5	19	34	6	21,5	188	125	150	150	160	13,5	15	9
EMT-A 40	523	521	45	150	273	42	65	188	192	12	168	-	150	13,5	19	34	6	21,5	188	125	150	150	160	13,5	15	9
EMT-A 80	589	599	51	159	330	56	95	220	215	13	226	-	200	13,5	19	40	6	21,5	188	125	150	150	160	13,5	15	9
EMT-A 140	685	705	73	185	378	63	95	220	248	15	226	-	200	13,5	25	60	8	28	252	160	190	190	200	17,5	20	9
EMT-A 210	737	-	72	174	436	55	115	-	248	19	244	-	-	M12	28	60	8	31	268	160	190	190	200	17,5	20	9
EMT-A 280	861	-	90	220	485	59	120	-	304	25	180	190	-	M16	32	80	10	35	292	200	236	236	250	22	28	9
EMT-A 440	937	-	88	214	550	64	135	-	302	24	200	210	-	M16	38	72	10	41	329	200	236	236	250	22	28	9

Pump size	Pipe thread suction flange		SAE suction flange						SAE discharge flange D1 = pipe thread connection							Leakage outlet D3	
			S1	t1	Inch	s3xt3	e1	e2	S2	Inch	s4xt4	e3	e4	D1	D2		
EMT-A 20	G1½	28	1½	M12x18	69,9	35,7	35	1	M10x18	52,4	26,2	G ¾	25	G ¼			
EMT-A 40	G1½	28	1½	M12x18	69,9	35,7	35	1	M10x18	52,4	26,2	G ¾	25	G ¼			
EMT-A 80	G2	28	2	M12x23	77,8	42,9	46	1½	M12x23	69,9	35,7	G 1¼	38	G ¾			
EMT-A 140	G2	28	2	M12x23	77,8	42,9	46	1½	M12x23	69,9	35,7	G 1¼	38	G ¾			
EMT-A 210	-	-	2½	M12x23	88,9	50,8	58	2	M12x23	77,8	42,9	-	46	G ¾			
EMT-A 280	-	-	3	M16x30	106,4	61,9	70	2½	M12x23	88,9	50,8	-	58	G ¾			
EMT-A 440	-	-	4	M16x30	130,2	77,8	98	3	M16x30	106,4	61,9	-	70	G ¾			

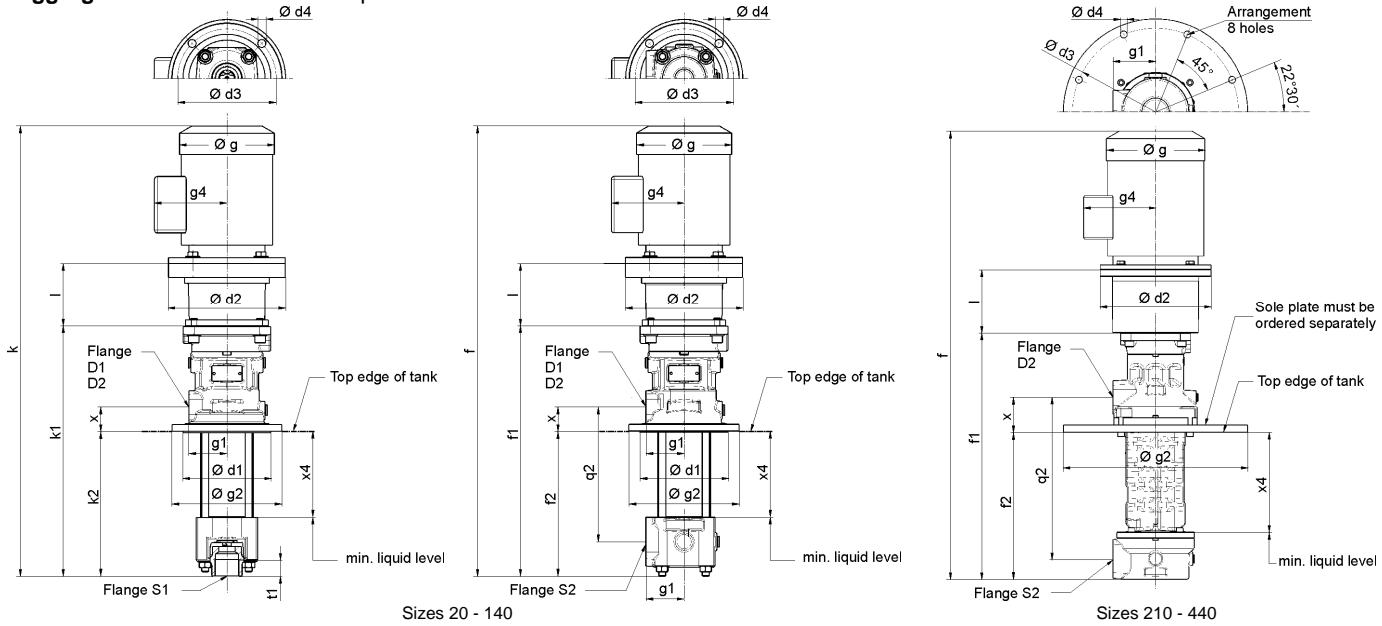
Aggregate dimensions – Aggregate design with mounting foot



Dimensions in mm.
Subject to alterations.

Pump size	Size acc. to IEC	Motor power at n = 3000 min ⁻¹	1500 min ⁻¹	Flanges SAE S2	SAE D2	a	b	c	d2	e	f	①	①	①	g1	g4	h	i1	k	k1	k6	l	l1	q1	q2	s	w	x
EMT-A 20	80	0,75 / 1,1	0,55 / 0,75	1½"	1"	60	180	12	200	90	210	162				124	112	768	521	108	24			11	15	158		
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181				130	112	823	521	115	31			11	15	158		
	100 L	3	3			185	215	15	250	230	250	203				158	155	858	674	120	19			14	23	179		
	112 M	4	4			185	215	15	250	230	250	228				171	155	870	674	120	19			14	23	179		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	943	722	144	20			14	23	187		
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320				233	235	1092	783	188	26			18	20	210		
EMT-A 40	80	0,75 / 1,1	0,55 / 0,75	1½"	1"	60	180	12	200	90	210	162				124	112	820	573	108	24			11	15	170		
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181				130	112	875	572	115	31			11	15	170		
	100 L	3	3			185	215	15	250	230	250	203				158	155	910	726	120	19			14	23	191		
	112 M	4	4			185	215	15	250	230	250	228				171	155	922	726	120	19			14	23	191		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	995	774	144	20			14	23	199		
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320				233	235	1144	835	188	26			18	20	222		
EMT-A 80	80	0,75 / 1,1	0,55 / 0,75	1½"	1"	60	180	12	200	90	210	162				124	112	820	573	108	24			11	15	170		
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181				130	112	875	572	115	31			11	15	170		
	100 L	3	3			185	215	15	250	230	250	203				158	155	910	726	120	19			14	23	191		
	112 M	4	4			185	215	15	250	230	250	228				171	155	922	726	120	19			14	23	191		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	995	774	144	20			14	23	199		
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320				233	235	1144	835	188	26			18	20	222		
EMT-A 140	112 M	4	4	2"	1½"	185	215	15	250	230	250	228				171	155	1000	795	128	19			14	23	208		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	1061	841	150	20			14	23	214		
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320				233	235	1204	895	188	26			18	20	231		
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358				259	235	1344	911	204	26			18	20	247		
	200 L	37	30			300	350	20	400	350	400	415				350	260	1407	941	204	26			18	25	237		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	1153	932	168	20			14	23	258		
EMT-A 210	160 M/L	11/15 / 18,5	11 / 15	2"	1½"	265	300	18	350	305	350	320				233	235	1294	985	204	26			18	20	273		
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358				259	235	1418	1015	204	26			18	20	273		
	200 L	37	30			300	350	20	400	350	400	415				350	260	1505	1015	204	26			18	25	263		
	225 M-2	45	-			335	400	20	450	385	450	470				335	295	1541	1070	234	26			18	25	283		
	225 S/M-4	-	37 / 45			335	400	20	450	385	450	470				335	295	1541	1070	234	26			18	25	283		
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267				195	185	1206	973	168	20			14	23	247		
EMT-A 280	160 M/L	11/15 / 18,5	11 / 15	3"	2½"	265	300	18	350	305	350	320				233	235	1347	1038	204	26			18	20	262		
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358				259	235	1471	1038	204	26			18	20	262		
	200 L	37	30			300	350	20	400	350	400	415				350	260	1534	1068	204	26			18	25	252		
	225 M-2	45	-			335	400	20	450	385	450	470				335	295	1594	1123	234	26			18	25	272		
	225 S/M-4	-	37 / 45			335	400	20	450	385	450	470				335	295	1594	1123	234	26			18	25	272		
	250 M-2	55	-			415	500	25	550	465	550	520				430	350	1703	1188	248	26			18	25	257		
EMT-A 440	250 M-2	55	-	4"	3"	415	500	25	550	465	550	520				430	350	1720	1205	265	26			18	25	274		
	250 M-4	-	55			415	500	25	550	465	550	520				490	350	1726	1188	248	26			18	25	274		
	280 S/M-2	75 / 90	-			415	500	25	550	465	550	575				490	350	1778	1188	248	26			18	25	257		
	280 S/M-4	-	75 / 90			415	500	25	550	465	550	575				490	350	1795	1205	265	26			18	25	274		
	315 S/M/L-2	110 / 132	160 / 200			495	600	30	660	555	660	645				515	380	2156	1356	275	50			22	30	280		
	315 S/M/L-4	-	110 / 132			495	600	30	660	555	660	645				515	380	2191	1410	310	32			22	30	334		
EMT-A 440	160 M/L	11/15 / 18,5	11 / 15	4"	3"	265	300	18	350	305	350	320				233	235	1549	1219	222	47			18	20	299		
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358				259	235	1683	1250	232	26			18	20	330		
	200 L	37	30			300	350	20	400	350	400	415				350	260	1742	1276	228	26			18	25	316		
	225 M-2	45	-			335	400	20	450	385	450	470				335	295	1780	1307	234	26			18	25	312		
	225 S/M-4	-	37 / 45			335	400	20	450	385	450	470				335	295	1806	1335	262	26			18	25	340		
	250 M-2	55	-			415	500	25	550	465	550	520				430	350	1904	1389	265	26			18	25	314		
EMT-A 440	250 M-4	-	55	4"	3"	415	500	25	550	465	550	520				430	350	1979	1389	265	26							

Aggregate dimensions – Tank top installation

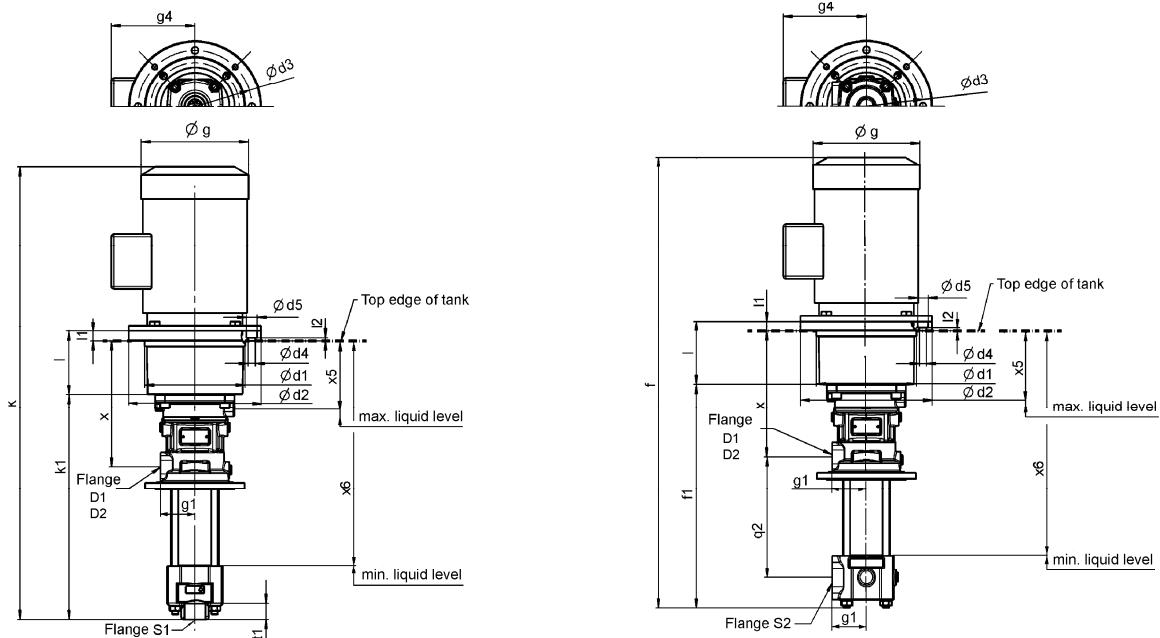


Pump size	Size acc. to IEC	Motor power at n = 3000 min ⁻¹		Flanges				① k	k1	k2	① f	f1	f2	x	q2	I	① g	g1	g2	① g4	t1	d1	d2	d3	d4	x4
		1500 min ⁻¹	kW	SAE S1	SAE S2	D1	SAE D2																			
EMT-A 20	80	0.75 / 1,1	0.55 /	G1½"	1½"	G¾"	1"	768	426	248	426	246	42	230	I	108	162	65	188	124	28	150	200	168	13,5	147
	90 S/L	1,5 / 2,2	1,1 / 1,5					823								115	181									
	100 L	3	3					858								120	203									
	112 M	4	4					894								120	228									
	132 S/M	5,5 / 7,5	5,5 / 7,5					943								144	267									
	160 M/L	11/15 / 18,5	11 / 15					1092								188	320									
EMT-A 40	80	0.75 / 1,1	0.55 /	G1½"	1½"	G¾"	1"	818	476	286	478	286	42	273	I	108	162	65	188	124	28	150	200	168	13,5	190
	90 S/L	1,5 / 2,2	1,1 / 1,5					873								115	181									
	100 L	3	3					908								120	203									
	112 M	4	4					920								120	228									
	132 S/M	5,5 / 7,5	5,5 / 7,5					993								144	267									
	160 M/L	11/15 / 18,5	11 / 15					1142								188	320									
EMT-A 80	80	0.75 / 1,1	0.55 /	G2"	2"	G1¼"	1½"	820	548	335	538	323	56	330	I	128	228	95	220	171	28	200	250	226,3	13,5	224
	90 S/L	1,5 / 2,2	1,1 / 1,5					875								120	203									
	100 L	3	3					910								120	228									
	112 M	4	4					922								144	267									
	132 S/M	5,5 / 7,5	5,5 / 7,5					995								188	320									
	160 M/L	11/15 / 18,5	11 / 15					1144								204	415									
EMT-A 140	112 M	4	4	G2"	2"	G1¼"	1½"	1070	632	386	612	364	63	378	I	128	228	95	220	171	28	200	250	226,3	13,5	224
	132 S/M	5,5 / 7,5	5,5 / 7,5					1119								150	267									
	160 M/L	11/15 / 18,5	11 / 15					1214								188	320									
	180 M/L	22	18,5 / 22					1354								204	358									
	200 L	37	30					1417								204	415									
	225 M-2	45	-					1541								234	470									
EMT-A 210	132 S/M	5,5 / 7,5	5,5 / 7,5	G2½"	2"	G1¼"	1½"	1172	665	397	94	436	63	378	I	168	267	95	220	195	28	200	250	226,3	13,5	265
	160 M/L	11/15 / 18,5	11 / 15					1314								204	320									
	180 M/L	22	18,5 / 22					1496								204	358									
	200 L	37	30					1534								204	415									
	225 M-2	45	-					1594								234	470									
	225 S/M-4	-	37 / 45					1594								234	470									
EMT-A 280	160 M/L	11/15 / 18,5	11 / 15	3"	-	2½"	-	1478	771	467	84	485	89	550	I	222	320	500	500	195	28	200	250	226,3	18,5	335
	180 M/L	22	18,5 / 22					1602								228	415									
	200 L	37	30					1664								234	470									
	225 M-2	45	-					1700								262	470									
	225 S/M-4	-	37 / 45					1728								265	520									
	250 M-2	55	-					1826								265	520									
EMT-A 440	250 M-4	-	55	4"	-	3"	-	1806	849	546	89	550	I	222	320	500	600	600	195	28	200	250	226,3	18,5	387	
	250 M-4	-	55					1904									234	470								
	280 S/M-2	75 / 90	-					1904									262	470								
	280 S/M-4	-	75 / 90					1929									265	575								
	315 S/M/L-2	110 / 132	160 / 200					2269																		

^① Approximate dimensions, can vary according to motor make.

Dimensions in mm. Subject to alterations.

Aggregate dimensions – In-tank installation



Pump size	Size acc. to IEC	Motor power at n =		Flanges				①		①		①		①		①		①		①		①		①			
		3000 min ⁻¹ kW	1500 min ⁻¹ kW	S1	SAE S2	D1	SAE D2	k	k1	t1	f	f1	x	q2	I	I1	I2	g	g1	g4	d1	d2	d3	d4	d5	x5	x6
EMT-A 20	100 L	3	3	G1½	1½"	G¾	1"	858	858	239	120	19	6,4	203	158	190	250	215	13,5	24	131	427					
	112 M	4	4					894	870	239	120	19	6,4	228	171	190	250	215	13,5	24	154	450					
	132 S / M	5,5 / 7,5	5,5 / 7,5					943	943	262	144	20	7,4	267	195	234	300	265	13,5	24	192	488					
	160 M / L	11/15 / 18,5	11 / 15					1092	1092	300	188	26	9,4	320	233	260	350	300	17,5	30	192	543					
EMT-A 40	100 L	3	3	G1½	1½"	G¾	1"	908	910	251	120	19	6,4	203	158	190	250	215	13,5	24	131	482					
	112 M	4	4					920	922	251	120	19	6,4	228	171	190	250	215	13,5	24	192	601					
	132 S / M	5,5 / 7,5	5,5 / 7,5					993	995	274	144	20	7,4	267	195	234	300	265	13,5	24	154	506					
	160 M / L	11/15 / 18,5	11 / 15					1144	1144	312	188	26	9,4	320	233	260	350	300	17,5	30	192	543					
EMT-A 80	112 M	4	4	G2	2"	G1½	1½"	1095	1085	321	213	51	9,4	228	171	260	350	300	17,5	30	192	601					
	132 S / M	5,5 / 7,5	5,5 / 7,5					1134	1124	321	213	51	9,4	267	195	260	350	300	17,5	30	192	601					
	160 M / L	11/15 / 18,5	11 / 15					1214	1204	321	188	26	9,4	320	233	260	350	300	17,5	30	192	601					
	180 M / L	22	18,5 / 22					1354	1344	337	204	26	9,4	358	259	260	350	300	17,5	30	208	617					
EMT-A 140	200 L	37	30	G2	2"	G1½	1½"	1417	1407	337	204	26	9,4	415	250	300	400	350	17,5	30	208	617					
	132 S/M	5,5 / 7,5	5,5 / 7,5					1218	1198	347	213	51	9,4	267	195	260	350	300	17,5	30	200	675					
	160 M/L	11/15 / 18,5	11 / 15					1314	1294	363	204	26	9,4	320	233	260	350	300	17,5	30	216	691					
	180 M/L	22	18,5 / 22					1438	1418	363	204	26	9,4	358	259	260	350	300	17,5	30	216	691					
EMT-A 210	200 L	37	30	G2	2"	G1½	1½"	1501	1481	378	204	26	9,4	415	250	300	400	350	17,5	30	216	691					
	225 M-2	45	-					1561	1541	393	234	26	9,4	470	250	350	450	400	17,5	30	246	721					
	225 S/M-4	-	37 / 45					1561	1541	393	234	26	9,4	470	250	350	450	400	17,5	30	246	721					
	132 S/M	5,5 / 7,5	5,5 / 7,5					1267	1267	352	229	51	9,4	267	195	300	400	350	17,5	30	215,5	732					
EMT-A 280	160 M/L	11/15 / 18,5	11 / 15	-	2½"	2"	-	1372	1372	352	229	51	9,4	320	233	300	400	350	17,5	30	215,5	732					
	180 M/L	22	18,5 / 22					1496	1496	352	229	51	9,4	358	259	300	400	350	17,5	30	215,5	732					
	200 L	37	30					1534	1534	352	204	26	9,4	415	250	300	400	350	17,5	30	215,5	732					
	225 M-2	45	-					1594	1594	382	234	26	9,4	470	250	350	450	400	17,5	30	245,5	762					
EMT-A 440	225 S/M-4	-	37 / 45	-	3"	2½"	-	1594	1594	382	234	26	9,4	470	250	350	450	400	17,5	30	245,5	762					
	250 M-2	55	-					1703	1703	396	248	26	9,4	520	250	450	550	500	17,5	30	259,5	776					
	250 M-4	-	55					1720	1720	413	265	26	9,4	520	250	450	550	500	17,5	30	276,5	793					
	280 S/M-2	75 / 90	-					1778	1778	396	248	26	9,4	575	250	450	550	500	17,5	30	259,5	776					
EMT-A 315	280 S/M-4	-	75 / 90	-	4"	3"	-	1795	1795	413	265	26	9,4	575	250	450	550	500	17,5	30	276,5	793					
	315 S/M/L-2	110 / 132	-					1478	1478	397	228	51	9,4	320	233	300	400	350	17,5	30	220,5	817					
	315 S/M/L-4	-	110 / 132					1602	1602	397	228	51	9,4	358	259	300	400	350	17,5	30	220,5	817					
	315 S/M/L-4	-	160 / 200					1664	1664	422	228	26	9,4	415	250	300	400	350	17,5	30	244,5	841					
EMT-A 225	225 M-2	45	-	-	3"	2½"	-	1700	1700	428	234	26	9,4	470	250	350	450	400	17,5	30	250,5	847					
	225 S/M-4	-	37 / 45					1728	1728	456	262	26	9,4	470	250	350	450	400	17,5	30	278,5	875					
	250 M-2	55	-					1826	1826	459	265	26	9,4	520	250	450	550	500	17,5	30	281,5	878					
	250 M-4	-	55					1904	1904	459	265	26	9,4	575	250	450	550	500	17,5	30	281,5	878					
EMT-A 200	280 S/M-2	75 / 90	-	-	4"	3"	-	1901	1901	459	265	26	9,4	575	250	450	550	500	17,5	30	281,5	878					
	280 S/M-4	-	75 / 90					2156	2156	445	275	50	11,4	645	250	550	660	600	22	36	267,5	864					
	315 S/M/L-2	110 / 132	-					2191	2191	498	310	32	11,4	645	250	550	660	600	22	36	320,5	917					
	315 S/M/L-4	-	160 / 200					1554	1554	390	227	51	9,4	320	233	350	450	400	17,5	30	229	866					
EMT-A 160	160 M/L	11/15 / 18,5	11 / 15	-	4"	3"	-	1678	1678	390	227	51	9,4	358	259	350	450	400	17,5	30	229	866					
	180 M/L	22	18,5 / 22					1741	1741	390	227	51	9,4	415	250	350	450	400	17,5	30	229	866					
	200 L	37	30					1778	1778	422	234	26	9,4	470	250	350	450	400	17,5	30	261	898					
	225 M-2	45	-					1806	1806	450	262	26	9,4	470	250	350	450	400	17,5	30	289	926					
EMT-A 250	225 S/M-4	-	37 / 45	-	4"	3"	-	1904	1904	453	265	26	9,4	520	250	350	450	400	17,5	30	292	929					
	250 M-2	55	-					1904	1904	453	265	26	9,4	520	250	350	450	400	17,5	30	292	929					
	250 M-4	-	55					1979	1979	453	265	26	9,4	575	250	450	550	500	17,5	30	292	929					
	280 S/M-2	75 / 90	-					1979	1979	453	265	26	9,4	575	250	450	550	500	17,5	30	292	929					
EMT-A 300	280 S/M-4	-	75 / 90	-	4"	3"	-	2269	2269	492	310	32	11,4	645	250	550	660	600	22	36	331	968					
	315 S/M/L-2	110 / 132	-					2269	2269	492	310	32	11,4	645	250	550	660	600	22	36	331	968					
	315 S/M/L-4	-	110 / 132																								

① Approximate dimensions, can vary according to motor make.

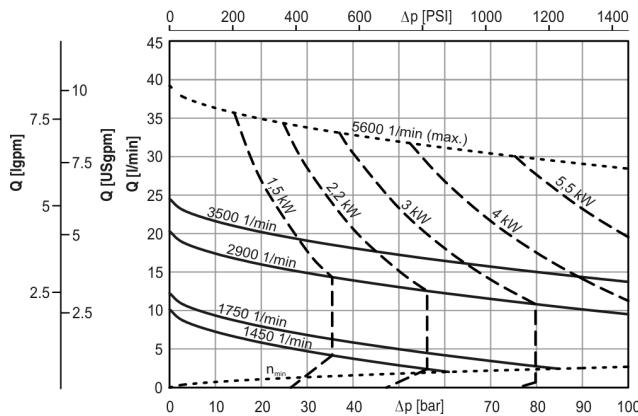
Dimensions in mm. Subject to alterations.

with ALLSPEED Controller

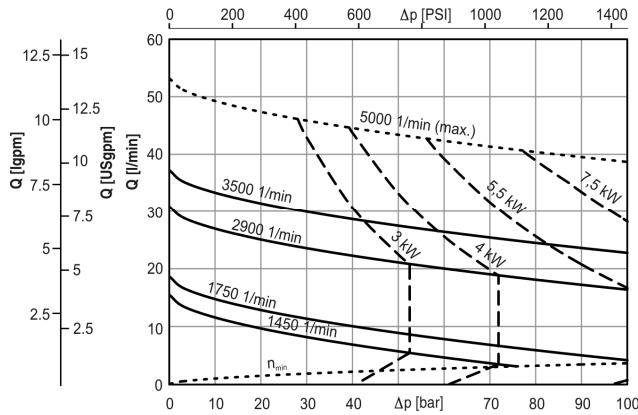
Performance graphs (see note on page 19 above)

Performance data at 1 mm²/s = emulsion

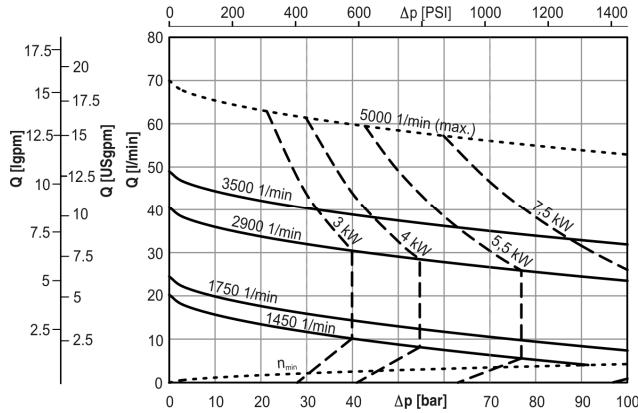
EMT 20-28



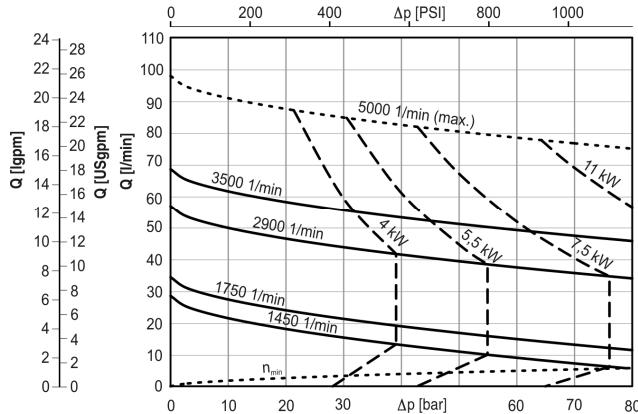
EMT 20-38



EMT 20-46

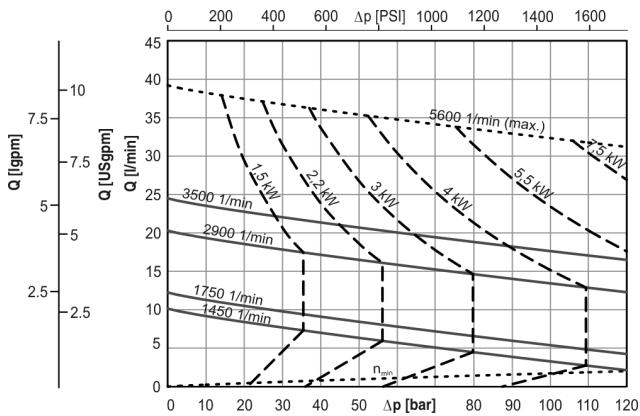


EMT 20-56

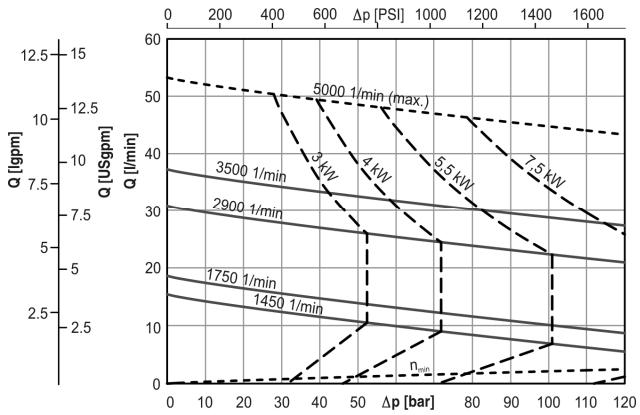


Performance data at 20 mm²/s = cutting oil with EP-additive

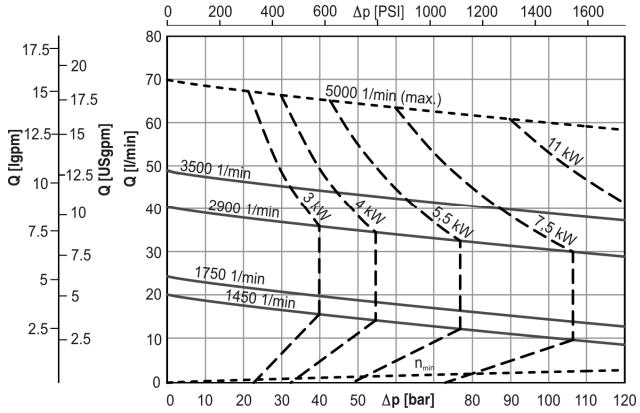
EMT 20-28



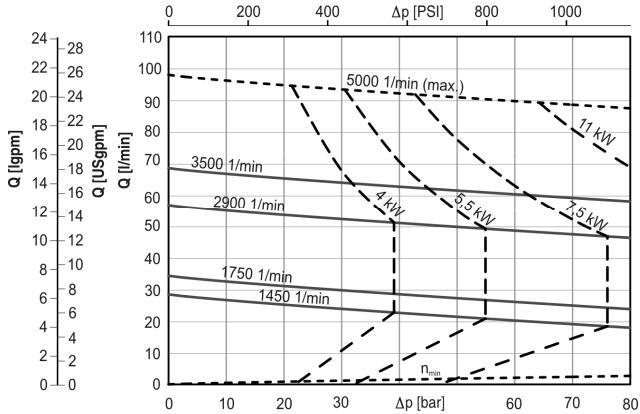
EMT 20-38



EMT 20-46



EMT 20-56

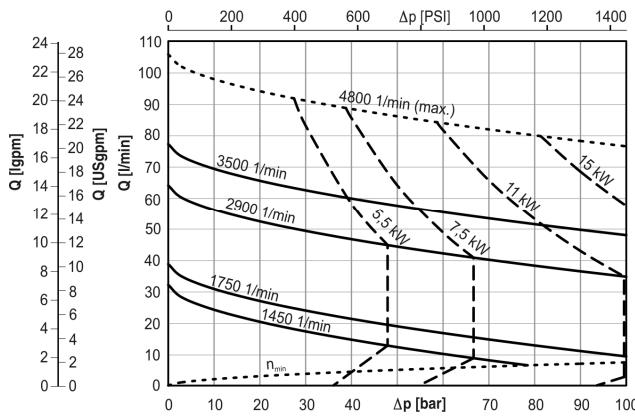


with ALLSPEED Controller

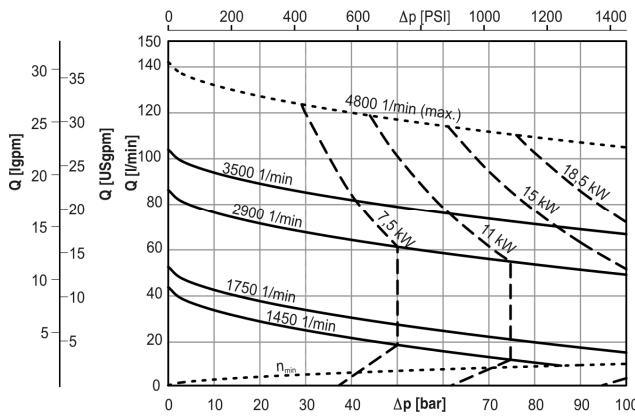
Performance graphs (see note on page 19 above)

Performance data at 1 mm²/s = emulsion

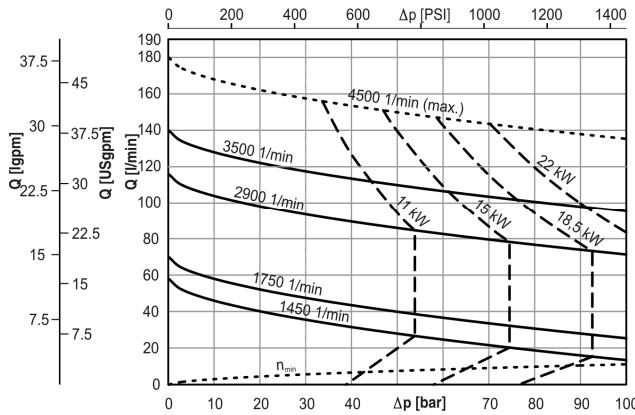
EMT 40-38



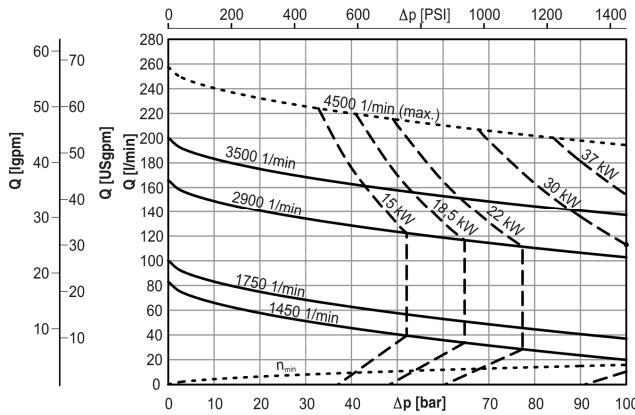
EMT 40-46



EMT 80-36

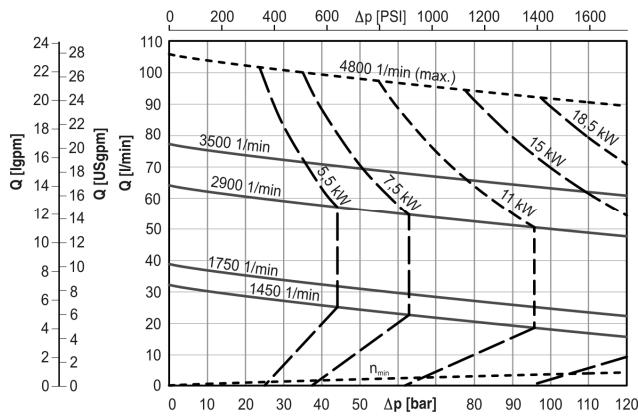


EMT 80-46

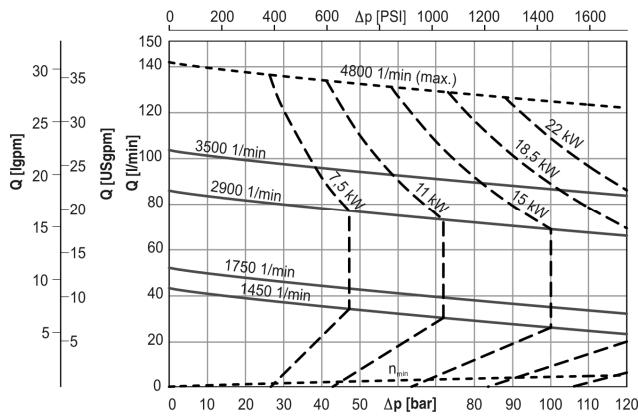


Performance data at 20 mm²/s = cutting oil with EP-additive

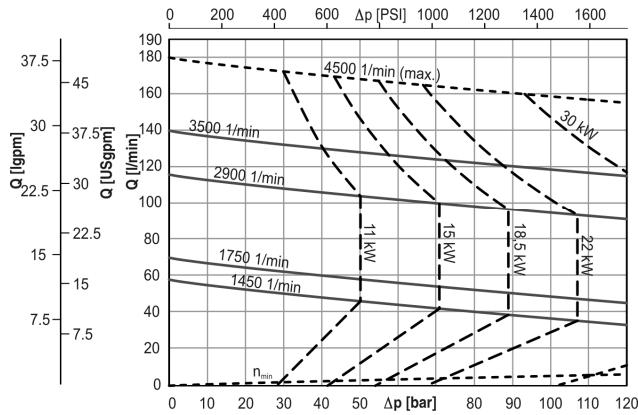
EMT 40-38



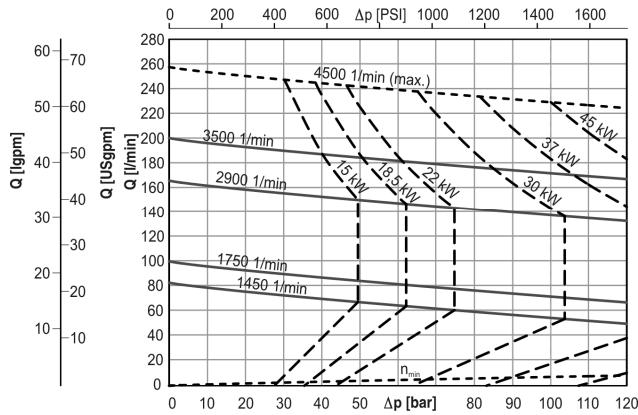
EMT 40-46



EMT 80-36



EMT 80-46

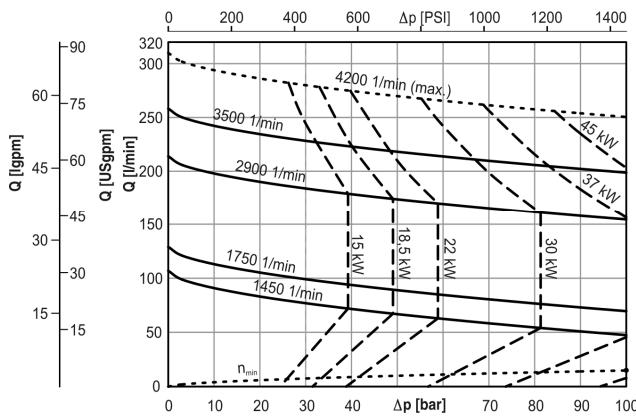


with ALLSPEED Controller

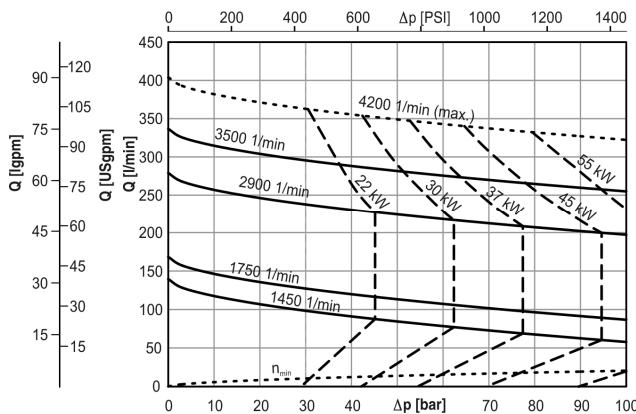
Performance graphs (see note on page 19 above)

Performance data at 1 mm²/s = emulsion

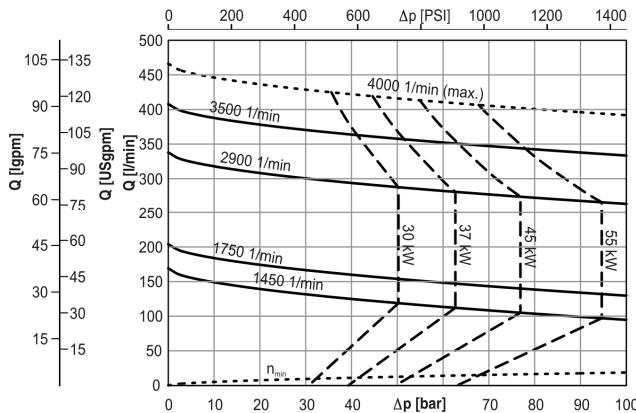
EMT 140-39



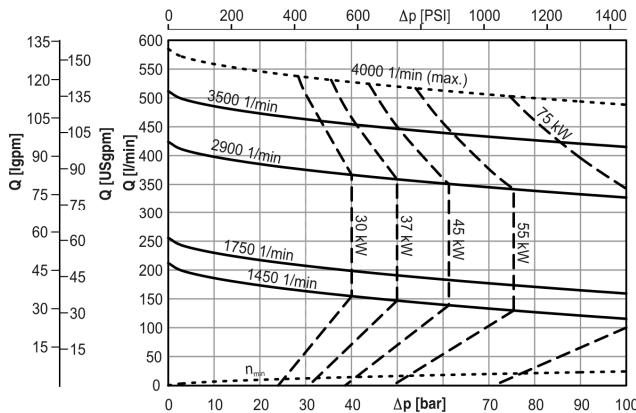
EMT 140-46



EMT 210-40

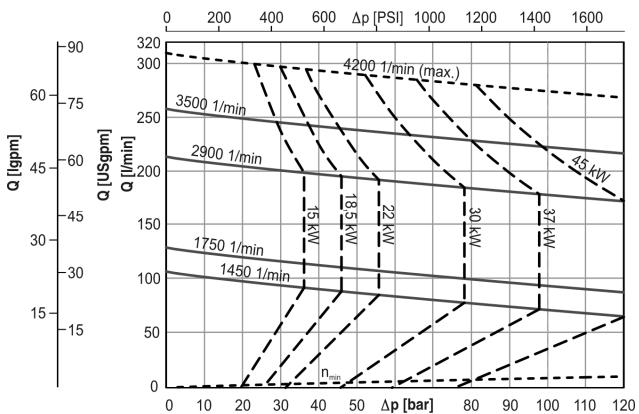


EMT 210-46

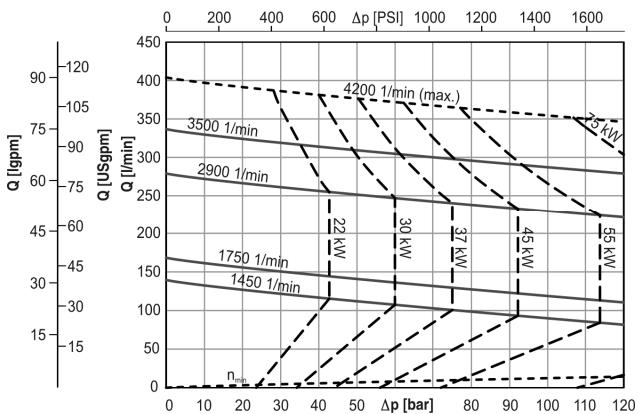


Performance data at 20 mm²/s = cutting oil with EP-additive

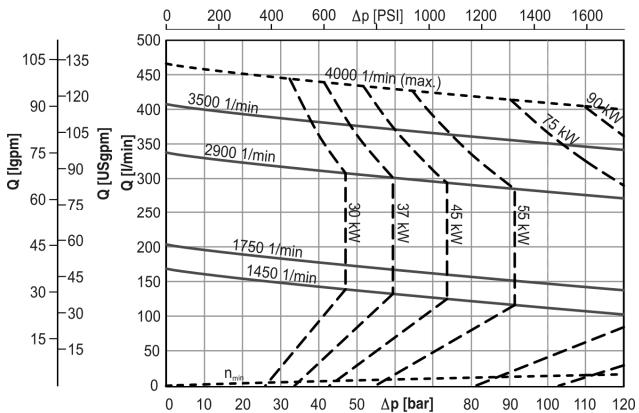
EMT 140-39



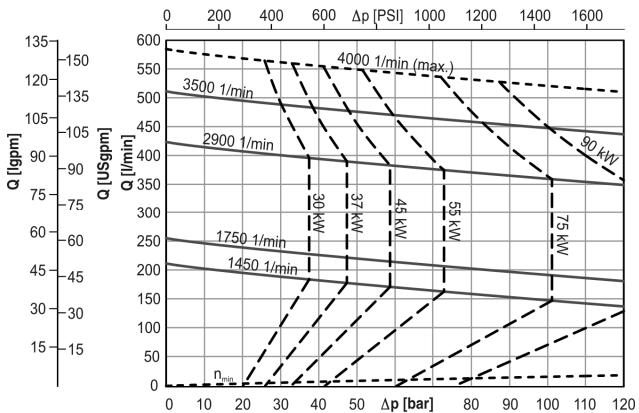
EMT 140-46



EMT 210-40



EMT 210-46

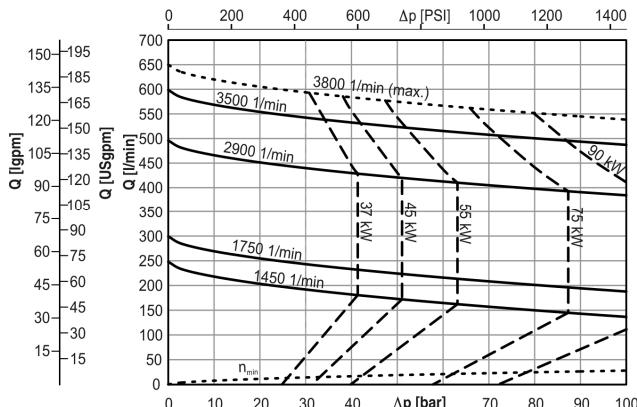


with ALLSPEED Controller

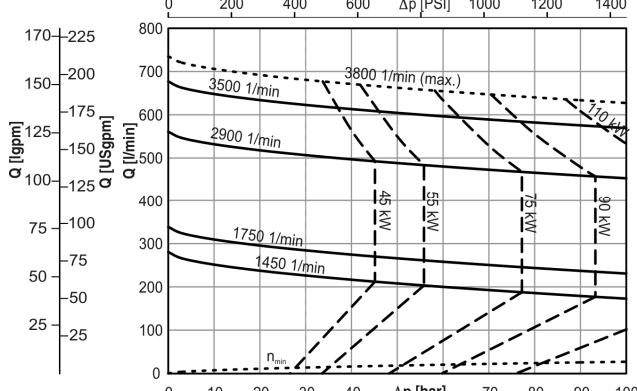
Performance graphs (see note on page 19 above)

Performance data at 1 mm²/s = emulsion

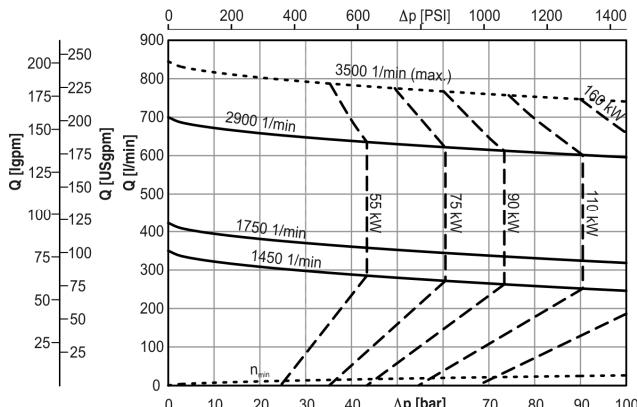
EMT 280-43



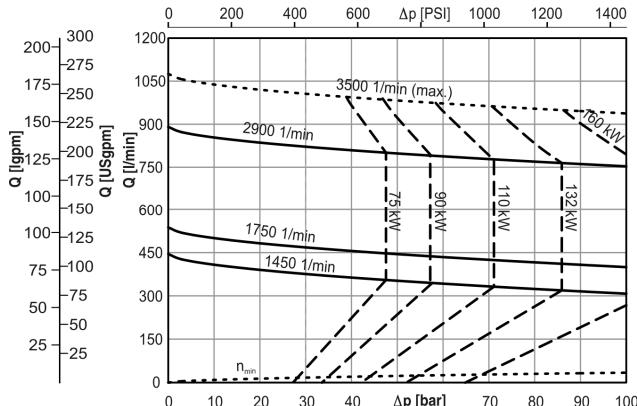
EMT 280-46



EMT 440-40

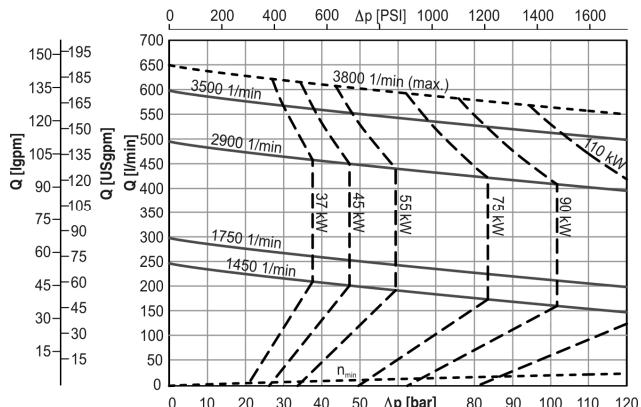


EMT 440-46

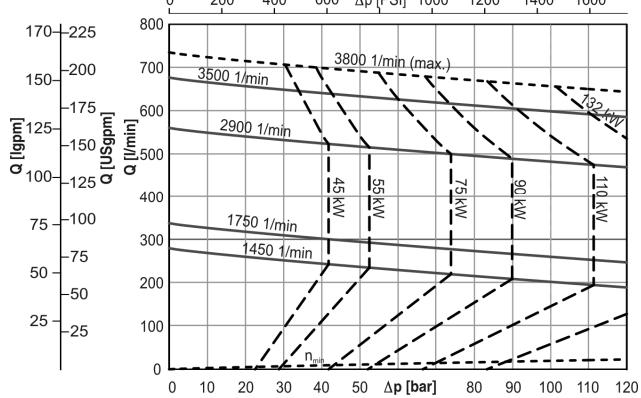


Performance data at 20 mm²/s = cutting oil with EP-additive

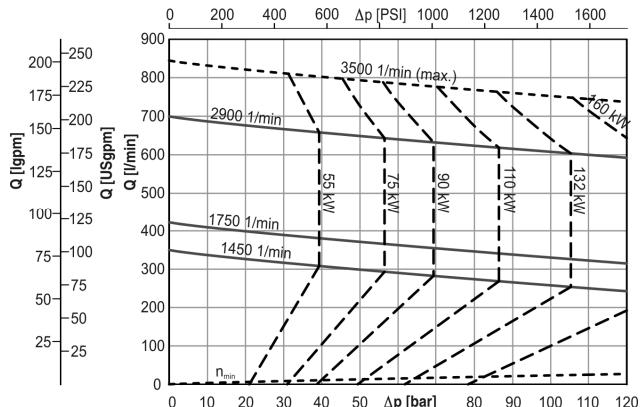
EMT 280-43



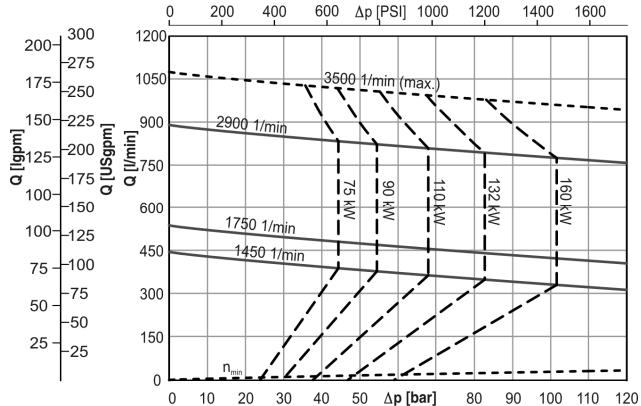
EMT 280-46

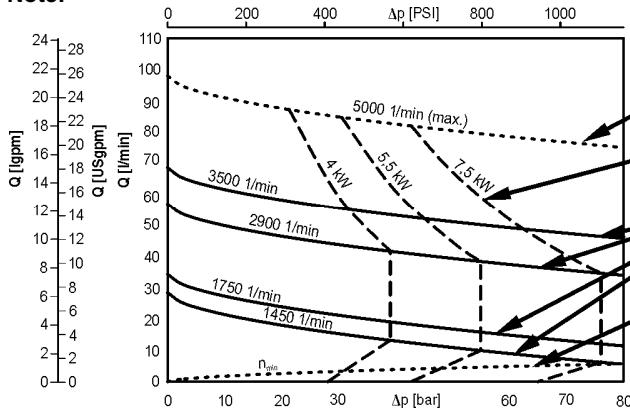


EMT 440-40



EMT 440-46



Note:

Pump characteristic curve at maximum speed.
Always observe the motor's maximal permissible speed.

Characteristic curve for the motor's power limit
in continuous operation. (50 Hz, 2-poles).

Characteristic curves for specified speeds.

Characteristic curve for the minimum capacity at the lowest
possible speed in continuous operation.

Motor power limits can sometimes be exceeded.
Speed can sometimes be below minimum speed.
Discussion with factory required.

Performance table

EMTEC-A

Speed of rotation: 2900 1/min

Capacity : Q [l/min]

Frequency: 50 Hz

Power required: P [kW]

Viscosity [mm²/s]	1 mm²/s = emulsion										20 mm²/s = cutting oil with EP-additive														
	0	10	20	30	40	50	60	70	80	90	100	0	10	20	30	40	50	60	70	80	90	100	110	120	
Pressure: [bar]	Q	20,3	17,4	16,0	14,9	13,9	13,0	12,3	11,5	10,8	10,2	9,5	20,3	19,3	18,6	17,8	17,2	16,5	15,9	15,2	14,6	14,0	13,4	12,9	12,3
20-28	P	0,3	0,7	1,0	1,3	1,7	2,0	2,3	2,7	3,0	3,4	3,7	0,3	0,7	1,0	1,3	1,7	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,4
20-38	Q	30,9	27,0	25,1	23,6	22,3	21,1	20,0	19,0	18,1	17,2	16,4	30,9	29,7	28,8	27,9	27,1	26,3	25,5	24,8	24,1	23,4	22,6	22,0	21,3
20-38	P	0,3	0,8	1,3	1,9	2,4	2,9	3,4	3,9	4,4	4,9	5,5	0,3	0,8	1,3	1,9	2,4	2,9	3,4	3,9	4,4	4,9	5,5	6,0	6,5
20-46	Q	40,6	36,0	33,8	32,0	30,5	29,1	27,8	26,7	25,6	24,5	23,5	40,6	39,2	38,1	37,0	36,0	35,1	34,1	33,2	32,3	31,5	30,6	29,8	29,0
20-46	P	0,3	1,0	1,7	2,3	3,0	3,7	4,4	5,0	5,7	6,4	7,1	0,3	1,0	1,7	2,3	3,0	3,7	4,4	5,0	5,7	6,4	7,1	7,8	8,4
20-56	Q	56,8	49,8	46,4	43,7	41,4	39,3	37,4	35,6	33,9	-	-	56,8	55,0	53,6	52,2	50,9	49,7	48,5	47,3	46,2	-	-	-	-
20-56	P	0,3	1,3	2,2	3,2	4,1	5,0	6,0	6,9	7,9	-	-	0,3	1,3	2,2	3,2	4,1	5,0	6,0	6,9	7,9	-	-	-	-
40-38	Q	63,9	56,0	52,1	49,1	46,5	44,1	41,9	39,9	38,0	36,2	34,5	63,9	61,9	60,2	58,7	57,3	56,0	54,6	53,4	52,1	50,9	49,6	48,4	47,2
40-38	P	0,4	1,5	2,5	3,6	4,7	5,7	6,8	7,8	8,9	10,0	11,0	0,8	1,9	3,0	4,0	5,1	6,2	7,2	8,3	9,4	10,4	11,5	12,6	13,6
40-46	Q	85,1	75,1	70,3	66,4	63,1	60,1	57,4	54,8	52,4	50,2	48,0	85,1	82,7	80,7	78,9	77,2	75,6	74,0	72,4	70,9	69,3	67,9	66,4	65,3
40-46	P	0,4	1,8	3,2	4,7	6,1	7,5	8,9	10,3	11,7	13,2	14,6	0,8	2,3	3,7	5,1	6,5	7,9	9,4	10,8	12,2	13,6	15,0	16,5	17,8
80-36	Q	116	104	97,4	92,5	88,2	84,4	80,9	77,6	74,5	71,6	68,8	116	113	109	107	104	101	98,5	96,0	93,6	91,2	88,8	86,5	84,2
80-36	P	0,6	2,6	4,5	6,4	8,4	10,3	12,3	14,2	16,1	18,1	20,0	1,3	3,3	5,2	7,1	9,1	11,0	13,0	14,9	16,8	18,8	20,7	22,7	24,6
80-46	Q	166	149	141	135	129	124	119	115	111	107	104	166	162	158	154	151	147	144	141	138	135	132	129	126
80-46	P	0,6	3,4	6,2	8,9	11,7	14,5	17,3	20,0	22,8	25,6	28,3	1,3	4,1	6,9	9,6	12,4	15,2	18,0	20,7	23,5	26,3	29,0	31,7	34,5
140-39	Q	214	198	190	184	178	173	169	166	161	157	153	214	209	204	200	197	193	190	186	183	179	176	173	170
140-39	P	1,0	4,6	8,1	11,7	15,3	18,8	22,4	26,0	29,5	33,1	36,7	2,1	5,6	9,2	12,8	16,3	19,9	23,5	27,0	30,6	34,2	37,7	41,3	44,9
140-46	Q	279	257	247	238	231	225	219	213	208	203	199	279	272	266	261	256	251	247	242	238	233	229	225	221
140-46	P	1,0	5,6	10,3	14,9	19,6	24,2	28,8	33,5	38,1	42,8	47,4	2,1	6,7	11,3	16,0	20,6	25,3	29,9	34,6	39,2	43,8	48,5	53,3	57,9
210-40	Q	338	318	308	301	294	288	282	277	273	268	264	338	330	324	318	312	307	302	297	292	287	282	277	273
210-40	P	1,7	7,3	13,0	18,6	24,2	29,9	35,5	41,1	46,8	52,4	58,0	3,5	9,2	14,8	20,4	26,1	31,7	37,3	43,0	48,6	54,2	59,9	65,5	71,1
210-46	Q	424	398	385	375	366	358	351	344	338	332	326	424	415	407	400	393	387	380	374	368	362	357	355	350
210-46	P	1,7	8,8	15,8	22,9	30,0	37,1	44,1	51,2	58,3	65,4	72,4	3,5	10,6	17,7	24,8	31,8	38,9	46,0	53,1	60,1	67,2	74,3	81,2	88,3
280-43	Q	496	466	452	440	430	421	413	405	398	392	385	496	484	475	466	458	450	443	435	428	421	414	404	397
280-43	P	2,8	11,1	19,4	27,6	35,9	44,1	52,4	60,7	68,9	77,2	85,5	5,9	14,1	22,4	30,7	38,9	47,2	55,5	63,7	72,0	80,2	88,5	96,8	105
280-46	Q	561	532	517	506	496	487	479	471	464	457	451	561	550	540	532	524	516	508	501	493	486	479	477	470
280-46	P	2,8	12,2	21,5	30,9	40,2	49,6	59,0	68,3	77,7	87,0	96,4	5,9	15,2	24,6	33,9	43,3	52,7	62,0	71,4	80,7	90,1	99,4	109	118
440-40	Q	700	672	659	648	639	630	623	615	609	602	596	700	687	676	666	657	648	639	631	622	614	606	598	590
440-40	P	4,4	16,0	27,7	39,4	51,0	62,7	74,4	86,1	97,7	109	121	9,1	20,8	32,5	44,1	55,8	67,5	79,2	90,8	103	114	126	138	149
440-46	Q	891	854	836	822	810	799	789	779	770	762	754	891	875	862	850	839	828	817	807	796	786	777	768	758
440-46	P	4,4	19,2	34,1	48,9	63,8	78,6	93,5	108	123	138	153	9,1	24,0	38,8	53,7	68,6	83,4	98,3	113	128	143	158	173	187

Performance table

EMTEC-A

3500 1/min

Speed of rotation: 3500 1/min

Capacity: Q [l/min]

Frequency: 60 Hz

Power required: P [kW]

Viscosity [mm²/s]		1 mm²/s = emulsion										20 mm²/s = cutting oil with EP-additive													
Pressure: [bar]		0	10	20	30	40	50	60	70	80	90	100	0	10	20	30	40	50	60	70	80	90	100	110	120
20-28	Q	24,5	21,6	20,2	19,1	18,1	17,2	16,5	15,7	15,0	14,4	13,8	24,5	23,5	22,8	22,0	21,4	20,7	20,1	19,4	18,8	18,2	17,6	17,1	16,5
	P	0,4	0,8	1,2	1,6	2,1	2,5	2,9	3,3	3,7	4,1	4,5	0,4	0,8	1,2	1,6	2,1	2,5	2,9	3,3	3,7	4,1	4,5	4,9	5,3
20-38	Q	37,2	33,3	31,5	29,9	28,6	27,5	26,4	25,4	24,5	23,6	22,8	37,2	36,1	35,2	34,3	33,5	32,7	31,9	31,2	30,5	29,7	29,0	28,3	27,7
	P	0,4	1,0	1,7	2,3	2,9	3,5	4,1	4,8	5,4	6,0	6,6	0,4	1,0	1,7	2,3	2,9	3,5	4,1	4,8	5,4	6,0	6,6	7,2	7,9
20-46	Q	49,0	44,4	42,2	40,4	38,9	37,5	36,2	35,1	34,0	32,9	31,9	49,0	47,6	46,5	45,4	44,4	43,5	42,5	41,6	40,7	39,9	39,0	38,2	37,3
	P	0,4	1,2	2,0	2,9	3,7	4,5	5,3	6,1	6,9	7,8	8,6	0,4	1,2	2,0	2,9	3,7	4,5	5,3	6,1	6,9	7,8	8,6	9,4	10,2
20-56	Q	68,6	61,6	58,2	55,5	53,2	51,1	49,2	47,4	45,7	-	-	68,6	66,8	65,3	64,0	62,7	61,5	60,3	59,1	57,9	56,8	-	-	-
	P	0,4	1,6	2,7	3,8	5,0	6,1	7,3	8,4	9,5	-	-	0,4	1,6	2,7	3,8	5,0	6,1	7,3	8,4	9,6	10,7	-	-	-
40-38	Q	77,1	69,2	65,3	62,3	59,7	57,3	55,1	53,1	51,2	49,4	47,7	77,1	75,1	73,5	72,0	70,5	69,2	67,9	66,6	65,3	64,1	62,8	61,6	60,5
	P	0,5	1,8	3,1	4,4	5,7	6,9	8,2	9,5	10,8	12,1	13,4	1,1	2,4	3,7	5,0	6,3	7,5	8,8	10,1	11,4	12,7	14,0	15,3	16,5
40-46	Q	103	92,8	87,9	84,1	80,7	77,7	75,0	72,4	70,0	67,8	65,6	102,8	100,3	98,4	96,5	94,8	93,2	91,6	90,0	88,5	87,0	85,5	84,0	82,6
	P	0,5	2,2	4,0	5,7	7,4	9,1	10,8	12,5	14,2	15,9	17,7	1,1	2,8	4,6	6,3	8,0	9,7	11,4	13,1	14,8	16,5	18,3	20,0	21,7
80-36	Q	141	128	122	117	112	108	105	102	98,6	95,7	92,9	141	137	134	131	128	125	123	120	118	115	113	111	108
	P	0,8	3,2	5,5	7,8	10,2	12,5	14,9	17,2	19,6	21,9	24,2	1,8	4,1	6,4	8,8	11,1	13,5	15,8	18,2	20,5	22,8	25,2	27,5	29,9
80-46	Q	201	184	176	161	164	158	154	150	145	142	138	201	196	192	189	185	182	179	176	173	170	167	164	161
	P	0,8	4,2	7,5	10,9	14,2	17,6	20,9	24,2	27,6	30,9	34,3	1,8	5,1	8,5	11,8	15,1	18,5	21,8	25,2	28,5	31,9	35,2	38,5	41,8
140-39	Q	258	242	234	228	222	218	213	209	205	201	198	258	253	249	245	241	237	234	230	227	224	220	217	214
	P	1,3	5,6	9,9	14,2	18,5	22,8	27,1	31,4	35,7	40,1	44,4	2,7	7,0	11,3	15,7	20,0	24,3	28,6	32,9	37,2	41,5	45,8	50,1	54,4
140-46	Q	336	315	304	296	289	282	276	271	266	261	256	336	329	324	318	313	309	304	300	295	291	287	283	279
	P	1,3	6,9	12,5	18,12	23,7	29,3	34,9	40,5	46,1	51,7	57,3	2,7	8,3	13,9	19,5	25,1	30,7	36,3	41,9	47,6	53,2	58,8	64,5	70,1
210-40	Q	408	388	378	371	364	358	352	347	343	338	334	408	400	394	388	382	377	372	367	362	357	352	347	343
	P	2,3	9,0	15,8	22,6	29,4	36,2	43,0	49,8	56,6	63,4	70,2	4,7	11,5	18,3	25,1	31,9	38,7	45,5	52,3	59,1	65,9	72,7	79,5	86,3
210-46	Q	512	486	473	463	454	446	439	432	426	420	414	512	503	495	488	481	475	468	462	456	450	444	443	437
	P	2,3	10,8	19,3	27,9	36,4	44,9	53,5	62,0	70,6	79,1	87,6	4,7	13,2	21,8	30,3	38,8	47,4	55,9	64,5	73,0	81,5	90,1	98,5	107
280-43	Q	598	569	554	543	533	524	516	508	501	494	488	598	587	577	569	561	553	545	538	530	523	516	507	499
	P	3,8	13,7	23,7	33,7	43,6	53,6	63,6	73,6	83,5	93,5	104	7,8	17,8	27,7	37,7	47,7	57,7	67,6	77,6	87,6	97,6	108	118	128
280-46	Q	677	648	633	622	612	603	595	587	580	573	567	677	666	657	648	640	632	624	617	609	602	595	593	586
	P	3,8	15,0	26,3	37,6	48,9	60,2	71,5	82,8	94,1	105	117	7,8	19,1	30,4	41,7	53,0	64,2	75,5	86,8	98,1	109	121	132	143
440-40	Q	845	817	804	793	783	775	767	760	754	747	741	845	832	822	811	802	793	784	776	767	759	751	743	735
	P	5,8	19,9	33,9	48	62,1	76,2	90,3	104	119	133	147	12,1	26,2	40,3	54,4	68,5	82,5	96,6	111	125	139	153	167	181
440-46	Q	1076	1039	1021	1006	994	983	973	964	955	946	938	1076	1059	1046	1034	1023	1012	1001	991	981	971	961	953	943
	P	5,8	23,7	41,6	59,6	77,5	95,4	113	131	149	167	185	12,1	30,0	48,0	65,9	83,8	102	120	138	156	174	191	209	227

Performance table
EMTEC-A

Speed of rotation: 1450 1/min
Frequency: 50 Hz

Capacity: Q [l/min]
Power required: P [kW]

Viscosity [mm²/s]		1 mm²/s = emulsion										20 mm²/s = cutting oil with EP-additive														
Pressure: [bar]		0	10	20	30	40	50	60	70	80	90	100	0	10	20	30	40	50	60	70	80	90	100	110	120	
20-28	Q	10,2	7,3	5,8	4,7	3,8	2,9	2,1	-	-	-	-	10,2	9,2	8,4	7,7	7,0	6,3	5,7	5,1	4,5	3,9	3,3	2,7	2,1	
	P	0,1	0,3	0,5	0,6	0,8	1,0	1,1	-	-	-	-	0,1	0,3	0,5	0,6	0,8	1,0	1,1	1,3	1,5	1,6	1,8	2,0	2,1	
20-38	Q	15,4	11,5	9,6	8,1	6,8	5,7	4,6	3,6	-	-	-	15,4	14,3	13,3	12,5	11,7	10,9	10,1	9,4	8,6	7,9	7,2	6,5	5,5	
	P	0,1	0,4	0,6	0,9	1,1	1,4	1,7	1,9	-	-	-	0,1	0,4	0,6	0,9	1,1	1,4	1,7	1,9	2,2	2,4	2,7	2,9	3,2	
20-46	Q	20,3	15,7	13,5	11,7	10,2	8,8	7,5	6,4	5,3	4,2	-	20,3	18,9	17,8	16,7	15,7	14,8	13,8	12,9	12,0	11,2	10,4	9,6	8,7	
	P	0,1	0,4	0,8	1,1	1,5	1,8	2,1	2,5	2,8	3,2	-	0,1	0,4	0,8	1,1	1,5	1,8	2,1	2,5	2,8	3,2	3,5	3,8	4,2	
20-56	Q	28,4	21,4	18,0	15,3	13,0	10,9	9,0	7,2	-	-	-	28,4	26,6	25,1	23,8	22,5	21,3	20,1	19	17,9	-	-	-	-	-
	P	0,1	0,6	1,1	1,5	2,0	2,5	3,0	3,4	-	-	-	0,1	0,6	1,1	1,5	2,0	2,5	2,9	3,4	3,9	-	-	-	-	-
40-38	Q	31,9	24,0	20,2	17,2	14,5	12,2	10,0	8,0	-	-	-	31,9	29,9	28,3	26,8	25,4	24,0	22,7	21,4	20,2	18,9	17,7	16,5	15,4	
	P	0,1	0,7	1,2	1,7	2,3	2,8	3,3	3,9	-	-	-	0,3	0,8	1,4	1,9	2,4	3,0	3,5	4,0	4,6	5,1	5,6	6,2	6,7	
40-46	Q	42,6	32,6	27,7	23,9	20,5	17,5	14,8	12,3	9,9	-	-	42,6	40,1	38,2	36,4	34,6	33,0	31,4	29,8	28,2	27,0	25,6	24,1	22,7	
	P	0,1	0,8	1,6	2,3	3,0	3,7	4,4	5,1	5,8	-	-	0,3	1,0	1,7	2,4	3,1	3,8	4,6	5,3	6,0	6,7	7,4	8,1	8,8	
80-36	Q	58,2	45,4	39,2	34,3	30,0	26,2	22,7	19,4	16,3	13,4	10,6	58,2	54,3	51,2	48,3	45,5	42,9	40,3	37,8	35,4	33,0	30,6	28,3	33,2	
	P	0,2	1,2	2,2	3,1	4,1	5,1	6,0	7,0	8,0	9,0	9,9	0,5	1,4	2,4	3,4	4,4	5,3	6,3	7,3	8,2	9,2	10,2	11,1	12,1	
80-46	Q	83,2	66,3	58,1	51,5	45,9	40,9	36,2	31,9	27,9	24,0	20,4	83,2	78,4	74,5	70,9	67,6	64,3	61,1	58,1	55,0	52,1	49,2	46,3	43,5	
	P	0,2	1,6	3,0	4,4	5,8	7,1	8,5	9,9	11,3	12,7	14,1	0,5	1,9	3,2	4,6	6,0	7,4	8,8	10,2	11,6	12,9	14,3	15,7	17,1	
140-39	Q	107,0	90,7	82,8	76,5	712,1	66,2	61,7	57,6	53,7	50,0	46,4	107	102	97,4	93,4	89,6	86,0	82,5	79,1	75,7	72,4	69,2	68,6	65,7	
	P	0,3	2,1	3,9	5,7	7,5	9,3	11,0	12,8	14,6	16,4	18,2	0,7	2,5	4,3	6,1	7,9	9,6	11,4	13,2	15,0	16,8	18,6	20,4	22,1	
140-46	Q	193	118	107	99,0	91,9	85,4	79,5	74,1	68,9	64,0	59,4	139	132	127	122	117	112	107	103	98,4	94,2	89,9	85,8	81,6	
	P	0,3	2,7	5,0	7,3	9,6	12,0	14,3	16,6	18,9	21,2	23,6	0,7	3,1	5,4	7,7	10,0	12,3	14,7	17,0	19,3	21,7	24	26,3	28,6	
210-40	Q	169	149	139	132	125	119	114	108	104	99,0	94,7	169	161	155	149	143	138	133	128	123	118	112	108	103	
	P	0,6	3,4	6,2	9,0	11,9	14,7	17,5	20,3	23,1	25,9	28,8	1,3	4,1	6,9	9,7	12,5	15,3	18,1	21,0	23,8	26,6	29,4	32,2	35,0	
210-46	Q	212	186	173	163	154	146	139	132	126	120	114	212	203	195	188	181	175	168	162	156	154	148	143	138	
	P	0,6	4,1	7,7	11,2	14,7	18,3	21,8	25,4	28,9	32,4	36,0	1,3	4,8	8,3	11,9	15,4	18,9	22,5	26,0	29,5	33,0	36,6	40,1	43,6	
280-43	Q	248	218	204	192	182	173	165	158	154	144	137	248	236	227	218	210	202	195	187	180	170	163	156	149	
	P	1,0	5,1	9,3	13,4	17,5	21,7	25,8	29,9	34,1	38,2	42,3	2,1	6,2	10,3	14,5	18,6	22,7	26,9	31,0	35,1	39,3	43,4	47,6	51,7	
280-46	Q	281	251	236	225	215	206	198	190	183	176	170	281	269	260	251	243	235	227	220	213	209	203	196	190	
	P	1,0	5,7	10,4	15,0	19,7	24,4	29,1	33,7	38,4	43,1	47,8	2,1	6,8	11,7	16,1	20,8	25,5	30,1	34,8	39,5	44,2	48,8	53,5	58,2	
440-40	Q	350	322	309	298	288	280	272	265	259	252	246	350	337	326	316	307	298	289	281	272	264	258	250	243	
	P	1,5	7,4	13,2	19,0	24,9	30,7	36,6	42,4	48,2	54,1	59,9	3,2	9,1	14,9	20,7	26,6	32,4	38,2	44,1	49,9	55,8	61,6	67,4	73,2	
440-46	Q	446	409	391	376	364	353	343	333	325	316	308	446	429	416,4	404	393	382	371	361	351	342	332	323	313	
	P	1,5	9,0	16,4	23,8	31,2	38,7	46,1	53,5	61,0	68,4	75,8	3,2	10,7	18,1	25,5	32,9	40,4	47,8	55,2	62,6	70,0	77,5	84,9	92,3	

Performance table

EMTEC-A

Speed of rotation: 1750 1/min

Capacity: Q [l/min]

Frequency: 60 Hz

Power required: P [kW]

Viscosity [mm²/s]		1 mm²/s = emulsion										20 mm²/s = cutting oil with EP-additive													
Pressure: [bar]		0	10	20	30	40	50	60	70	80	90	100	0	10	20	30	40	50	60	70	80	90	100	110	120
20-28	Q	12,3	9,4	7,9	6,8	5,9	5,0	4,2	3,5	2,8	-	-	12,3	11,3	10,5	9,8	9,1	8,4	7,8	7,2	6,6	6,0	5,4	4,8	4,2
	P	0,2	0,4	0,6	0,8	1,0	1,2	1,4	1,6	1,8	-	-	0,2	0,4	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6
20-38	Q	18,6	14,7	12,8	11,3	10,0	8,9	7,8	6,8	5,9	5,0	4,1	18,6	17,5	16,5	15,7	14,9	14,1	13,3	12,6	11,8	11,1	10,4	9,7	9,0
	P	0,1	0,5	0,8	1,1	1,4	1,7	2,0	2,3	2,6	2,9	3,2	0,1	0,5	0,8	1,1	1,4	1,7	2,0	2,3	2,6	2,9	3,2	3,6	3,9
20-46	Q	24,5	19,9	17,7	15,9	14,4	13,0	11,7	10,6	9,5	8,4	7,4	24,5	23,1	22,0	20,9	19,9	19,0	18,0	17,1	16,2	15,4	14,6	13,8	12,9
	P	0,1	0,6	1,0	1,4	1,8	2,2	2,6	3,0	3,4	3,8	4,2	0,1	0,6	1,0	1,4	1,8	2,2	2,6	3,0	3,4	3,8	4,2	4,6	5,0
20-56	Q	34,3	27,3	23,9	21,2	18,9	16,8	14,9	13,1	11,4	-	-	34,3	32,5	31,0	29,7	28,4	27,2	26,0	24,9	23,7	-	-	-	-
	P	0,1	0,7	1,3	1,9	2,4	3,0	3,6	4,1	4,7	-	-	0,1	0,7	1,3	1,9	2,4	3,0	3,6	4,1	4,7	-	-	-	-
40-38	Q	38,5	30,6	26,8	23,8	21,1	18,8	16,6	14,6	12,7	10,9	9,2	38,5	36,5	34,9	33,4	32,0	30,6	29,3	28,0	26,8	25,5	24,3	23,1	21,9
	P	0,2	0,8	1,5	2,1	2,8	3,4	4,0	4,7	5,3	6,0	6,6	0,4	1,0	1,7	2,3	3,0	3,6	4,3	4,9	5,5	6,2	6,8	7,5	8,1
40-46	Q	51,4	41,4	36,5	32,7	29,3	26,4	23,6	21,1	18,7	16,4	14,2	51,4	48,9	47,0	45,2	43,5	41,8	40,2	38,6	37,1	35,8	34,4	32,9	31,5
	P	0,2	1,0	1,9	2,8	3,6	4,5	5,3	6,2	7,0	7,9	8,7	0,4	1,3	2,1	3,0	3,8	4,7	5,5	6,4	7,2	8,1	8,9	9,8	10,6
80-36	Q	70,2	57,4	51,2	46,3	42,0	38,2	34,7	31,4	28,4	25,5	22,7	70,2	66,3	63,2	60,3	57,6	54,9	52,4	49,9	47,4	45,0	42,6	40,3	38,0
	P	0,3	1,5	2,6	3,8	5,0	6,1	7,3	8,5	9,7	10,8	12,0	0,6	1,8	3,0	4,1	5,3	6,5	7,6	8,8	10,0	11,2	12,3	13,5	14,7
80-46	Q	100	83,5	75,3	68,7	63,1	58,1	53,4	49,1	45,1	41,2	37,6	100	95,6	91,7	88,1	84,8	81,5	78,3	75,3	72,2	69,3	66,4	63,5	60,7
	P	0,3	2,0	3,6	5,3	7,0	8,7	10,3	12,0	13,7	15,3	17,0	0,6	2,3	4,0	5,6	7,3	9,0	10,7	12,3	14,0	15,6	17,3	19,0	20,6
140-39	Q	129	113	105	98,6	93,2	88,3	83,9	79,7	75,8	72,1	68,6	129	124	120	116	112	108	105	101	97,9	94,6	91,3	90,8	87,8
	P	0,5	2,6	4,8	6,9	9,1	11,2	13,4	15,5	17,7	19,8	22,0	1,0	3,1	5,3	7,4	9,6	11,7	13,9	16,0	18,2	20,3	22,5	24,7	26,8
140-46	Q	168	147	136	128	121	114	108	103	97,7	92,8	88,2	168	161	156	150	145	141	136	132	127	123	119	115	111
	P	0,5	3,3	6,1	8,9	11,7	14,5	17,3	20,1	22,9	25,7	28,5	1,0	3,8	6,6	9,4	12,2	15,0	17,8	20,6	23,4	26,2	29,0	31,9	34,7
210-40	Q	204	184	174	167	160	154	148	143	139	134	130	204	196	190	184	178	173	168	163	158	153	148	143	138
	P	0,8	4,2	7,6	11,0	14,4	17,8	21,2	24,6	28	31,4	34,8	1,7	5,1	8,5	11,9	15,3	18,7	22,1	25,5	28,9	32,3	35,6	39,0	42,4
210-46	Q	256	230	217	207	198	190	183	176	170	164	158	256	247	239	232	225	218	212	206	200	198	192	187	182
	P	0,8	5,1	9,3	13,6	17,9	22,1	26,4	30,7	34,9	39,2	43,5	1,7	5,9	10,2	14,5	18,7	23,0	27,3	31,5	35,8	40,0	44,3	48,5	52,8
280-43	Q	299	269	255	243	234	225	216	209	202	195	189	299	288	278	270	262	254	246	239	231	224	214	207	200
	P	1,3	6,3	11,3	16,3	21,3	26,3	31,2	36,2	41,2	46,2	51,2	2,8	7,7	12,7	17,7	22,7	27,7	32,7	37,7	42,6	47,6	52,7	57,6	62,6
280-46	Q	339	309	295	283	273	264	256	248	241	234	228	339	327	318	309	301	293	286	278	271	267	261	254	248
	P	1,3	7,0	12,6	18,3	23,9	29,5	35,2	40,8	46,5	52,1	57,8	2,8	8,4	14,0	19,7	25,3	31,0	36,6	42,3	47,9	53,5	59,2	64,8	70,5
440-40	Q	423	395	381	370	361	353	345	338	331	325	319	423	410	399	389	379	370	362	353	345	337	328	323	315
	P	2,0	9,1	16,1	23,2	30,2	37,3	44,3	51,3	58,4	65,4	72,5	4,3	11,3	18,4	25,4	32,5	39,5	46,5	53,6	60,6	67,7	74,7	81,7	88,7
440-46	Q	538	501	483	469	456	445	435	426	417	408	400	538	522	509	497	485	474	463	453	443	434	424	415	405
	P	2,0	11,0	20,0	28,9	37,9	46,9	55,8	64,8	73,8	82,7	91,7	4,3	13,2	22,2	31,2	40,1	49,1	58,1	67,0	76,0	84,9	93,9	103	112

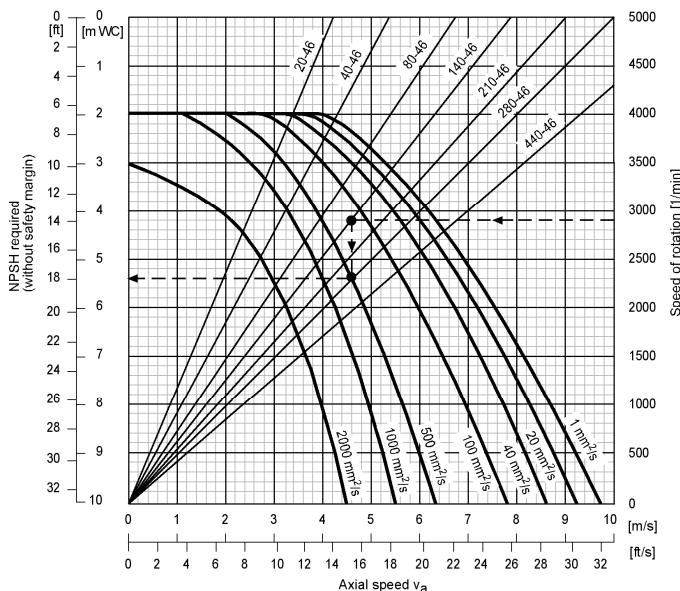
NPSH graphs of series EMTEC®

The data of the performance graphs refer to liquids without any air enclosed and show the beginning of aeration. For this reason, a safety margin of 0.5 m must be added to the NPSH value taken from the curve. An additional value must be added to the derived NPSH value at liquids with air inclusions (undissolved air). When dealing with critical conditions in your plant, always consult the factory.

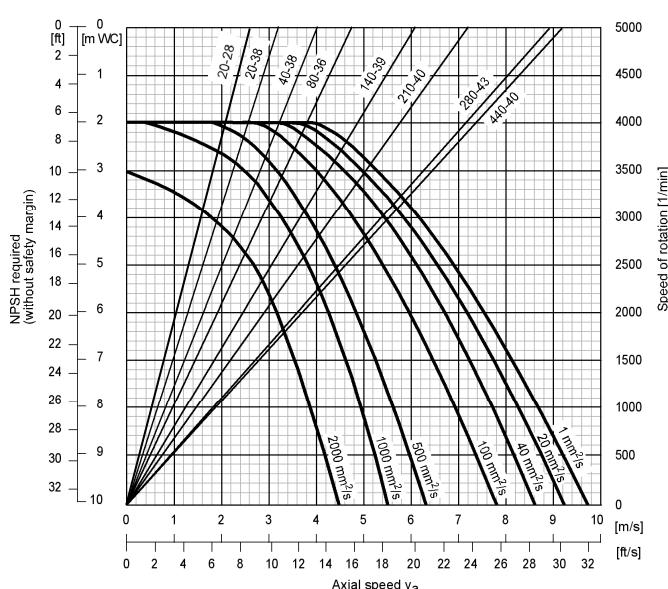
Maximum allowable air content:

Emulsion/cooling lubricant solutions: 10 %
Oil: 7 %

Screw pitch angle 46°



Screw pitch angle <46°



Example:

Given:

Size 140-46
Speed $n = 2900 \text{ 1/min}$
Viscosity $\nu = 500 \text{ mm}^2/\text{s}$

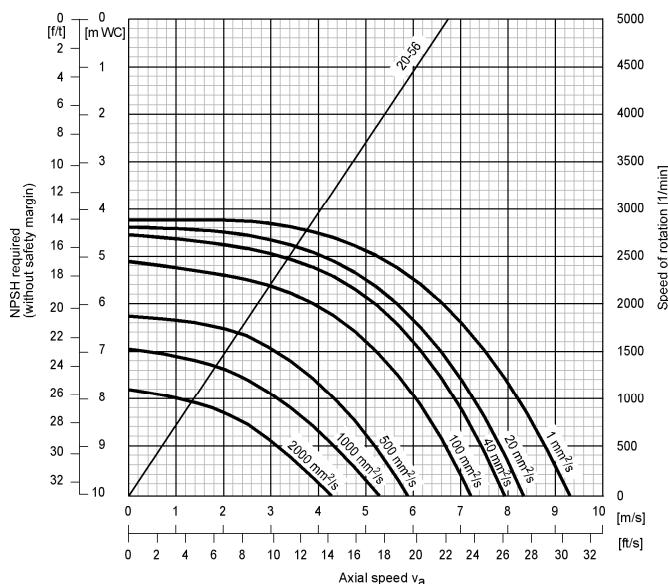
Wanted:

NPSH required

Solution:

NPSH taken from 5,4 m WC
+ safety margin 0,5
= 5.9 m WC

Screw pitch angle 56°



Subject to technical alterations.



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