

# Screw Pumps Series EMTEC®



**with ALLSPEED Controller**

## 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

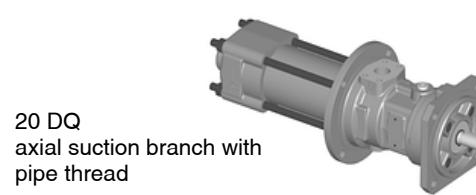
Three-screw, self-priming, flange-mounted pump (DIN ISO 3019-2) with special surface-hardened drive and idler screws. The idler screws are hydraulically driven and the axial thrust is completely neutralised hydrostatically.

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.

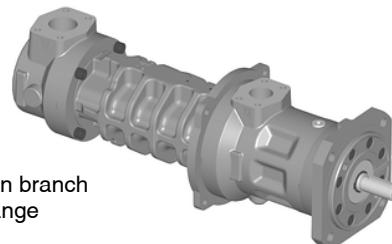
The rotor housing has been optimised to ensure maximum resistance to wear. The material used is specially hardened grey cast iron (EN-GJL) that is part of a special safety concept. The housing surface in contact area to the screws shows a ceramic-like hardness. Additionally, unlike with other materials - such as SiC - wear, shocks, vibration or aeration cannot lead to sudden failure of the pump unit. 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 <sub>s</sub>		to	10	bar
Differential pressure	Δp		to	100	bar (emulsion)
			to	120	bar (oil)
Outlet pressure	p <sub>d</sub>		to	130	bar ②
Viscosity range	v	1	to	2000	mm <sup>2</sup> /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

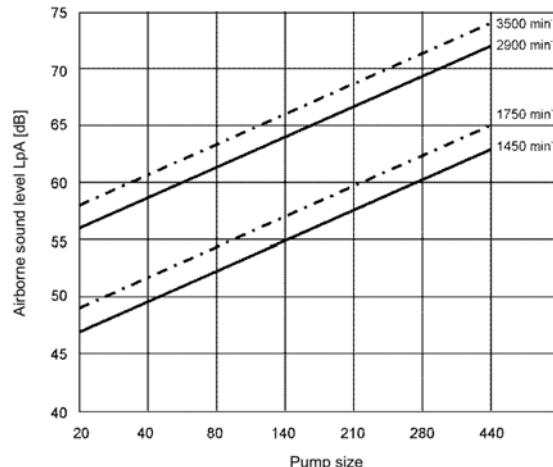
② D = external antifriction bearing, shaft seal unheated, uncooled

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	

## 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<sub>A</sub>. 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.

## 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 (Material code W 110222)
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	
	Solutions, dispersions of organic (synthetic) materials in water	Higher cooling effect, lower lubricating effect
E Emulsions	Oil-in-water emulsions (Oil content E 2 % ... E 20 %)	Cooling-lubricating effect
	Cutting oils without additives (pure)	
S Petroleum-based cutting and grinding oils (natural and synthetic)	Cutting oils with polar (physically effective) additives	Higher lubricating effect, lower cooling effect
	Cutting oils with mild-effect (lubricating film forming) EP additives	
	Cutting oils with polar and mild-effect EP additives	Better surface adhesion provides protection against corrosion
	Cutting oils with active (chemical) EP additives	
	Cutting oils with polar and active EP additives	Higher temperature and pressure resistance

EP = „Extreme Pressure“

**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**

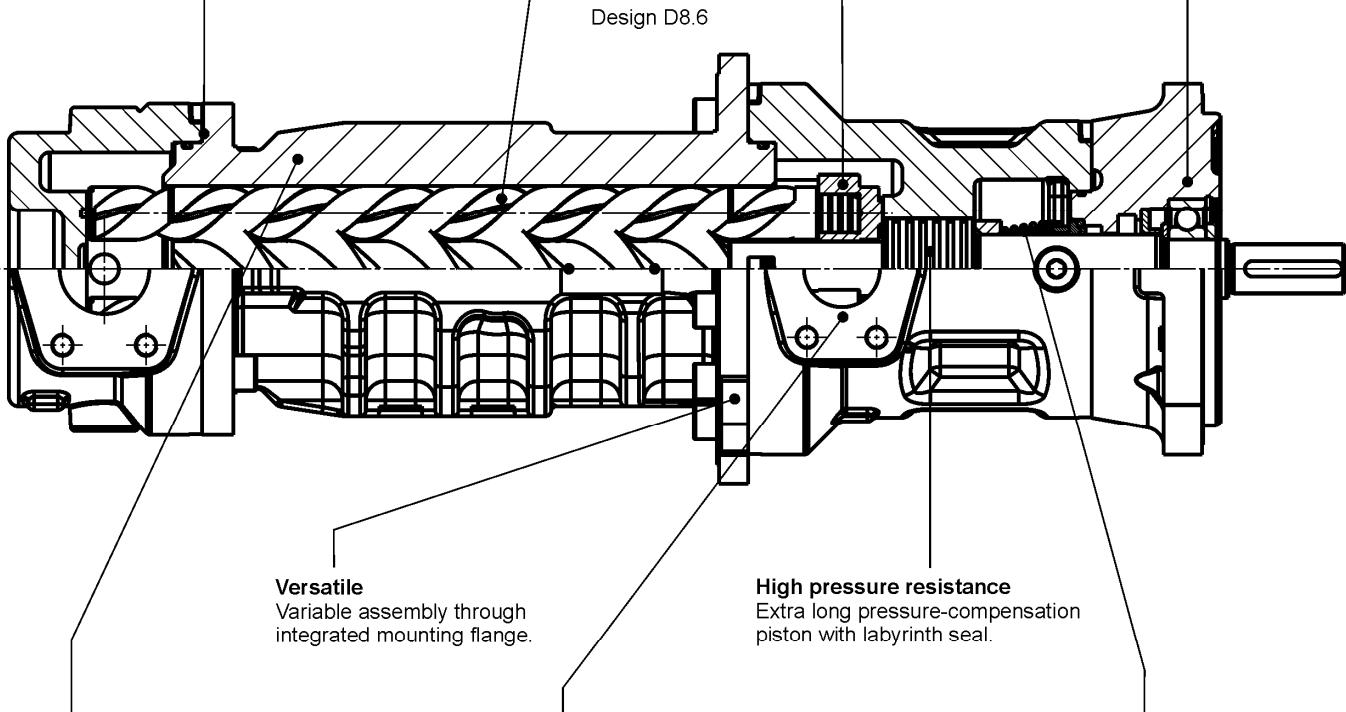
External ball bearing, grease lubricated for lifetime. Labyrinth seal protects against wash-out.

**Convenient service**

Service-friendly pump design; simple assembly and disassembly.

**Safe**

Connections well sealed with SAE flanges.

**Wear-resistant**

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

**High load capacity**

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

**Low maintenance**

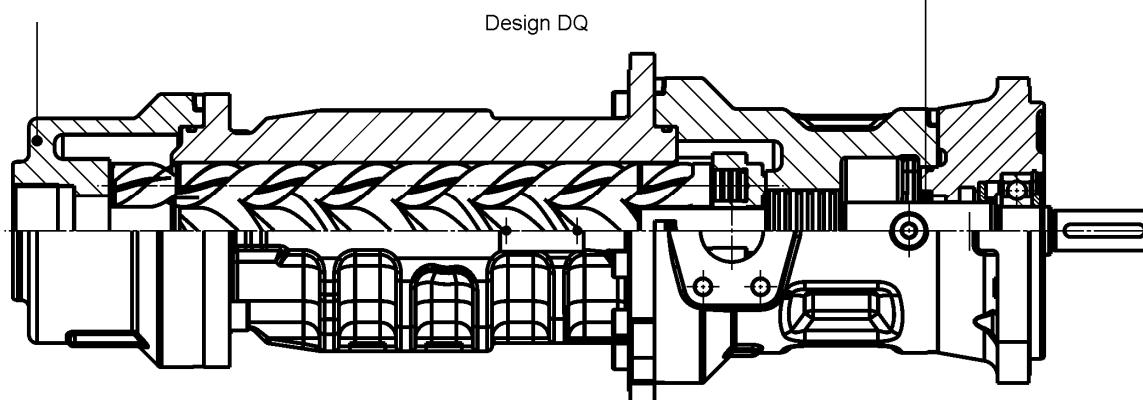
On version D8.6 shaft sealed with maintenance-free silicon carbide mechanical seal according to DIN EN 12 756.

**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.

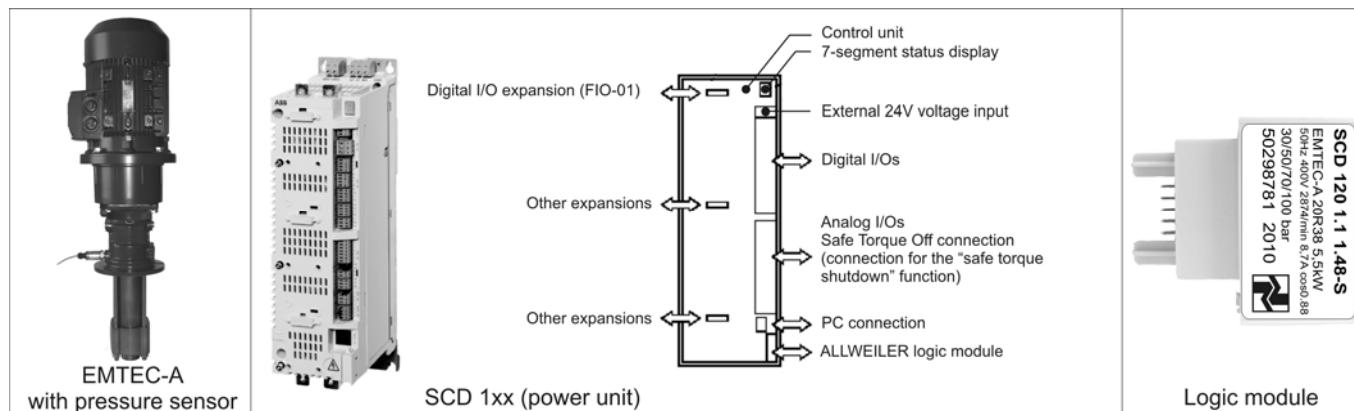


## Benefits and usage

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.

## System design

Depiction of individual system components



## Design, installation, and parameterization

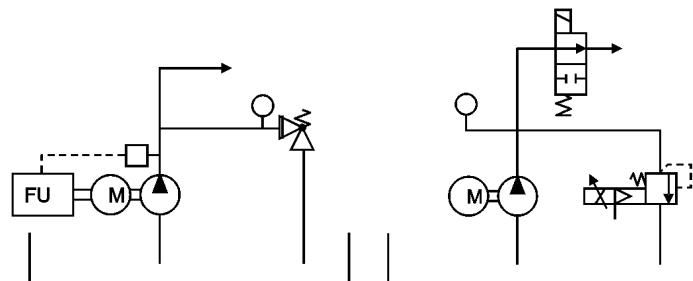
The EMTEC system with ALLSPEED Controller employs a high-output converter with integrated ALLWEILER logic module. The converter is air-cooled and designed for installation in a switch cabinet. The pluggable ALLWEILER logic module contains the software for precise and highly dynamic pump control. It can 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).

The ALLSPEED controller achieves minimal energy consumption and no pressure pulsations. In contrast, a conventional controller with a proportional valve and a pump with constant speed results in significant pressure pulsations.

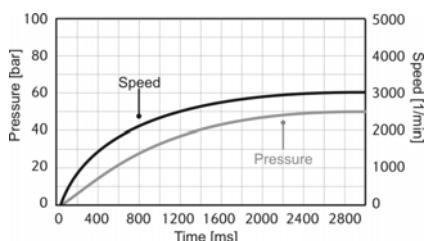


ALLSPEED controller:  
Minimal energy consumption  
No pressure pulsations

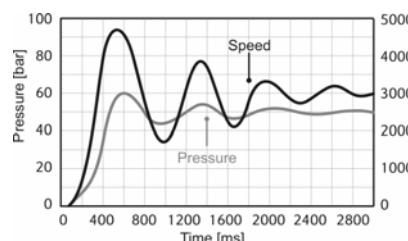
Conventional controller:  
Proportional valve  
Pump with constant speed

## Control behavior

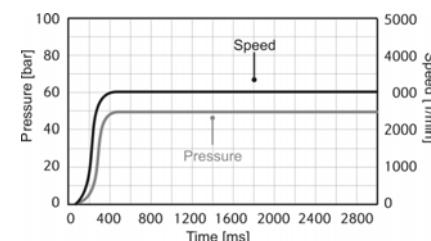
PID pressure control behavior compared to control with ALLSPEED controller



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.

**Short designation, parameters**

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

① 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 11x, 13x)
Digital inputs:	AI2	Pressure sensor connection
	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 12x)	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****AI1 Pressure set point:** (on version SCD 11x, 13x)

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 ≈ 0 bar

10 V ≈ max. discharge pressure (as specified by customer)

**FIO-01 digital I/O expansion:** (on version SCD 12x)

Four digital inputs that the customer can use for freely selectable pressure stages.

**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.

**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 ≈ 0 l/min

20 mA ≈ max. capacity (see data sheet)

**AO2 Actual pressure:** Displays current pressure.

0 – 1 V ≈ 0 bar

10 V ≈ max. discharge pressure (as specified by customer)

**RO Alarm:** Converter, pump, or motor fault.

24V rated voltage shut off during alarm. Alarm is also activated during initialize (DI5).

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

**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.

**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.

**Very small capacities can cause the ALLSPEED controller to automatically reset the pressure:**

In this way the controller protects the pump from overloads at slow speeds while simultaneously ensuring that cooling lubricant continues to be pumped.

The minimum volume limits are documented in the characteristic curves (starting on page 15) and in the selection program.

If the volume falls below the minimum amount, the controller will activate the DIO3 digital output. If needed, it can be used to trigger a bypass valve.

**Converter specifications and operational limits**

Rated output [kW]	Size	Rated input current $I_{1N}$ [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	B	7,9	CHK-03	JFI-03
5,50		10	CHK-04	
7,50		14		
11,00	C	20	CHK-05	JFI-05
15,00		27	CHK-06	
18,50		33		
22,00	D	39	CHK-07	JFI-07
30,00		55	CHK-08	
37,00		65		
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

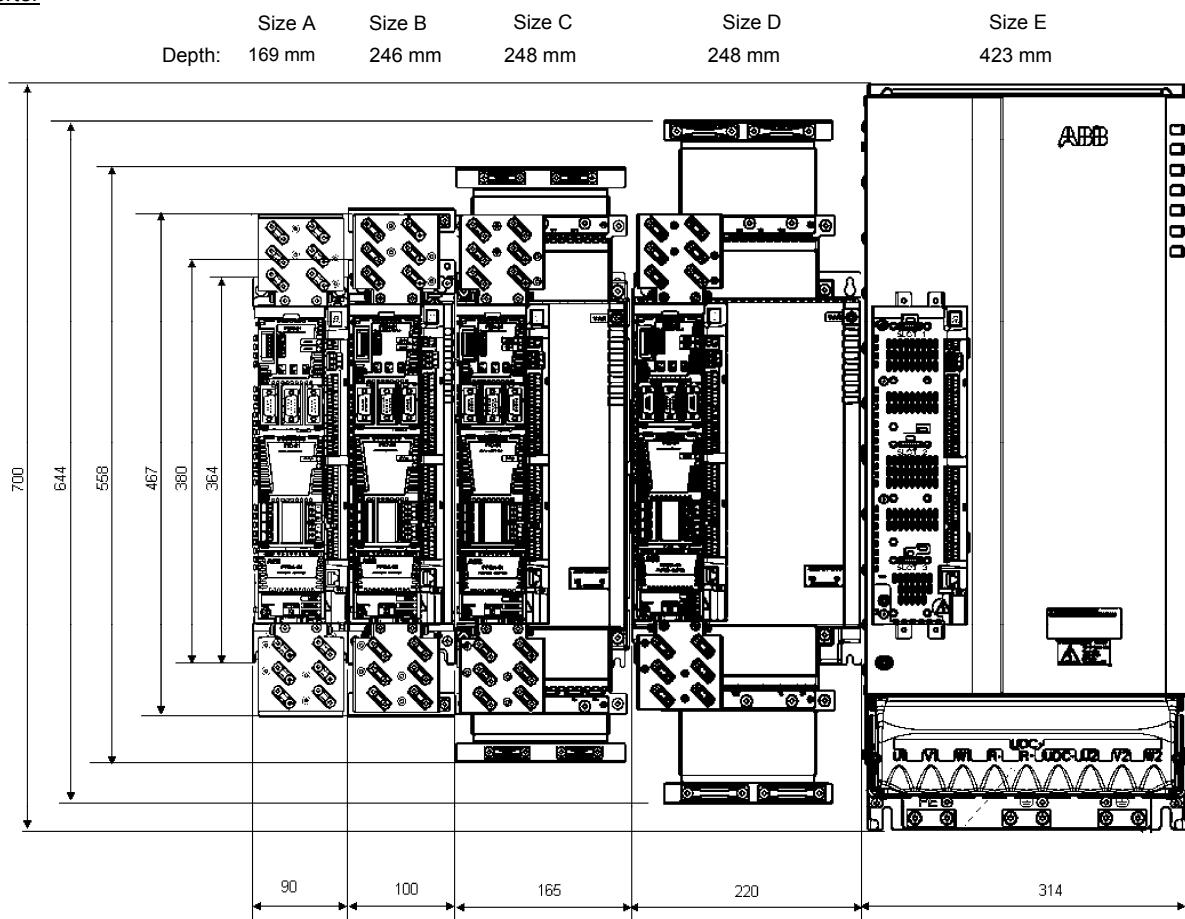
Mains connection	
Voltage range:	3-phase 380 V to 480 V +10/15%
Frequency:	50 to 60 Hz ± 5%
Distortion (THD):	In accordance with EN 61000-3-2, IEC 61000-3-12, IEC 61000-3-4 with mains choke for compliance with limit values
DC connection	
Voltage level:	485 to 648 V DC ± 10 %
Load control:	Integrated
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 water, 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

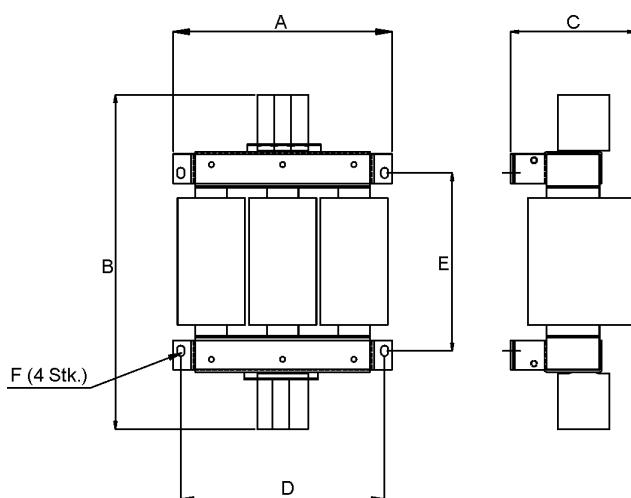
## Main dimensions – Converter, mains filter, and mains choke

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.

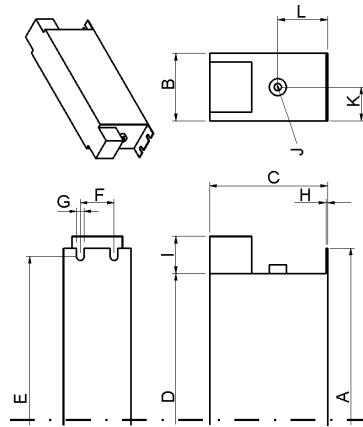
### Converter



### Mains choke



### Mains filter



### 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

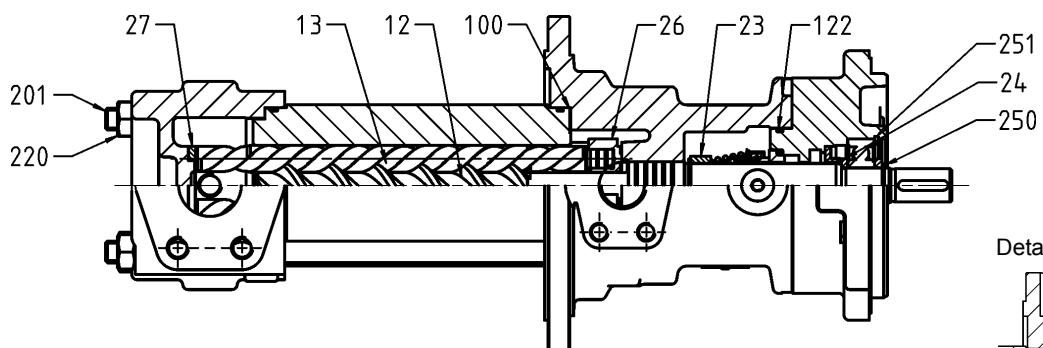
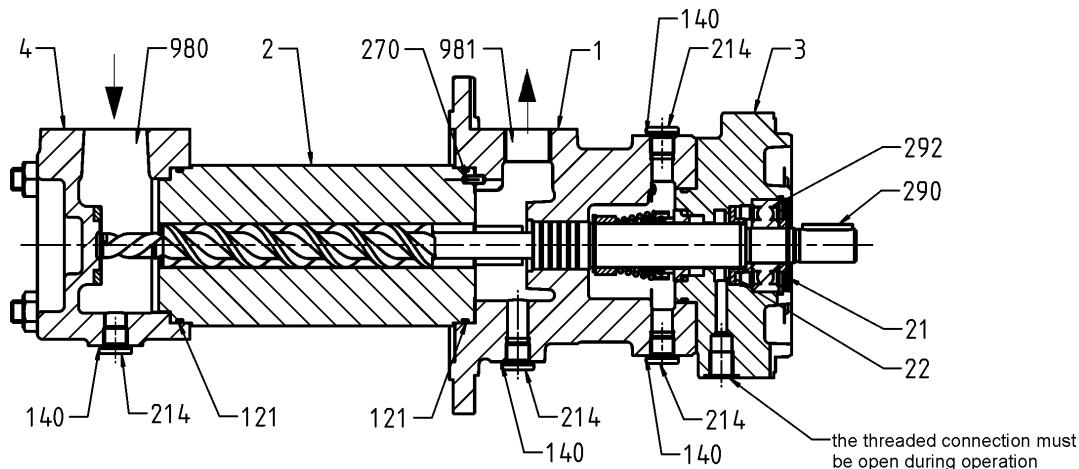
Parameter	EMC filter for each filter type			
	JFI-02	JFI-03	JFI-05	JFI-07
A	250	250	250	270
B	45	50	85	90
C	70	85	90	150
D	220	240	220	240
E	235	255	235	255
F	25	30	60	65
G	5,4	5,4	5,4	6,5
H	1	1	1	1,5
I	22	25	39	45
J	M5	M5	M6	M10
K	22,5	25	42,5	45
L	29,5	39,5	26,5	64

**Sectional drawing**

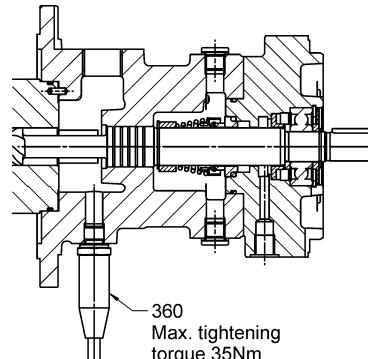
EMTEC-A

D 8.6

SAE flange on suction side

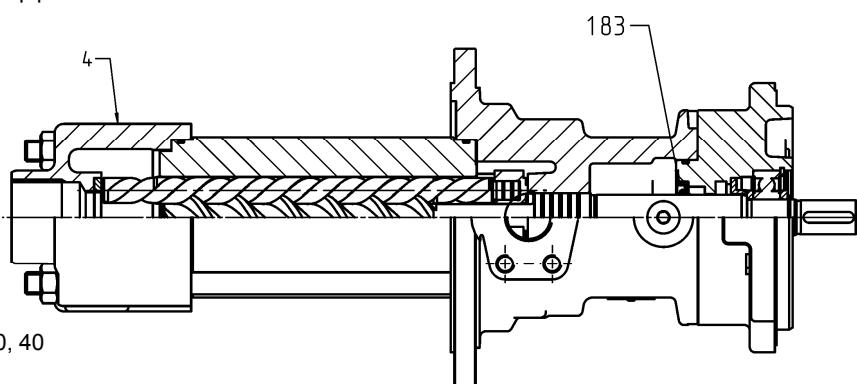


Detail view of pressure sensor



DQ

with axial pipe thread connection on suction side



Sizes 20, 40

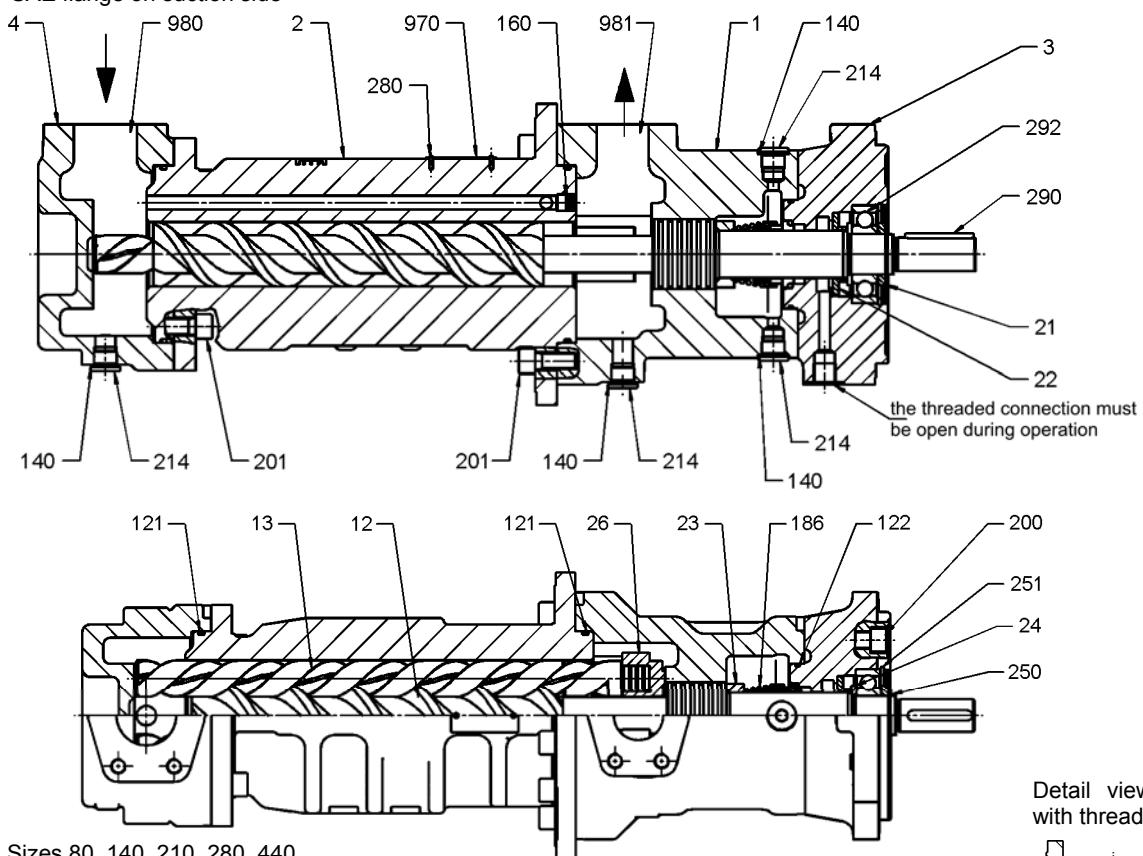
Denomination	Part No.	Denomination	Part No.	Denomination	Part No.
Discharge casing	1	Gasket	100	Circlip	252
Rotor housing	2	O-ring	121	Clamping sleeve	270
Pump cover	3	O-ring	122	Rivet	280
Suction casing	4	Seal ring	140	Key	290
Drive screw	12	Shaft seal ring	183	Groove ball bearing	292
Idler screw	13	Mechanical seal	186	Pressure sensor	360
Labyrinth ring	21	Socket head cap screw	200	Rating plate	970
Labyrinth ring	22	Stud bolt	201	Plastic cover	980
Spacer ring	23	Screw plug	214	Plastic cover	981
Spacer ring	24	Hexagon nut	220		
Balance bush	26	Circlip	250		
Stop disc	27	Circlip	251		

**Sectional drawing**

EMTEC-A

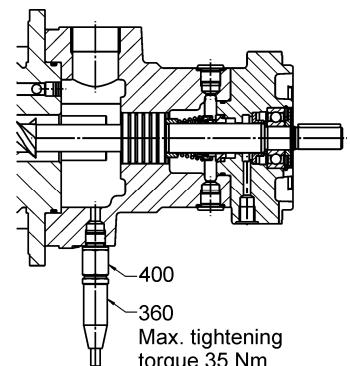
D 8.6

SAE flange on suction side



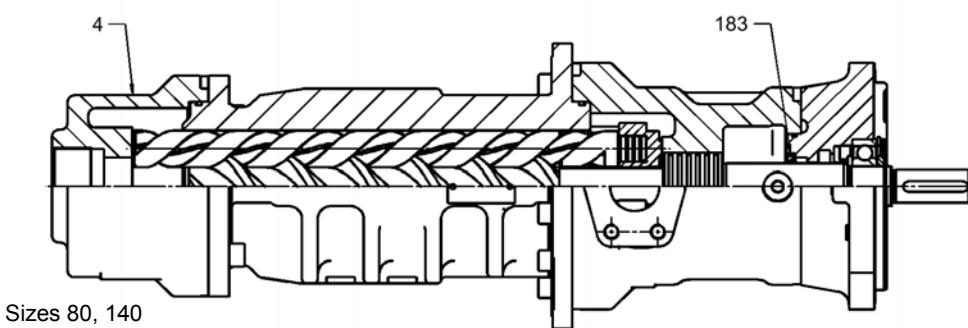
Sizes 80, 140, 210, 280, 440

Detail view of pressure sensor with threaded adapter



DQ

with axial pipe thread connection on suction side



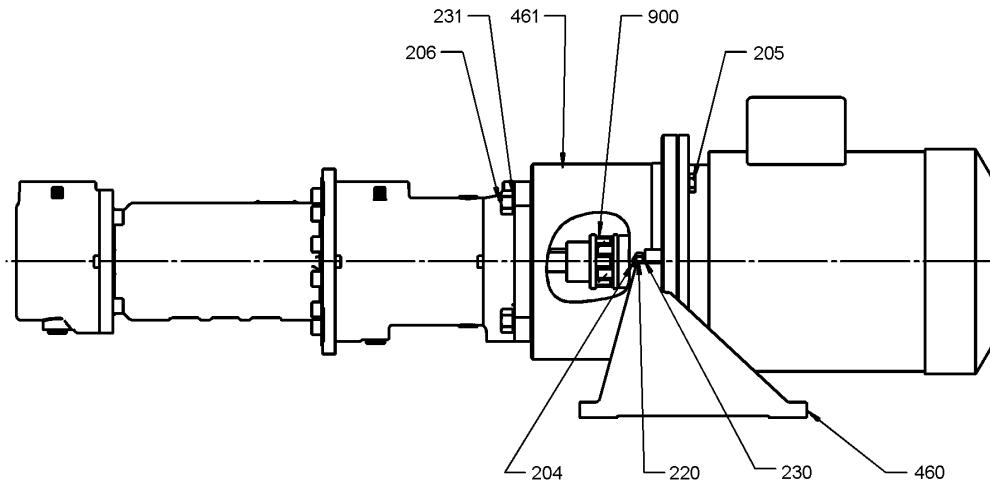
Sizes 80, 140

Denomination	Part No.	Denomination	Part No.	Denomination	Part No.
Discharge casing	1	O-ring	121	Circlip	250
Rotor housing	2	O-ring	122	Circlip	251
Pump cover	3	O-ring	129	Inside 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	Shaft seal ring	183	Pressure sensor	360
Labyrinth ring	22	Mechanical seal	186	Threaded adapter	400
Spacer ring	23	Socket head cap screw	200	Rating plate	970
Ring	24	Socket head cap screw	201	Plastic cover	980
Balance bush	26	Screw plug	214	Plastic cover	981

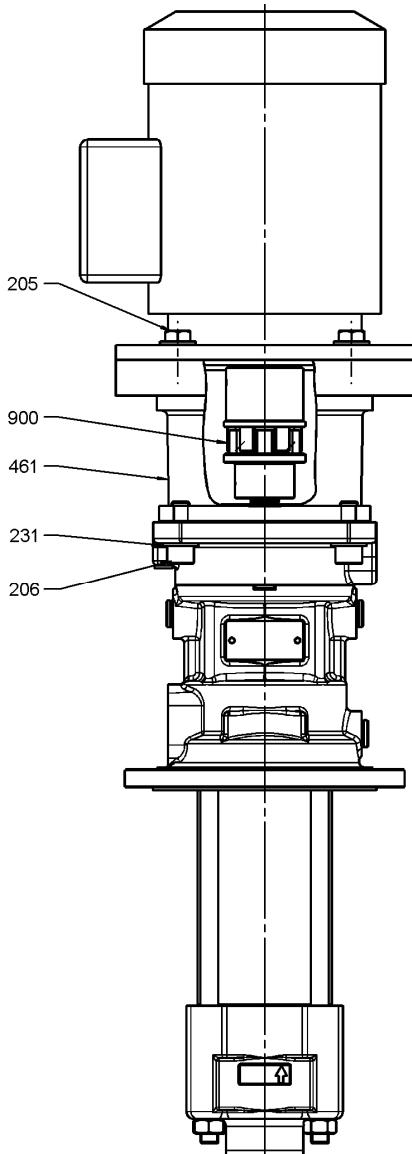
① Accessories for sizes 80 to 440 for connecting an ALLSPEED pressure sensor

**Aggregates**  
**EMTEC-A**

Aggregate design with mounting foot



Aggregate design for in-tank installation and tank top installation

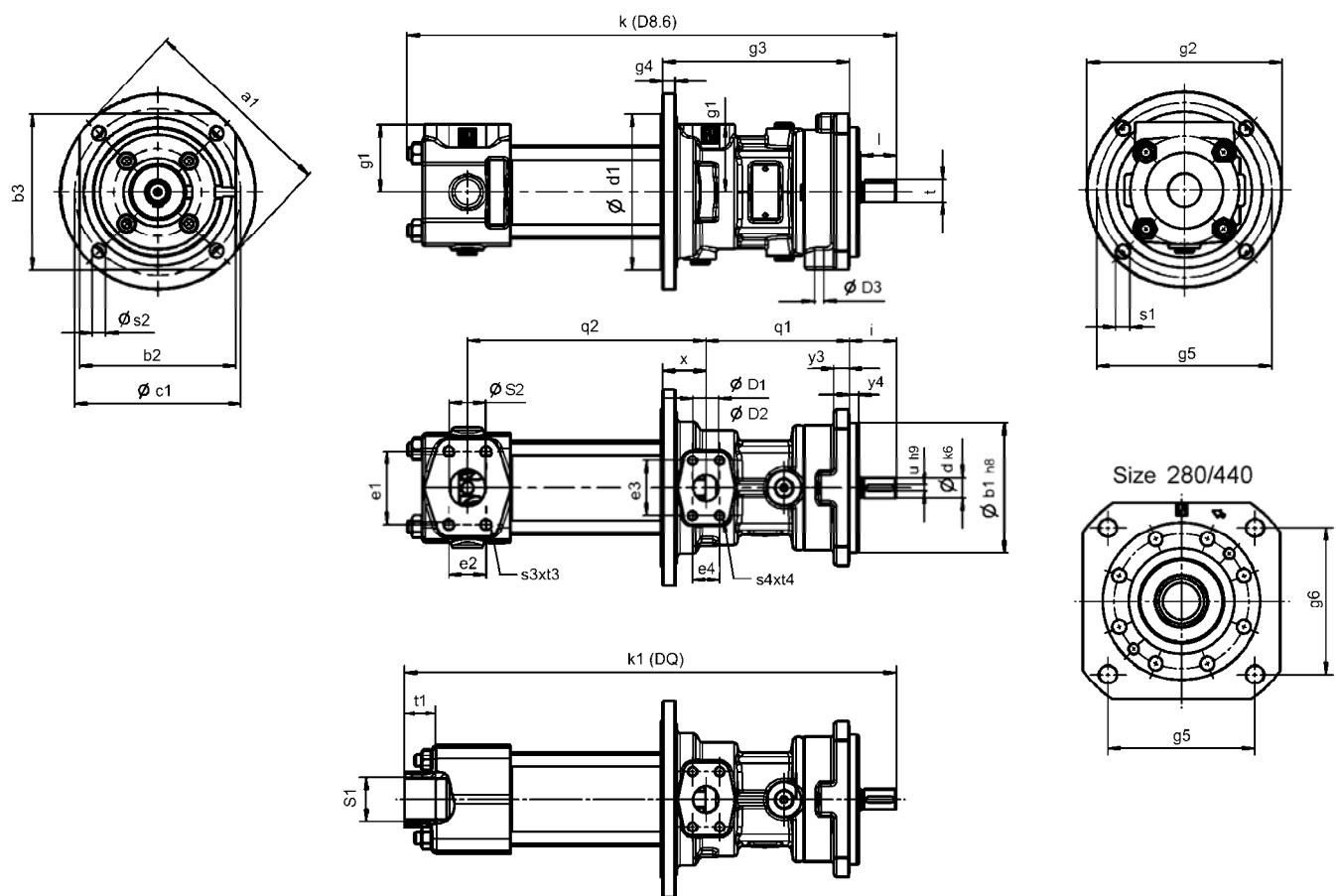


Denomination	Part No.
Socket head cap screw	204
Hexagon head bolt	205
Hexagon head bolt	206
Hexagon nut	220
Lock washer	230
Lock washer	231
Pump foot	460
Pump bracket	461
Coupling	900

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

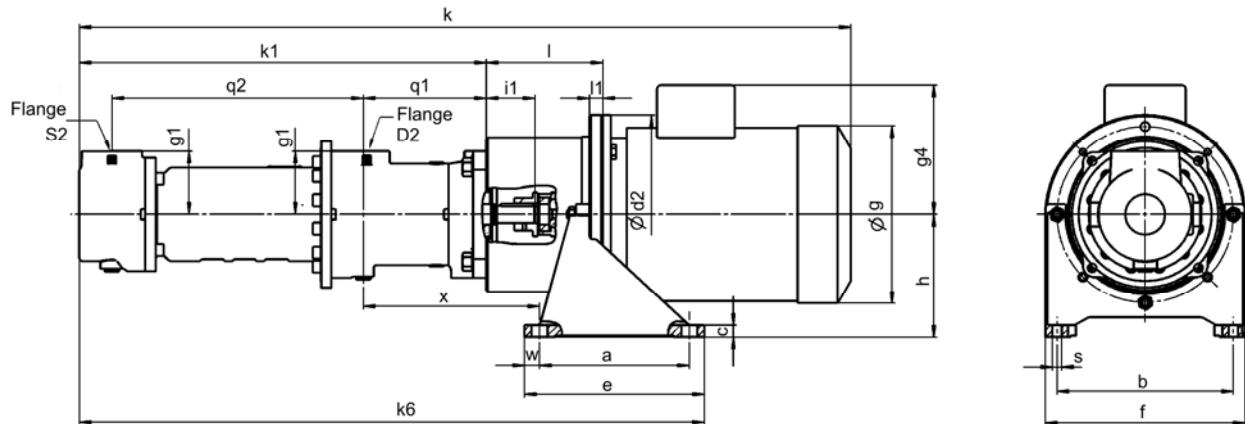


Dimensions in mm.  
Subject to alterations

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	
				S1	t1	Inch	s3xt3	e1	e2	S2	Inch	s4xt4	e3	e4	D1	D2	D3		
EMT-A 20	G1½	28	1½	M12x18	69,9	35,7	35	1	M10x18	52,4	26,2	G ¼	25	G ¼					
EMT-A 40	G1½	28	1½	M12x18	69,9	35,7	35	1	M10x18	52,4	26,2	G ¼	25	G ¼					
EMT-A 80	G2	28	2	M12x18	77,8	42,9	46	1½	M12x18	69,9	35,7	G 1¼	38	G %					
EMT-A 140	G2	28	2	M12x18	77,8	42,9	46	1½	M12x18	69,9	35,7	G 1¼	38	G %					
EMT-A 210	-	-	2½	M12x18	88,9	50,8	58	2	M12x18	77,8	42,9	-	46	G %					
EMT-A 280	-	-	3	M16x24	106,4	61,9	70	2½	M12x18	88,9	50,8	-	58	G %					
EMT-A 440	-	-	4	M16x24	130,2	77,8	98	3	M16x24	106,4	61,9	-	70	G %					

### **Aggregate dimensions** – Aggregate design with mounting foot



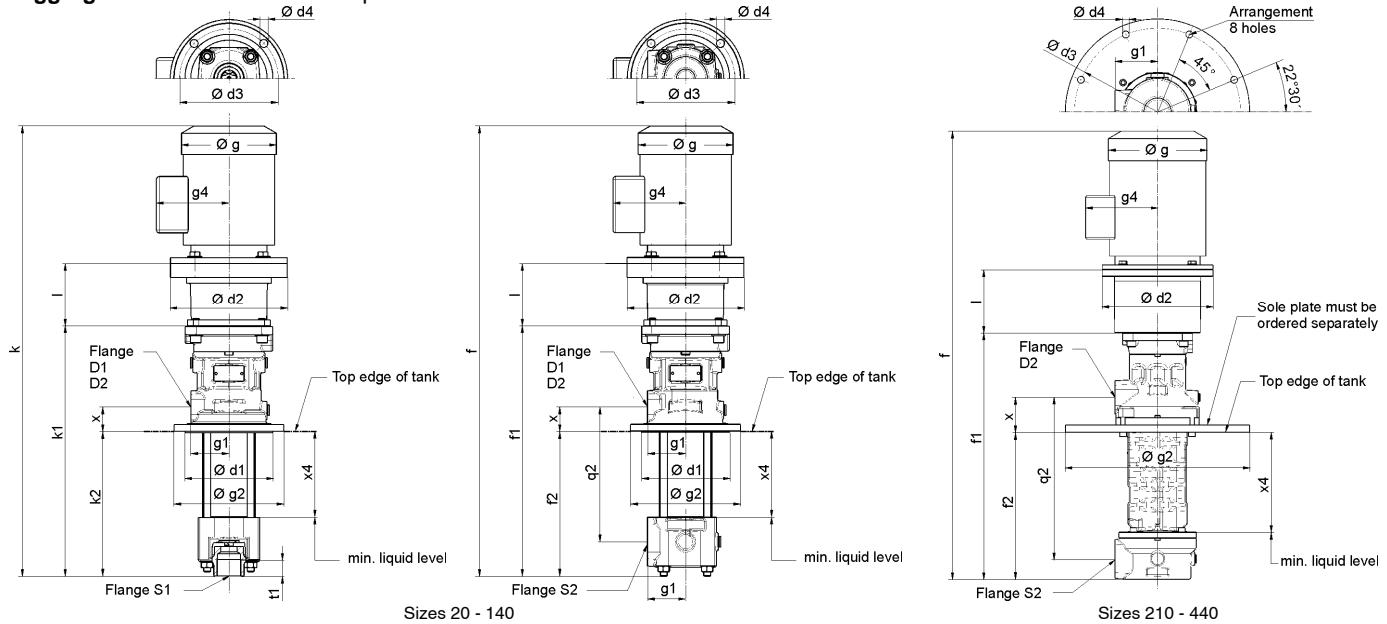
Dimensions in mm.

Dimensions in mm.  
Subject to alterations

Pump size	Size acc. to IEC	Motor power at n = 3000 min <sup>-1</sup>		Flanges SAE SAE		a	b	c	d2	e	f	g	g1	①	①	①	g4	h	i1	k	K1	K6	I	I1	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	65	124	112	768	521	108	24	426	138	230	11	15	158				
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181	65	130	112	823	521	115	31										
	100 L	3	3			185	215	15	250	230	250	203	65	158	155	858	674	120	19										
	112 M	4	4			185	215	15	250	230	250	228	65	171	155	870	674	120	19										
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267	65	195	185	943	722	144	20										
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320	65	233	235	1092	783	188	26										
EMT-A 40	80	0,75 / 1,1	0,55 / 0,75	1½"	1"	60	180	12	200	90	210	162	65	124	112	820	573	108	24	478	150	273	11	15	170				
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181	65	130	112	875	572	115	31										
	100 L	3	3			185	215	15	250	230	250	203	65	158	155	910	726	120	19										
	112 M	4	4			185	215	15	250	230	250	228	65	171	155	922	726	120	19										
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267	65	195	185	995	774	144	20										
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320	65	233	235	1144	835	188	26										
EMT-A 80	80	0,75 / 1,1	0,55 / 0,75	2"	1½"	60	180	12	200	90	210	162	95	124	112	820	573	108	24	538	159	330	11	15	208				
	90 S/L	1,5 / 2,2	1,1 / 1,5			60	180	12	200	90	210	181	95	130	112	875	572	115	31										
	100 L	3	3			185	215	15	250	230	250	203	95	158	155	910	726	120	19										
	112 M	4	4			185	215	15	250	230	250	228	95	171	155	995	774	144	20										
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267	95	195	185	1000	795	128	19										
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320	95	233	235	1204	895	188	26										
EMT-A 140	112 M	4	4	2"	1½"	185	215	15	250	230	250	228	95	171	155	1000	795	128	19	612	159	330	11	15	231				
	132 S/M	5,5 / 7,5	5,5 / 7,5			225	265	18	300	270	300	267	95	195	185	1061	841	150	20										
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320	95	233	235	1204	895	188	26										
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358	95	259	235	1344	911	204	26										
	200 L	37	30			300	350	20	400	350	400	415	95	350	260	1407	941	204	26										
	225 M-2	45	-			335	400	20	450	385	450	470	95	355	295	1541	1070	234	26										
EMT-A 210	132 S/M	5,5 / 7,5	5,5 / 7,5	2½"	2"	225	265	18	300	270	300	267	95	195	185	1153	932	168	20	612	185	378	11	15	258				
	160 M/L	11/15 / 18,5	11 / 15			265	300	18	350	305	350	320	95	233	235	1294	985	204	26										
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358	95	259	235	1418	985	204	26										
	200 L	37	30			300	350	20	400	350	400	415	95	350	260	1505	1015	204	26										
	225 M-2	45	-			335	400	20	450	385	450	470	95	355	295	1541	1070	234	26										
	225 S/M-4	-	37 / 45			335	400	20	450	385	450	470	95	355	295	1541	1070	234	26										
	250 M-2	55	-			415	500	25	550	465	550	520	95	355	295	1594	1123	234	26										
	250 M-4	-	55	3"	2½"	415	500	25	550	465	550	520	115	335	295	1594	1123	234	26	665	174	436	11	15	272				
	250 M-4	-	55			415	500	25	550	465	550	520	115	335	295	1594	1123	234	26										
	260 S/M-2	75 / 90	-			415	500	25	550	465	550	520	115	335	295	1594	1123	234	26										
	260 S/M-4	-	75 / 90			415	500	25	550	465	550	520	115	335	295	1594	1123	234	26										
	280 S/M-2	75 / 90	-			415	500	25	550	465	550	520	115	335	295	1594	1123	234	26										
	280 S/M-4	-	75 / 90			415	500	25	550	465	550	520	115	335	295	1594	1123	234	26										
EMT-A 280	160 M/L	11/15 / 18,5	11 / 15	3"	2½"	265	300	18	350	305	350	320	120	233	235	1471	1141	222	47	771	220	485	11	15	305				
	180 M/L	22	18,5 / 22			265	300	18	350	305	350	358	120	259	235	1605	1198	228	26										
	200 L	37	30			300	350	20	400	350	400	415	120	350	260	1664	1198	228	26										
	225 M-2	45	-			335	400	20	450	385	450	470	120	335	295	1700	1229	234	26										
	225 S/M-4	-	37 / 45			335	400	20	450	385	450	470	120	335	295	1728	1257	262	26										
	250 M-2	55	-			415	500	25	550	465	550	520	120	430	350	1826	1311	265	26										
	250 M-4	-	55	4"	3"	415	500	25	550	465	550	520	120	430	350	1826	1311	265	26	88	214	550	11	15	320				
	280 S/M-2	75 / 90	-			415	500	25	550	465	550	520	120	430	350	1826	1311	265	26										
	280 S/M-4	-	75 / 90			415	500	25	550	465	550	520	120	430	350	1826	1311	265	26										
	315 S/M/L-2	110 / 132	160 / 200			495	600	30	660	555	660	645	135	515	380	2156	1356	2											

① Approximate dimensions, can vary according to motor make.

## Aggregate dimensions – Tank top installation

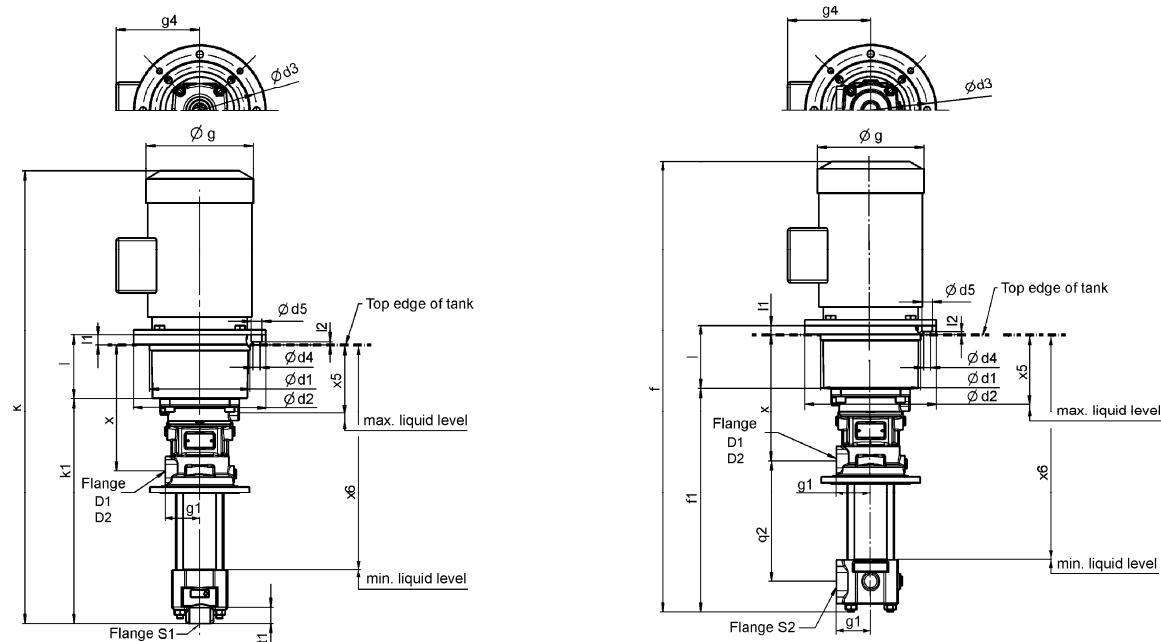


Pump size	Size acc. to IEC	Motor power at n = 3000 min <sup>-1</sup> / 1500 min <sup>-1</sup>		Flanges												I	g	g1	g2	g4	t1	d1	d2	d3	d4	x4
		kW	kW	S1	SAE S2	SAE D1	SAE D2	① k	k1	k2	① f	f1	f2	x	q2											
EMT-A 20	80	0.75 / 1,1	0.55 /	G1½"	1½"	G¾"	1"	768			768					108	162			124		200				
	90 S/L	1,5 / 2,2	1,1 / 1,5					823			823					115	181			130		200				
	100 L	3	3					858			858					120	203			158		250				
	112 M	4	4					894			870					120	228			171		250				
	132 S/M	5,5 / 7,5	5,5 / 7,5					943			943					144	267			195		300				
	160 M/L	11/15 / 18,5	11 / 15					1092			1092					188	320			233		350				
EMT-A 40	80	0.75 / 1,1	0.55 /	G1½"	1½"	G¾"	1"	818			820					108	162			124		200				
	90 S/L	1,5 / 2,2	1,1 / 1,5					873			875					115	181			130		200				
	100 L	3	3					908			910					120	203			158		250				
	112 M	4	4					920			922					120	228			171		250				
	132 S/M	5,5 / 7,5	5,5 / 7,5					993			995					144	267			195		300				
	160 M/L	11/15 / 18,5	11 / 15					1142			1144					188	320			233		350				
EMT-A 80	112 M	4	4	G2	2"	G1¼"	1½"	1070			1060					128	228			171		250				
	132 S/M	5,5 / 7,5	5,5 / 7,5					1119			1109					150	267			195		300				
	160 M/L	11/15 / 18,5	11 / 15					1214			1204					188	320			233		350				
	180 M/L	22	18,5 / 22					1354			1344					204	358			259		350				
	200 L	37	30					1417			1407					204	415			350		400				
	225 S/M-4	-	37 / 45					1172			1153					168	267			195		300				
EMT-A 140	132 S/M	5,5 / 7,5	5,5 / 7,5	G2	2"	G1¼"	1½"	1314			1294					204	320			233		350				
	160 M/L	11/15 / 18,5	11 / 15					1438			1418					204	358			259		350				
	180 M/L	22	18,5 / 22					1501			1481					204	415			350		400				
	200 L	37	30					1561			1541					234	470			335		450				
	225 M-2	45	-					1561			1541					234	470			335		450				
	225 S/M-4	-	37 / 45					1267			1272					168	267			195		300				
EMT-A 210	132 S/M	5,5 / 7,5	5,5 / 7,5	-	2½"	-	2"	1372			1496					204	358			259		350				
	160 M/L	11/15 / 18,5	11 / 15					1496			1534					204	415			350		400				
	180 M/L	22	18,5 / 22					1534			1594					234	470			335		450				
	200 L	37	30					1594			1703					234	470			335		450				
	225 M-2	45	-					1720			1778					248	520			430		550				
	225 S/M-4	-	37 / 45					1795			1795					265	520			430		550				
EMT-A 280	250 M-2	55	-	-	3"	-	2½"	1265			1371					166	415			233		350				
	250 M-4	-	55					1467			1806					1741	415			233		350				
	280 S/M-2	75 / 90	-					1806			1904					1778	415			233		350				
	280 S/M-4	-	75 / 90					1904			1979					1806	415			233		350				
	315 S/M/L-2	110 / 132	-					1979			2156					1904	415			233		350				
	315 S/M/L-4	-	110 / 132					2156			2191					1904	415			233		350				
EMT-A 440	160 M/L	11/15 / 18,5	11 / 15	-	4"	-	3"	1478			1678					222	320			233		350				
	180 M/L	22	18,5 / 22					1602			1664					232	358			259		350				
	200 L	37	30					1700			1728					228	415			350		400				
	225 M-2	45	-					1728			1826					234	470			335		450				
	225 S/M-4	-	37 / 45					1826			1904					262	470			335		450				
	250 M-2	55	-					1904			1979					265	520			430		550				
EMT-A 440	250 M-4	-	55	-	3"	-	2½"	1979			2269					265	575			430		550				
	280 S/M-2	75 / 90	-					1979			2269					265	575			490		550				
	280 S/M-4	-	75 / 90					2269			2269					265	575			490		550				
	315 S/M/L-2	110 / 132	-					2269			2269					310	645			515		660				
	315 S/M/L-4	-	110 / 132					2269			2269					310	645			515		660				
	315 S/M/L-4	-	160 / 200					2269			2269					310	645			515		660				

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	k	t1	①	f	f1	x	q2	I	I1	I2	g	①	g1	g4	d1	d2	d3	d4	d5	x5	x6
		3000 min⁻¹ kW	1500 min⁻¹ kW	S1	SAE S2	D1	SAE D2																						
EMT-A 20	100 L	3	3	G1½"	1½"	G¾"	1"	858	426	28	858	426	230	239	120	19	6,4	203	65	158	190	250	215	13,5	24	131	427		
	112 M	4	4					894			239			120	19	6,4	228				171	190	250	215	13,5	24	131	427	
	132 S / M	5,5 / 7,5	5,5 / 7,5					943			144	26	7,4	267							195	234	300	265	13,5	24	154	450	
	160 M / L	11/15 / 18,5	11 / 15					1092			300			188	26	9,4	320				233	260	350	300	17,5	30	192	488	
EMT-A 40	100 L	3	3	G1½"	1½"	G¾"	1"	908	476	28	910	478	273	251	120	19	6,4	203	65	158	190	250	215	13,5	24	131	482		
	112 M	4	4					920			922			251						171	190	250	215	13,5	24	131	482		
	132 S / M	5,5 / 7,5	5,5 / 7,5					993			995			274						195	234	300	265	13,5	24	154	506		
	160 M / L	11/15 / 18,5	11 / 15					1142			312			188	26	9,4	320				233	260	350	300	17,5	30	192	543	
EMT-A 80	100 L	3	3	G2"	2"	G1¼"	1½"	1095	538	28	1085	538	330	321	120	19	6,4	228	95	171	260	350	300	17,5	30	192	601		
	112 M	4	4					1134			1214	548	321	321						195	260	350	300	17,5	30	192	601		
	132 S / M	5,5 / 7,5	5,5 / 7,5					1214			1204			321						233	260	350	300	17,5	30	192	601		
	160 M / L	11/15 / 18,5	11 / 15					1354			1344			337						259	260	350	300	17,5	30	208	617		
EMT-A 140	200 L	37	30	G2"	2"	G1¼"	1½"	1417	632	28	1407	612	378	337	120	19	6,4	267	95	195	260	350	300	17,5	30	208	617		
	132 S/M	5,5 / 7,5	5,5 / 7,5					1428			1418			378						233	260	350	300	17,5	30	216	691		
	160 M/L	11/15 / 18,5	11 / 15					1501			1501			378						259	260	350	300	17,5	30	216	691		
	180 M/L	22	18,5 / 22					1561			1561			378						350	300	400	350	17,5	30	216	691		
EMT-A 210	200 L	37	30	-	2½"	-	2"	1218	665	28	1198	665	436	347	120	19	6,4	267	115	195	260	350	300	17,5	30	200	675		
	132 S/M	5,5 / 7,5	5,5 / 7,5					1314			1294			436						233	260	350	300	17,5	30	216	691		
	160 M/L	11/15 / 18,5	11 / 15					1438			1418			436						259	260	350	300	17,5	30	216	691		
	180 M/L	22	18,5 / 22					1501			1501			436						350	300	400	350	17,5	30	216	691		
EMT-A 280	225 M-2	45	-	-	3"	-	2½"	1267	771	28	1267	771	485	352	120	19	6,4	267	115	195	300	400	350	17,5	30	245,5	732		
	225 S/M-4	-	37 / 45					1594			1594			436						335	350	450	400	17,5	30	245,5	732		
	250 M-2	55	-					1594			1594			436						335	350	450	400	17,5	30	246	721		
	250 M-4	-	55					1703			1703			436						430	450	550	500	17,5	30	245,5	722		
EMT-A 440	280 S/M-2	75 / 90	-	-	4"	-	2½"	1496	849	28	1496	849	550	352	120	19	6,4	267	135	195	300	400	350	17,5	30	244,5	841		
	280 S/M-4	-	75 / 90					1728			1728			459						335	350	450	400	17,5	30	245,5	841		
	315 S/M/L-2	110 / 132	-					1826			1826			459						335	350	450	400	17,5	30	245,5	841		
	315 S/M/L-4	-	110 / 132					2156			2156			459						43									

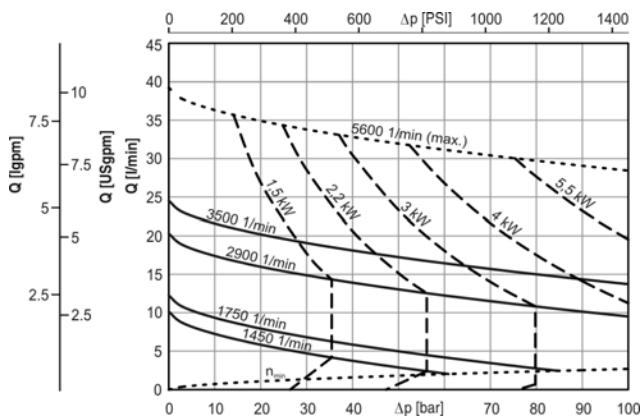
# Series EMTEC® with ALLSPEED Controller



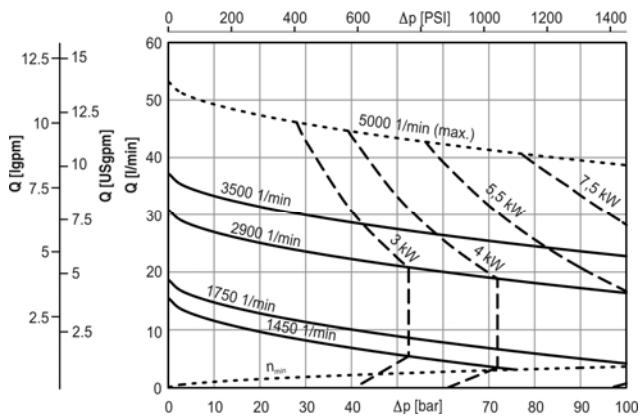
Performance graphs (see note on page 19 above)

Performance data at 1 mm<sup>2</sup>/s = emulsion

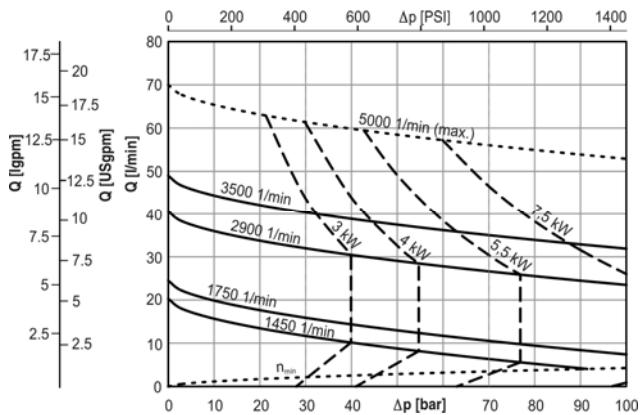
## EMT 20-28



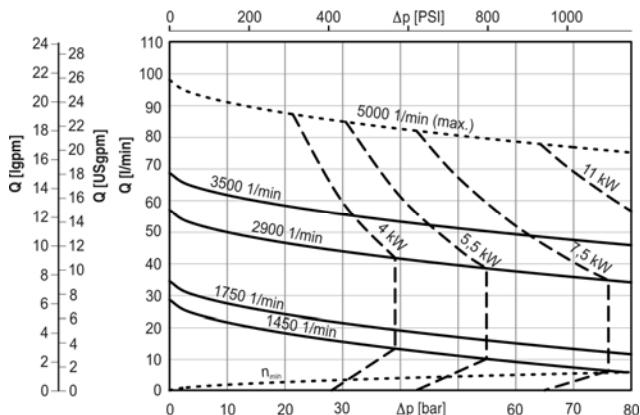
## EMT 20-38



## EMT 20-46

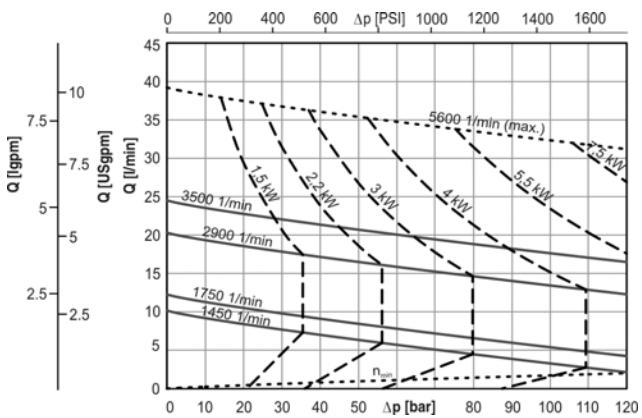


## EMT 20-56

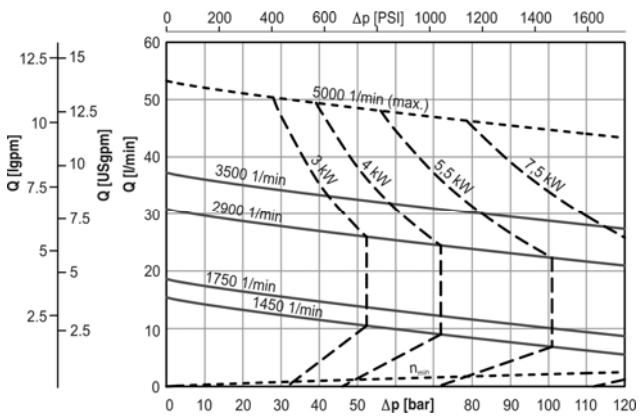


Performance data at 20 mm<sup>2</sup>/s = cutting oil with EP-additive

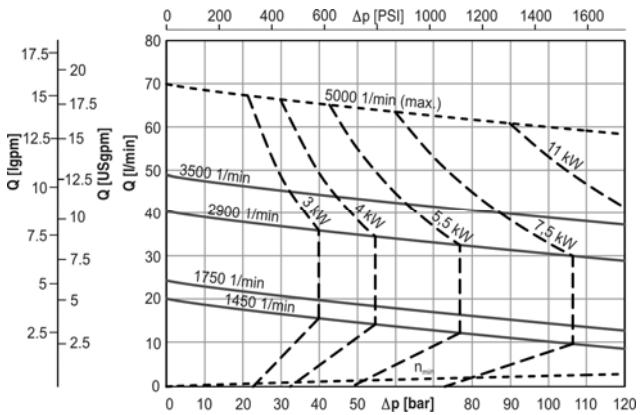
## EMT 20-28



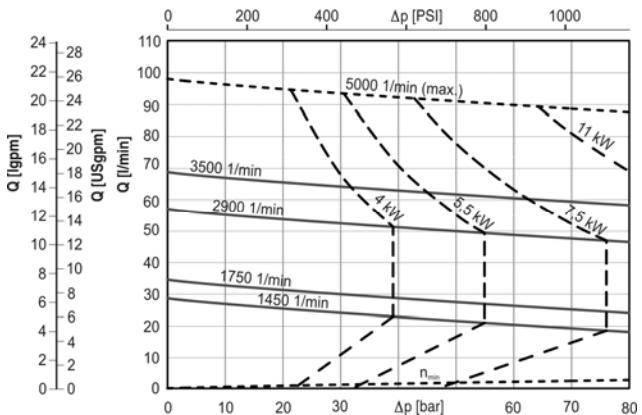
## EMT 20-38



## EMT 20-46



## EMT 20-56



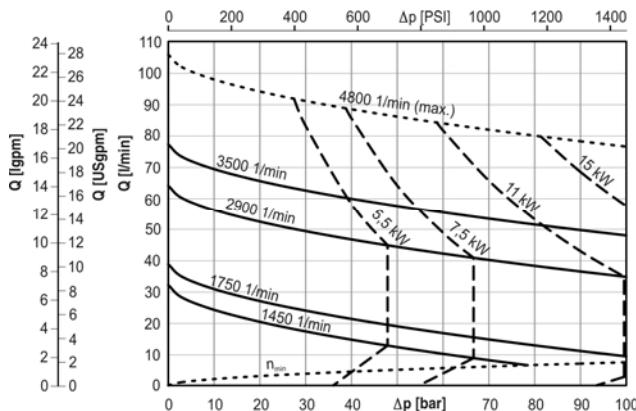
# Series EMTEC® with ALLSPEED Controller



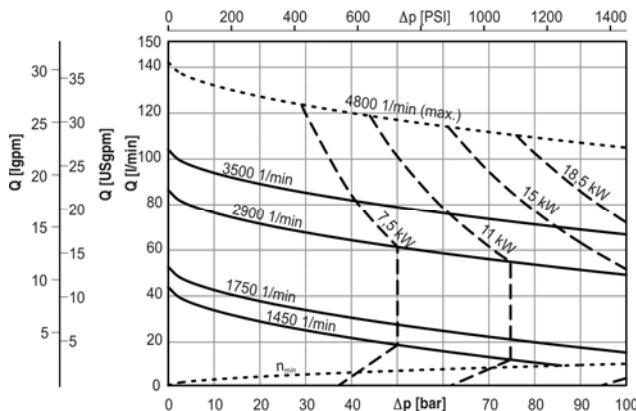
## Performance graphs (see note on page 19 above)

Performance data at 1 mm<sup>2</sup>/s = emulsion

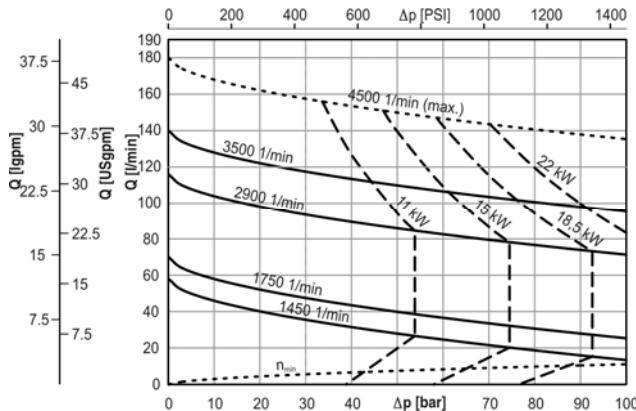
### EMT 40-38



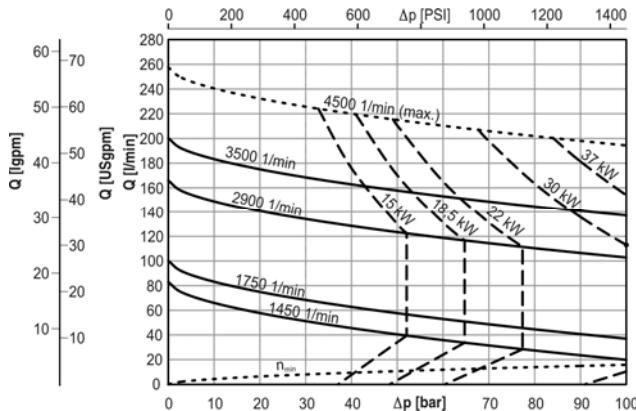
### EMT 40-46



### EMT 80-36

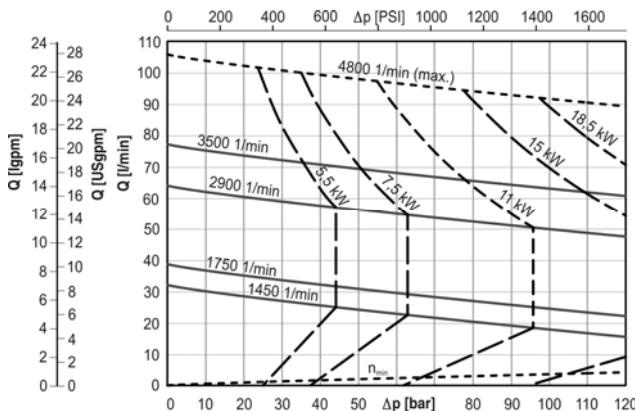


### EMT 80-46

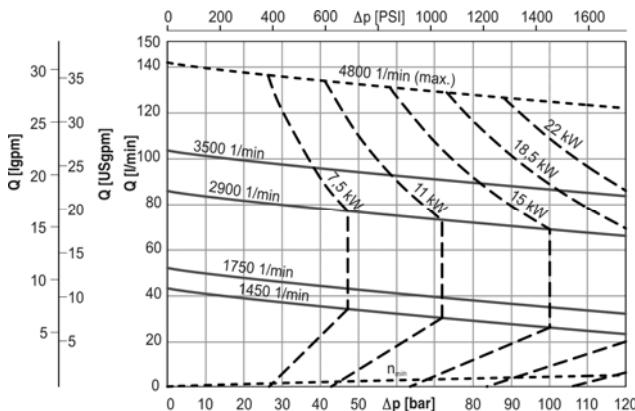


Performance data at 20 mm<sup>2</sup>/s = cutting oil with EP-additive

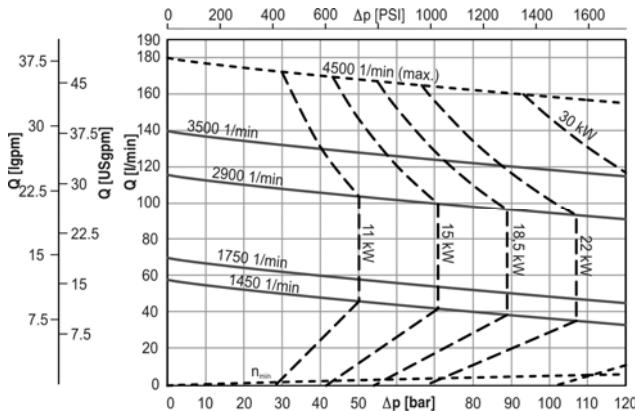
### EMT 40-38



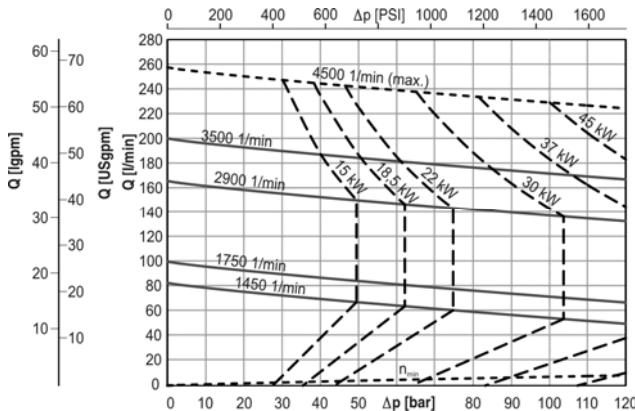
### EMT 40-46



### EMT 80-36



### EMT 80-46



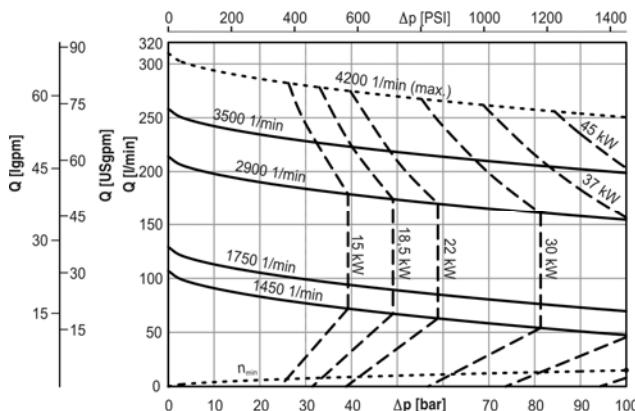
# Series EMTEC® with ALLSPEED Controller

**ALLWEILER** 

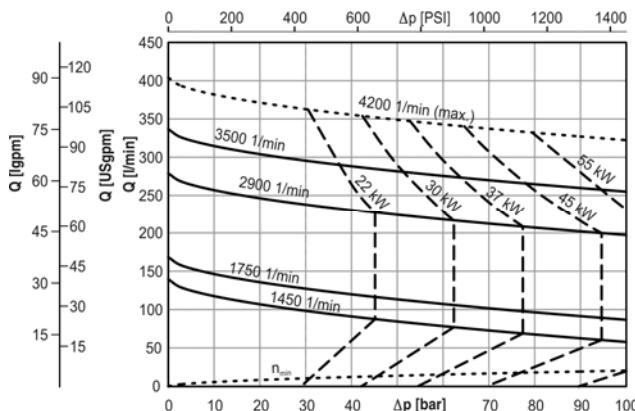
## Performance graphs (see note on page 19 above)

Performance data at 1 mm<sup>2</sup>/s = emulsion

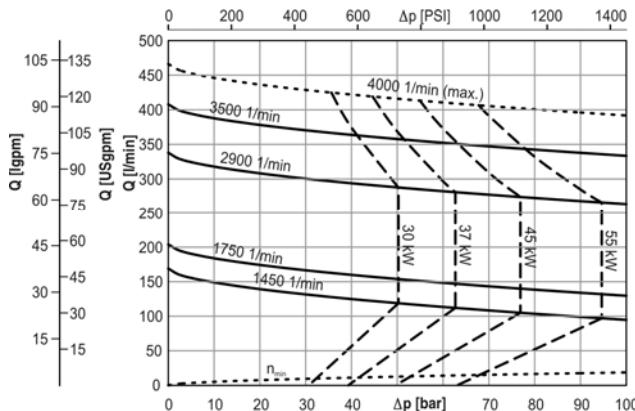
### EMT 140-39



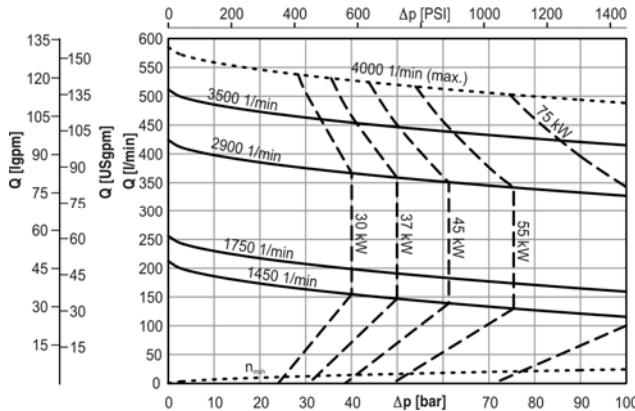
### EMT 140-46



### EMT 210-40

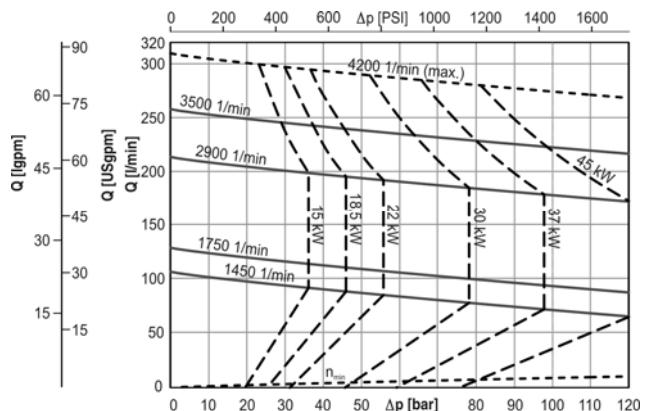


### EMT 210-46

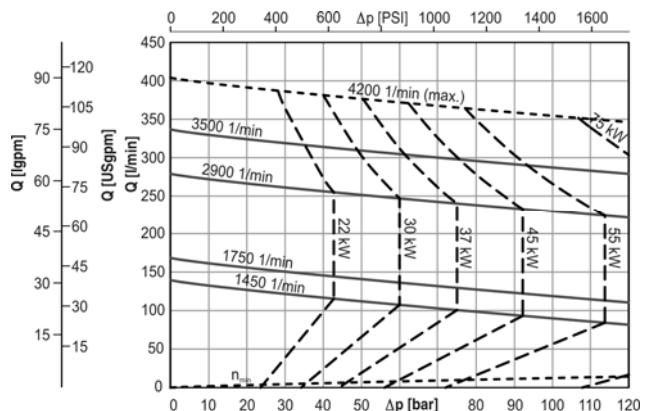


Performance data at 20 mm<sup>2</sup>/s = cutting oil with EP-additive

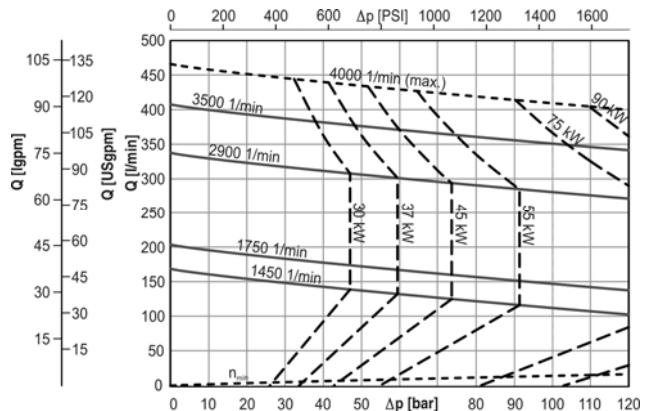
### EMT 140-39



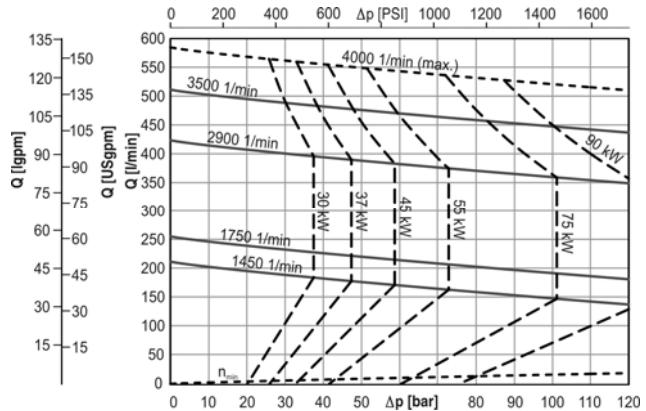
### EMT 140-46



### EMT 210-40



### EMT 210-46



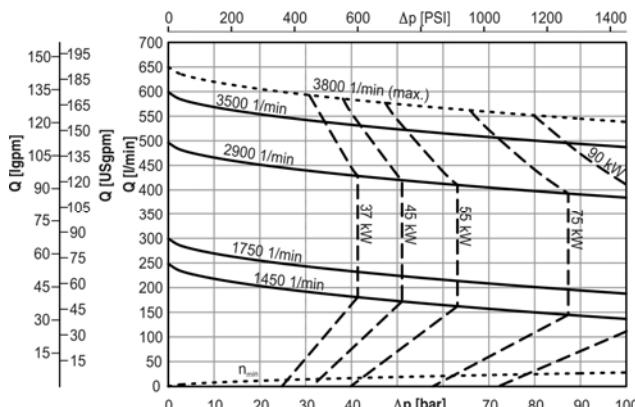
# Series EMTEC® with ALLSPEED Controller



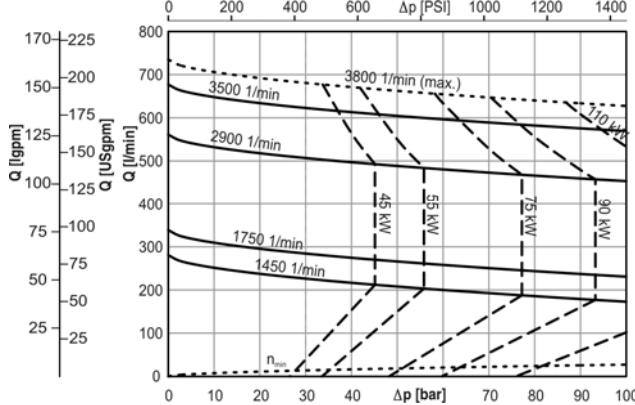
## Performance graphs (see note on page 19 above)

Performance data at 1 mm<sup>2</sup>/s = emulsion

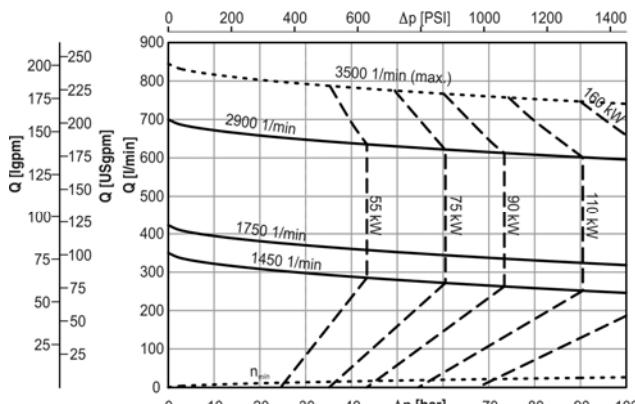
### EMT 280-43



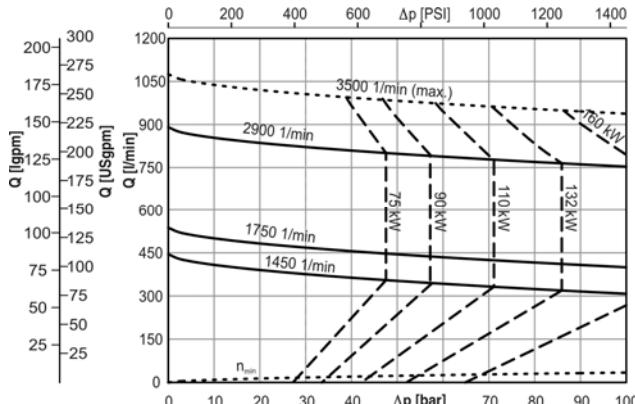
### EMT 280-46



### EMT 440-40

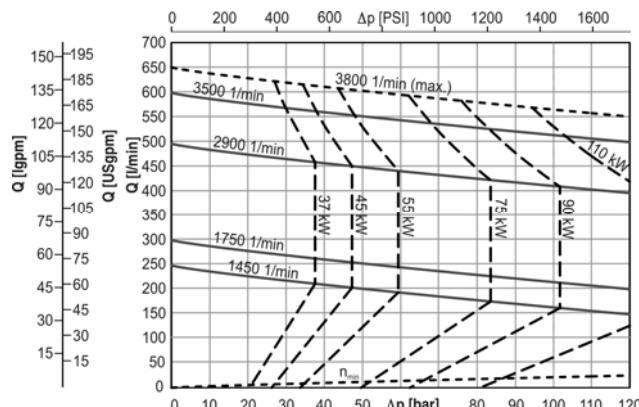


### EMT 440-46

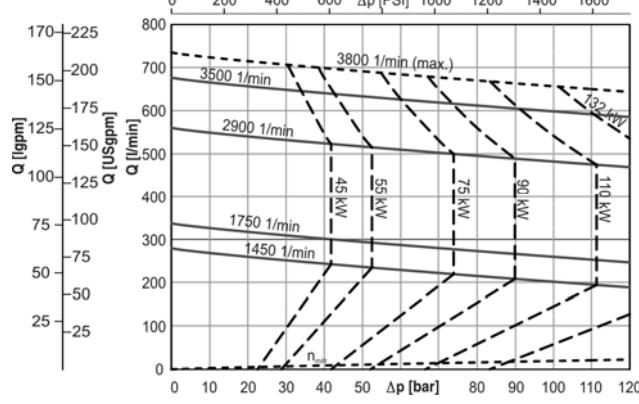


Performance data at 20 mm<sup>2</sup>/s = cutting oil with EP-additive

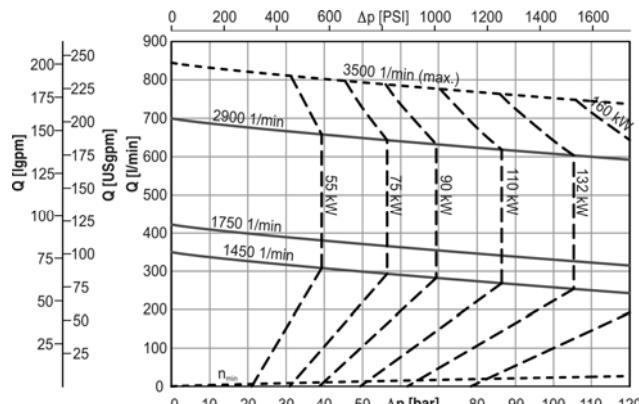
### EMT 280-43



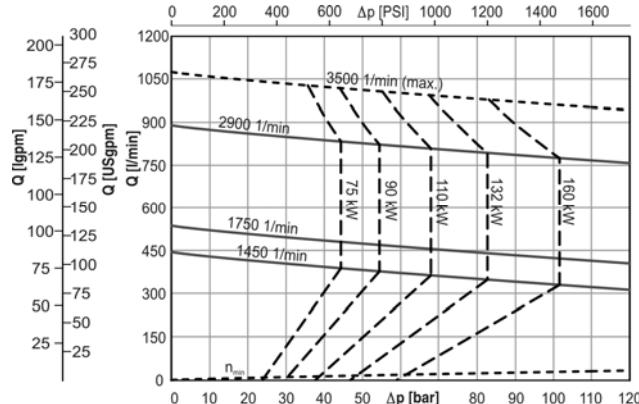
### EMT 280-46

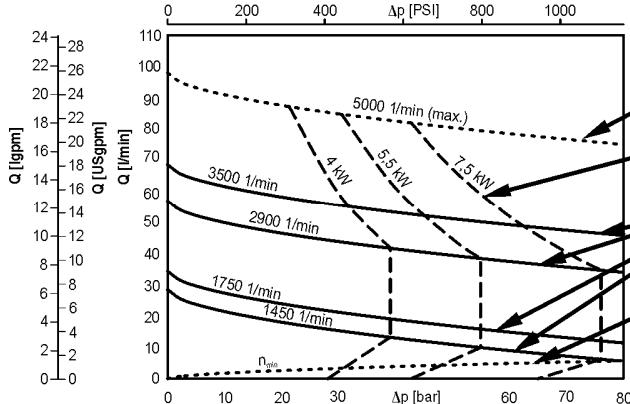


### EMT 440-40



### 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	
<b>20-28</b>	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	
<b>20-38</b>	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	
<b>20-46</b>	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	
<b>20-56</b>	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	-	-	-	-	-
<b>40-38</b>	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	
<b>40-46</b>	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	
<b>80-36</b>	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	
<b>80-46</b>	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	
<b>140-39</b>	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	
<b>140-46</b>	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	
<b>210-40</b>	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	
<b>210-46</b>	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	
<b>280-43</b>	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	
<b>280-46</b>	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	
<b>440-40</b>	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	
<b>440-46</b>	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

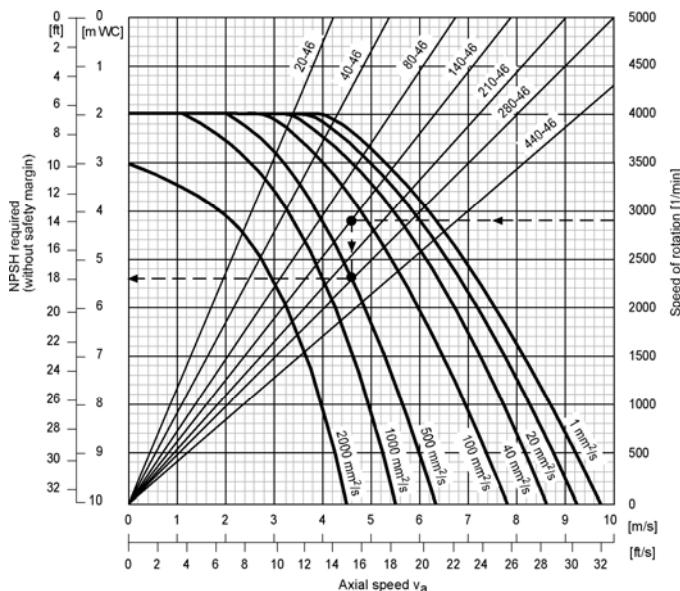
## NPSH graphs of series EMTEC®

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.

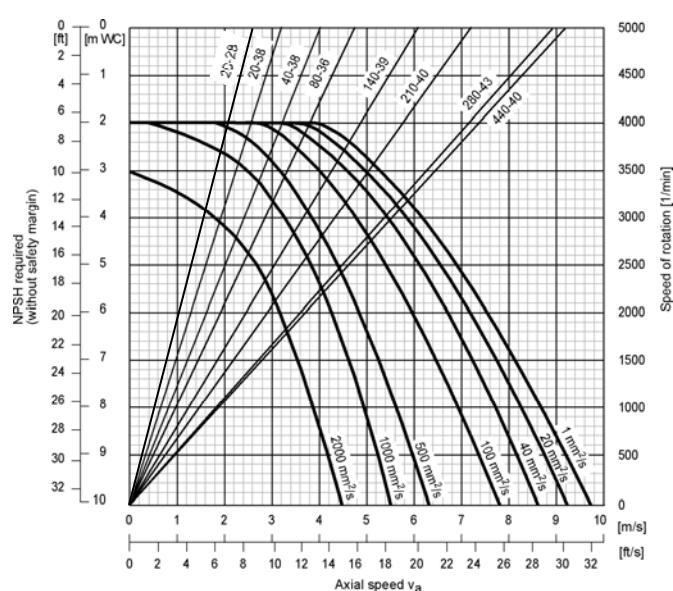
Maximum allowable air content:

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

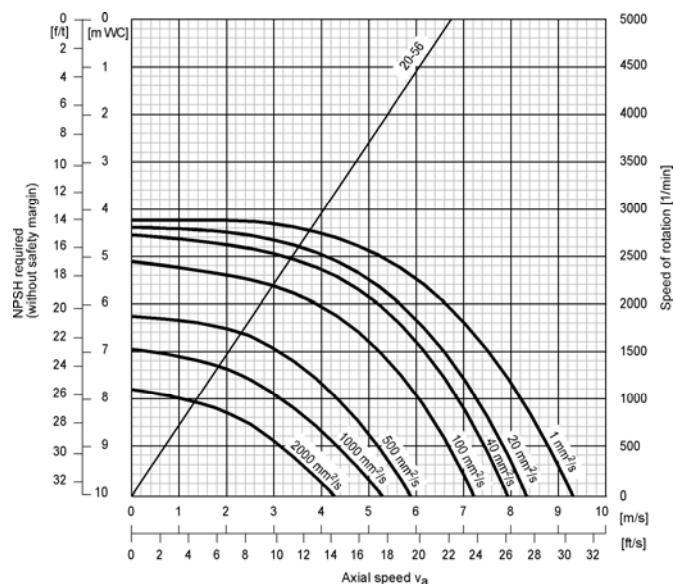
Screw pitch angle 46°



Screw pitch angle <46°



Screw pitch angle 56°



### Example:

#### Given:

Size 140-46  
Speed  $n = 2900$  1/min  
Viscosity  $\nu = 500$  mm<sup>2</sup>/s

#### Wanted:

NPSH required

#### Solution:

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

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Subject to technical alterations.



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