Volute Pumps
for heat carrier oils up to bis 350 °C

ZTI 40-160 . . . 100-160

FLOWSERVE
SIHI® Pumps

TECHNICAL DATA

Output:	max. 200 m³/h
Delivery head:	max. 60 m
Speed:	max. 3600 rpm
Temperature:	max. 350 °C
Casing pressure:	PN 16
Shaft sealing:	mechanical seal, radial shaft seal ring
Flange connections:	DIN 2501 PN 16
Sence of rotation:	clockwise, when seen from drive on the pump

APPLICATION

Volute pumps of the series ZTI in inline design have been developed as space saving and easy-to-install pumping units, especially for the circulation of mineral and synthetic heat carriers in

primary
secondary and
tertiary

circuits.

In compact design they are also applicable successfully in heat transfer plants as main circulation pumps; for reasons of their constructional features they offer the plant manufacturer absolutely new possibilities for his plant conception.

DESIGN

Single-stage pump units in compact design with nominal performances as per DIN 24255 / EN 733. Suction and discharge orifices are arranged in line with each other for direct installation in the pipe work.

Electric motor and pump do not have a common shaft; standard motors as per list are applied.

The back pull out construction permits the dismounting of the complete pull-out unit without removing the pump casing out of the pipe work. The separate pump shaft and motor shaft connected by a plug-in coupling make possible to dismount resp. replace the motor without touching the pump.

The DIN 4754 specifications are complied with.

At present, the programme comprises 9 pump sizes.

CONSTRUCTION

Casing pressure:

Max. 16 bar from 0 °C to 120 °C
Max. 13 bar from 120 °C to 300 °C
Max. 10 bar from 300 °C to 350 °C
Intermediate values can be interpolated
Please note:
Technical rules and safety regulations.
Casing pressure = inlet pressure + zero delivery head
Permissible inlet pressure (system pressure) 5 bar.
Permissible inlet pressure = permissible casing pressure at shaft sealing CDC

Position of branches:

Suction and discharge orifice arranged radially in line.

Flanges:

The flanges correspond to DIN 2533/PN 16. Flange design drilled as per ANSI 150 is possible

Hydraulic:

Code of this construction: A·

Bearing:

A groove ball bearing acc. to DIN 625, grease lubricated for service life, a liquid surrounded step bearing in the pump. Code of this construction: ·A

Sense of rotation:

Clockwise when seen from drive on the pump.

Shaft sealing:

Code 002:	several radial shaft seal rings arranged in series, uncooled temperature range: 0 °C to 350 °C
Code CDC:	unbalanced mechanical seal temperature range: 0 °C to 350 °C

Material design:

Item	COMPONENT PARTS	MATERIAL DESIGN 1B
10.10	volute casing	GGG 40.3
16.10	casing cover	
21.00	shaft	X 20 Cr 13
23.00	impeller	GG 25
34.00	bearing bracket	
42.13	shaft seal radial shaft seal ring 002	viton
43.30	mechanical seal CDC	chrome cast
44.10, 44.11	casing shaft seal	CK 45
54.51	bush	carbon

Casing seal:

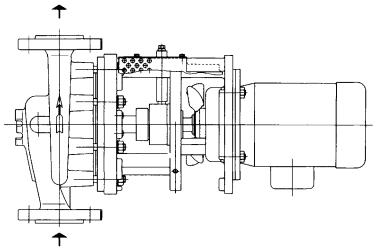
The casing is sealed by a flat type seal of special paper. Code of this construction: 2

Drive / Speed:

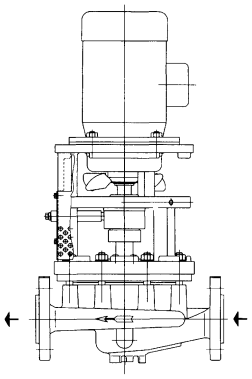
By commercial electric motors, type IM B 5 resp. IM V 1.
The max. admissible speed n = 3600 rpm, out of pump size 100-160 (max. speed n = 3000 rpm).

Mounting position:

ZTI pumps can be mounted either horizontally or vertically into pipe systems with sufficient carrying capacity, with this the drive power has to be taken into consideration:



Horizontal installation up to 7,5 kW



Vertical installation up to 7,5 kW possible, from 11 kW necessary. For this particular purpose a taphole is provided in the pump casing (see dimensions table).

Please note:
The installation of the motor below the pump is, for reasons of operating safety, not allowed.
The installation of compensators is **not** necessary. **Saving of costs!**

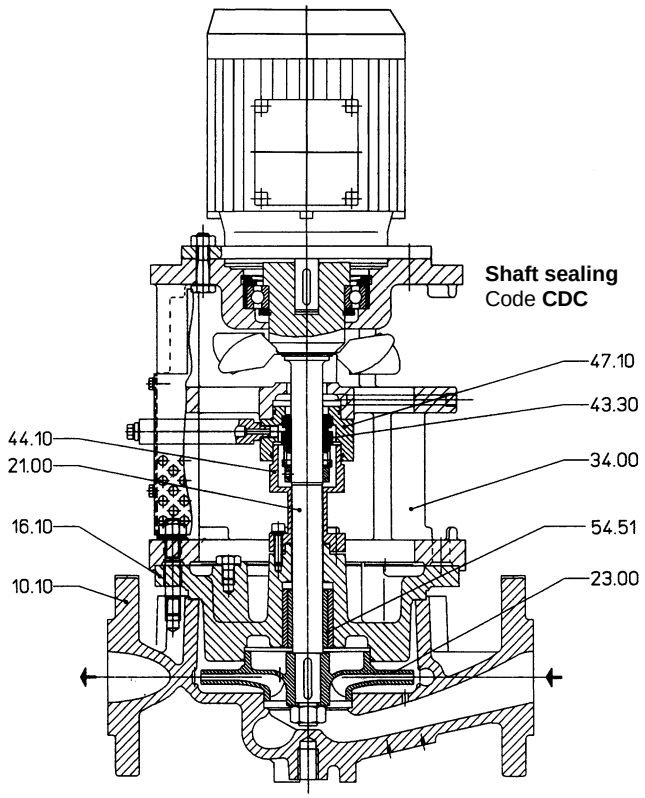
General comments:

For the equipment of heat carrier plants, a complete programme is available for a flow range between 1 - 1000 m³/h including the following additional series:

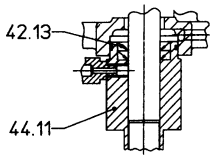
Series **ZTN** standard heat carrier pump; dimensions and nominal performances acc. to DIN 24255/EN 733, additionally pump sizes exceeding the standard
Series **ZTK** close coupled construction, magnetic coupling up to 400 °C
Series **AEH** self-priming special side channel pump, inline design

Technical documentation regarding these programmes will readily be supplied on request.

Sectional drawing and Nomenclature

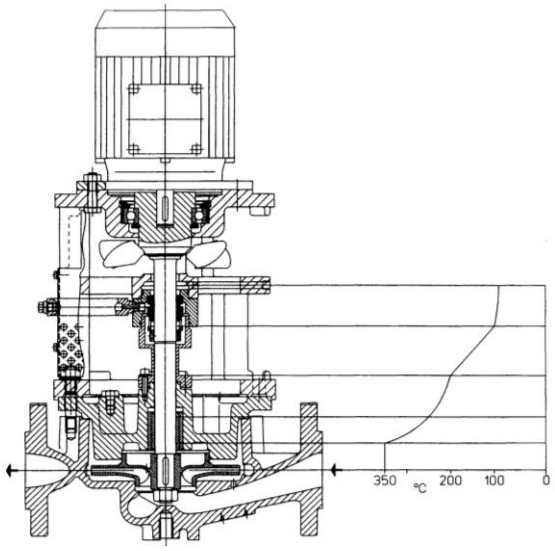


Shaft sealing
Code **002**

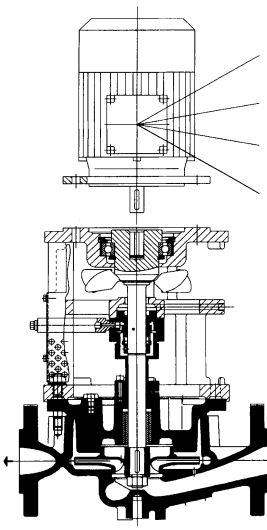


10.10	Volute casing
16.10	casing cover
21.00	shaft
23.00	impeller
34.00	bearing bracket
42.13	radial shaft seal ring
43.30	mechanical seal
44.10,44.11	casing shaft seal
54.51	bush

Heat blocking / shaft sealing / bearings



Heat transfer plants have reached a high state of technical development. Therefore pumps handling heat carriers are facing, with regard to safety of operation, environmental neutrality, maintenance facility, and operating costs, much severer requirements now than in former times. The type ZTI based on many years of experience and on the most up-to-date know-how, fully complies with these requirements.
By the heat blocking, behind the cover, with integrate throttling clearance a favourable temperature lowering towards the drive end is reached (see above figure). Heat losses of the product handled are effectively prevented (energy saving). The temperature lowering makes possible the safe use of a single, uncooled type of shaft sealing. As the lubricating qualities of heat carrier oils are not very good for antifriction bearings, at impeller side a liquid surrounded step bearing is installed. The external antifriction bearing in the bearing bracket is not in contact with the heat carrier and causes no problems. Noiseless operation and long durability are attained.



Motor combination

+ type IM B 5
  or IM V 1
+ protection IP type up to
  e II (Ex)

+ speed 50 and 60 cycles

= motor at your choice

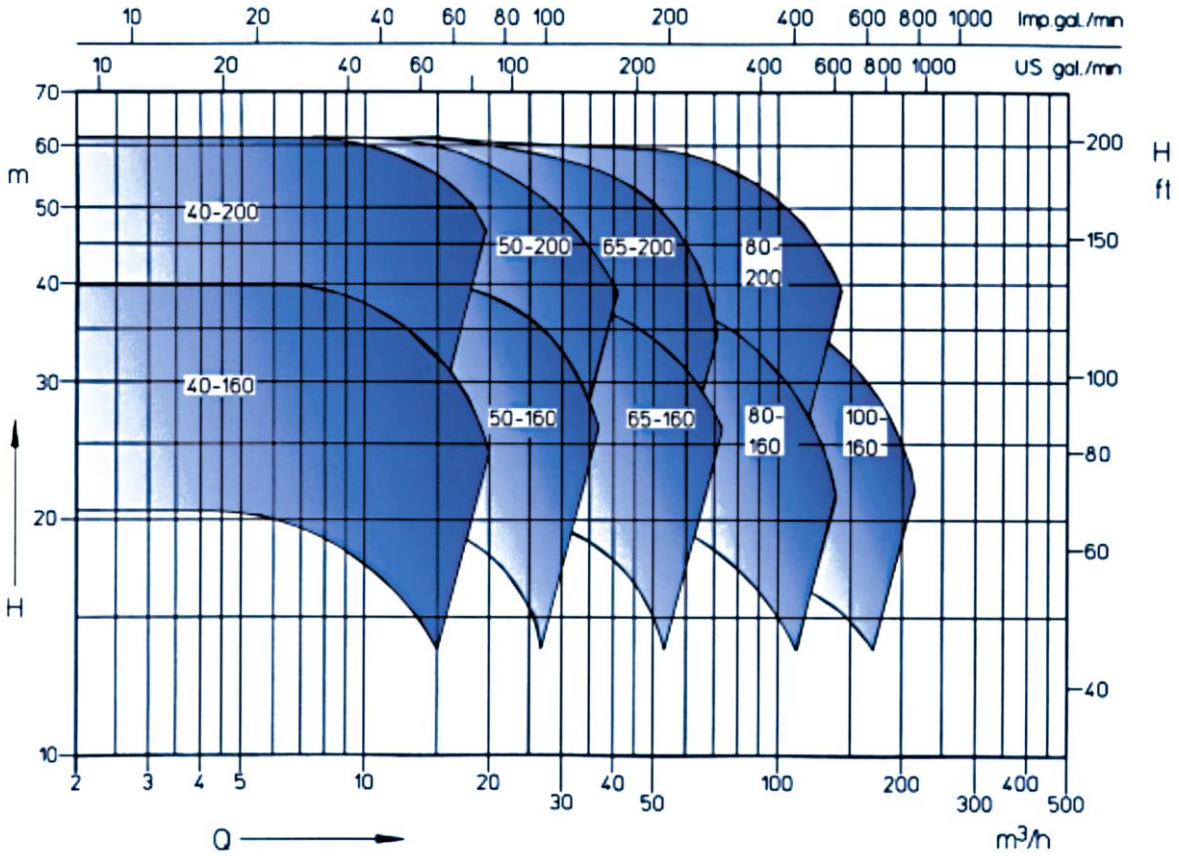
+ shaft sealing
  pumping unit

= readiness for operation

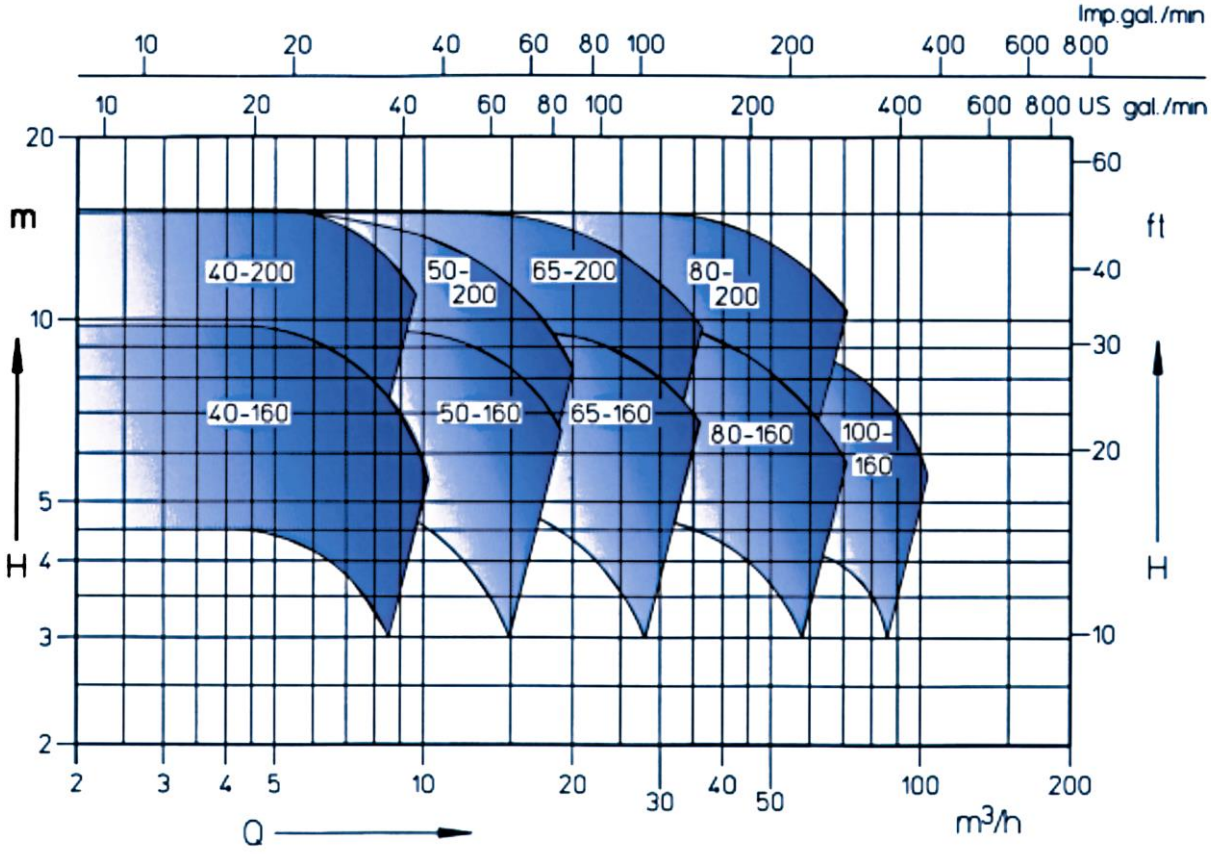
*shaft end	as per DIN 748 T 3
key	as per DIN 6885 T 1
flanges	as per DIN 42677

In case of necessity the motor can be changed in the unit without draining the pipe work. The pump unit remains as **„shaft tight armature“** in the pipe work and so the readiness for operation in increased.

Performance graph **n = 2900 rpm**

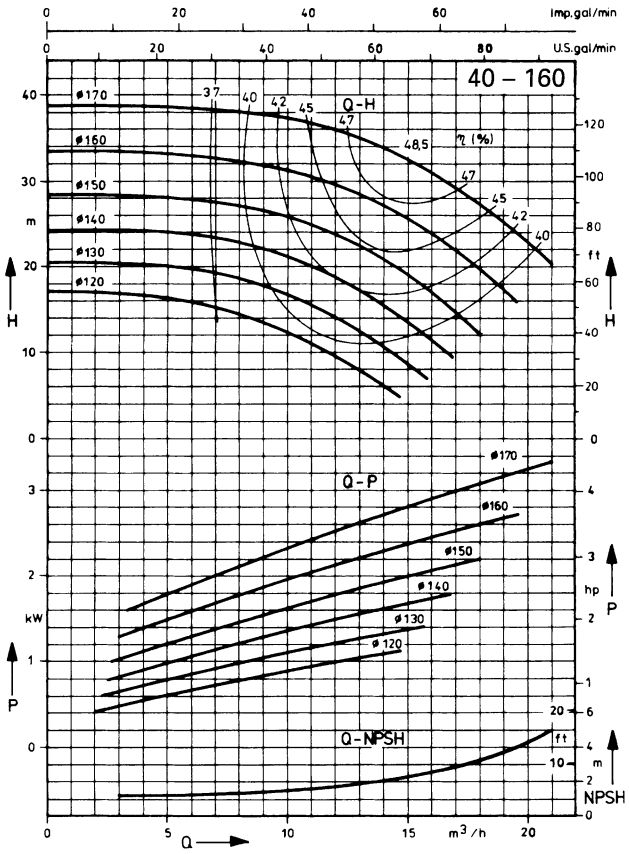


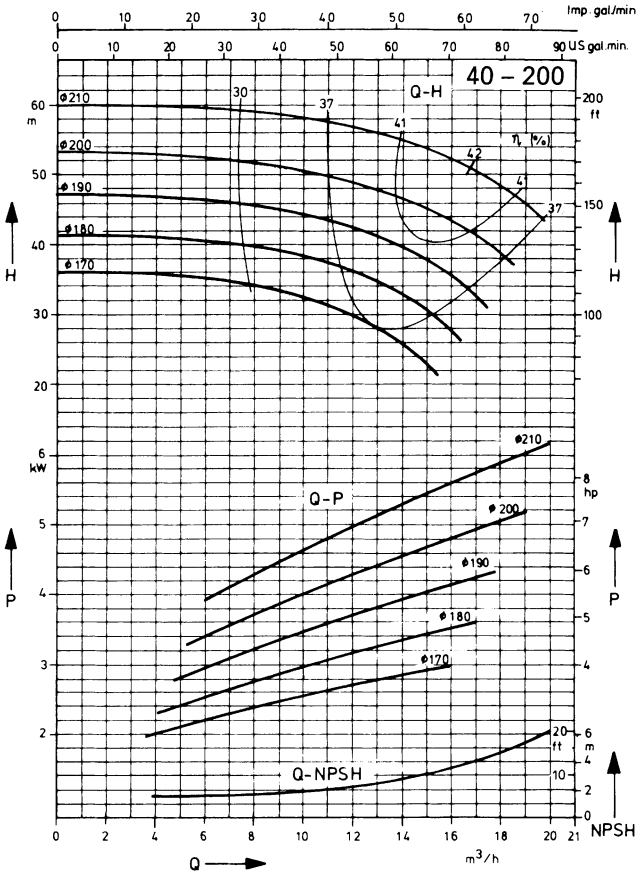
Performance graph **n = 1450 rpm**

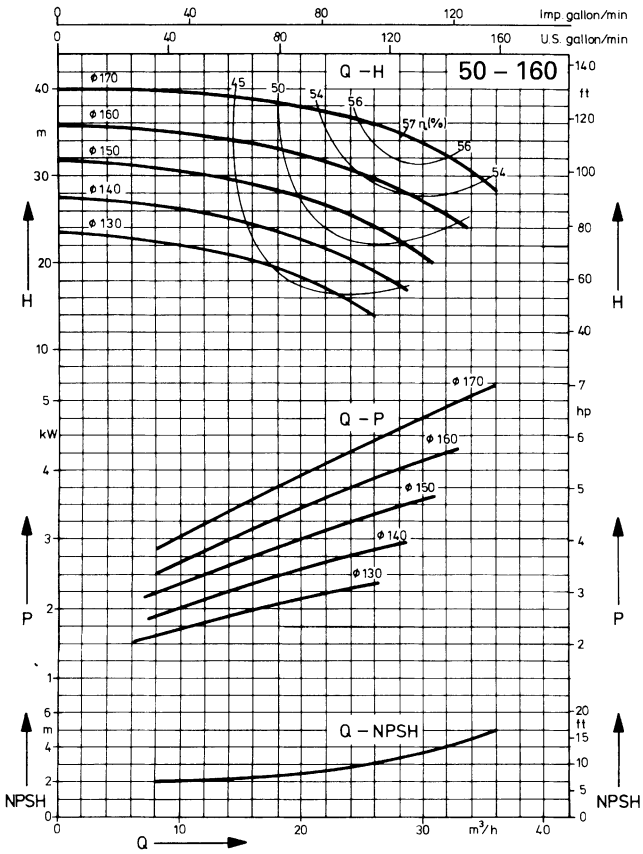


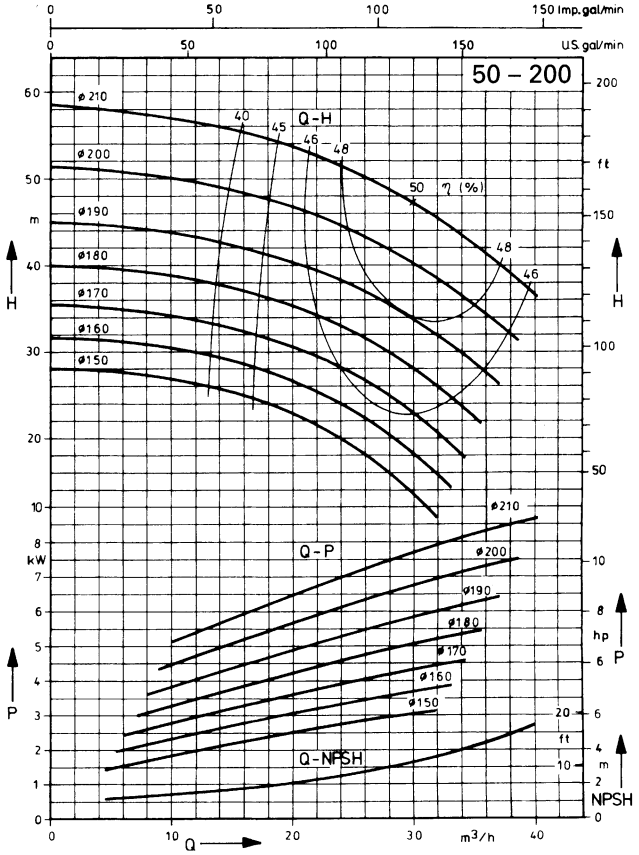
Characteristic curves

n = 2900 rpm



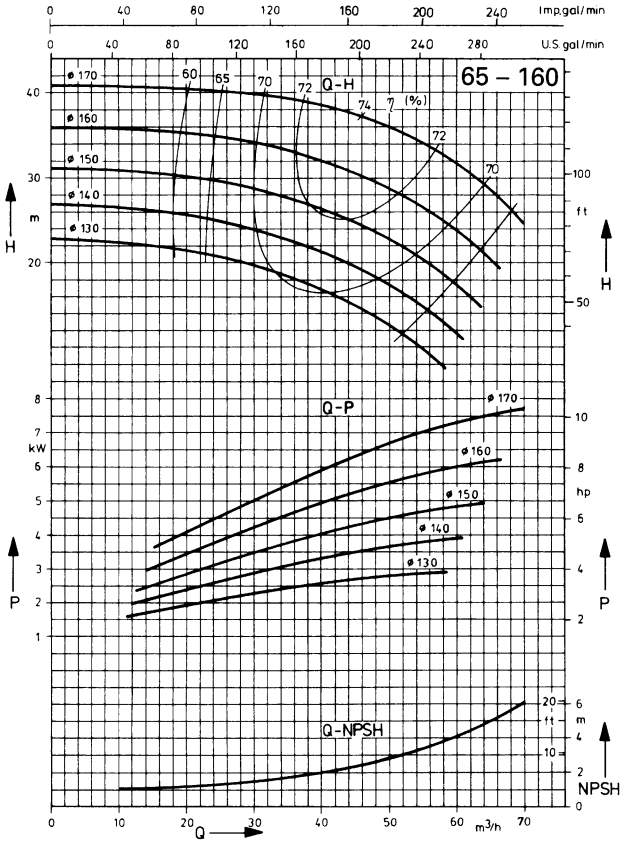


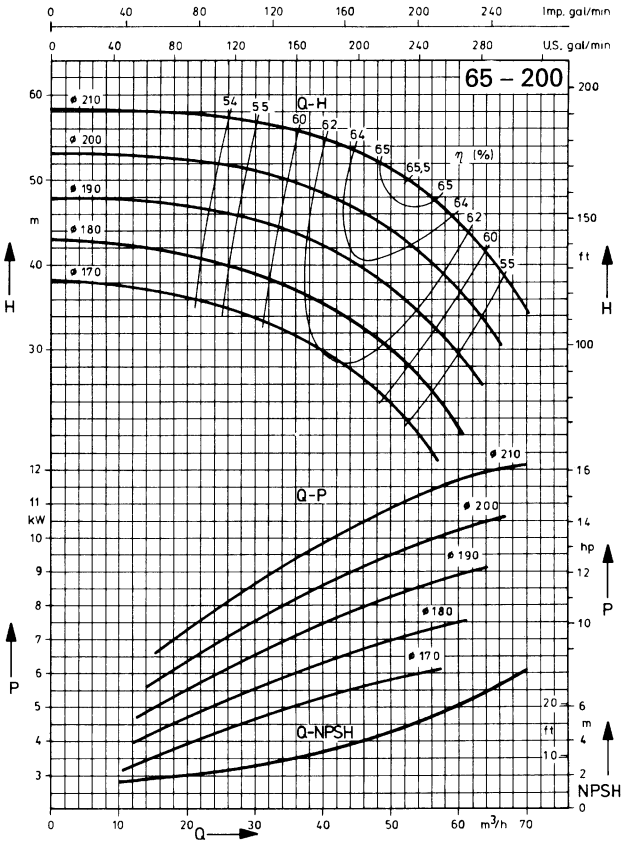


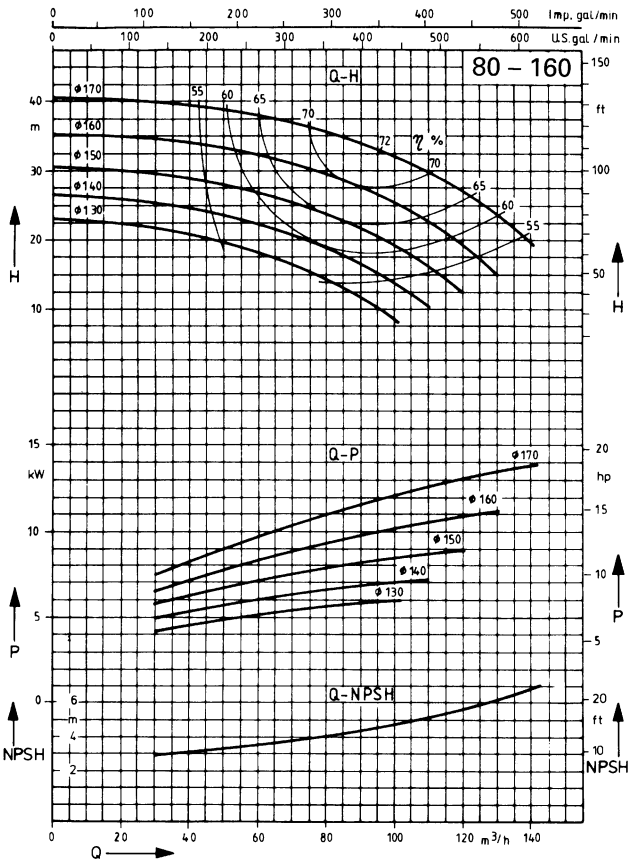


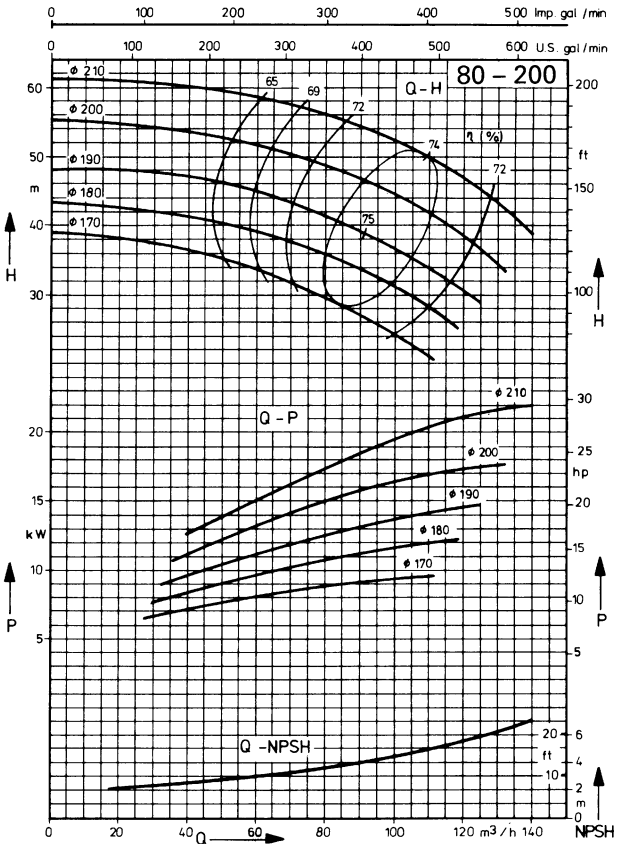
Characteristic curves

n = 2900 rpm



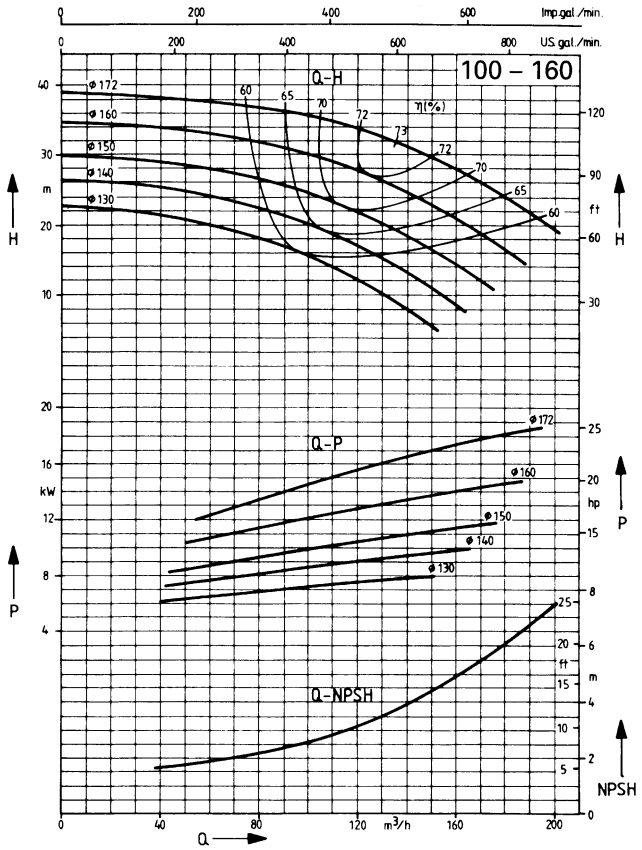






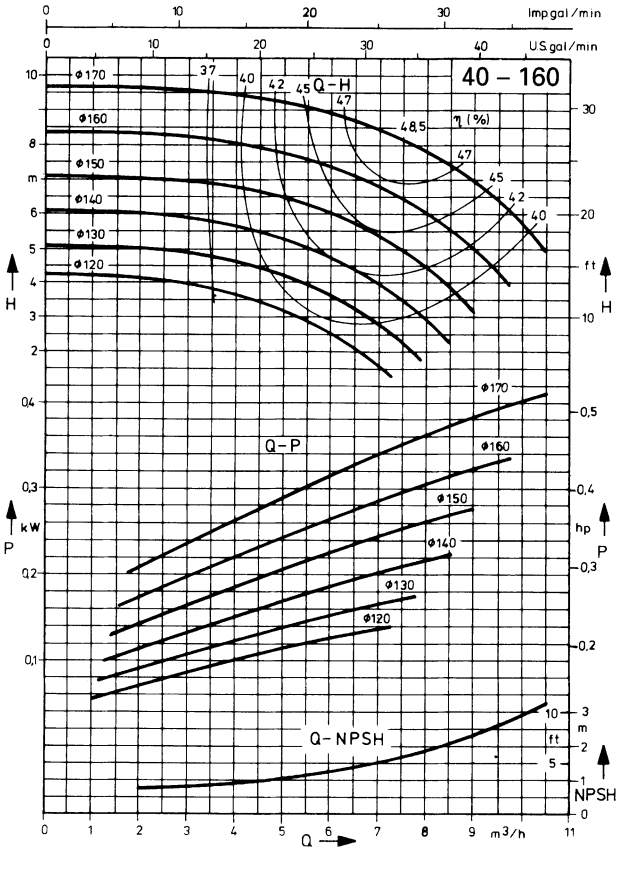
Characteristic curves

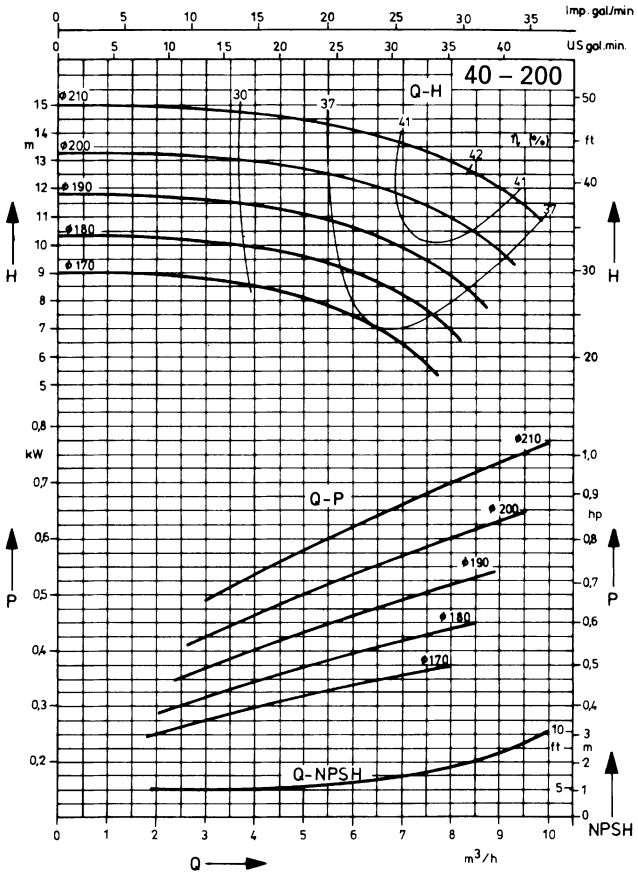
n = 2900 rpm



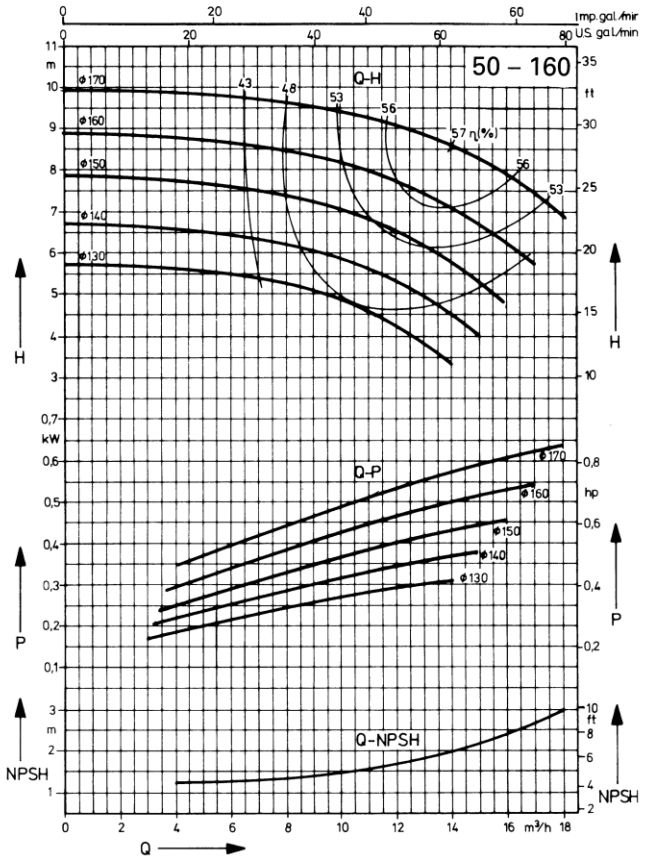
Characteristic curves

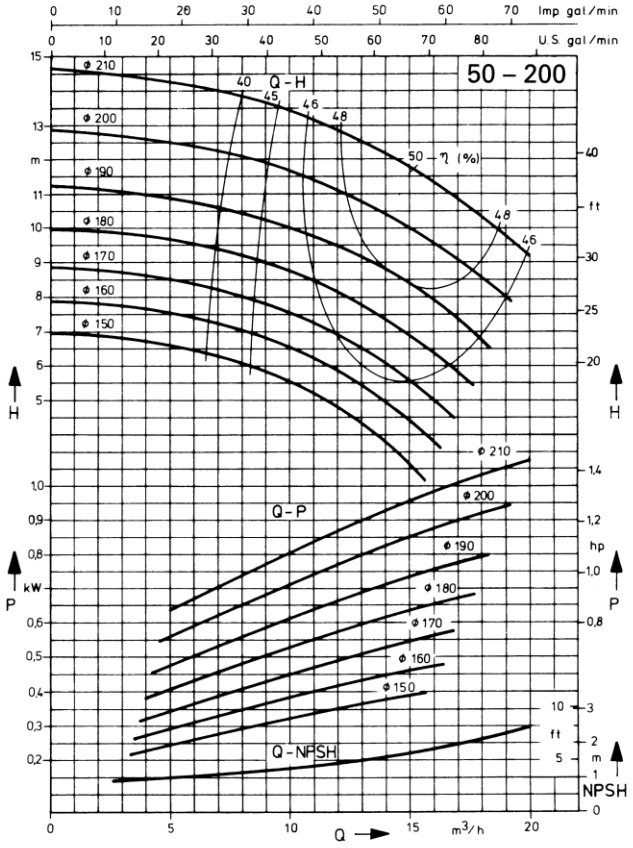
n = 1450 rpm

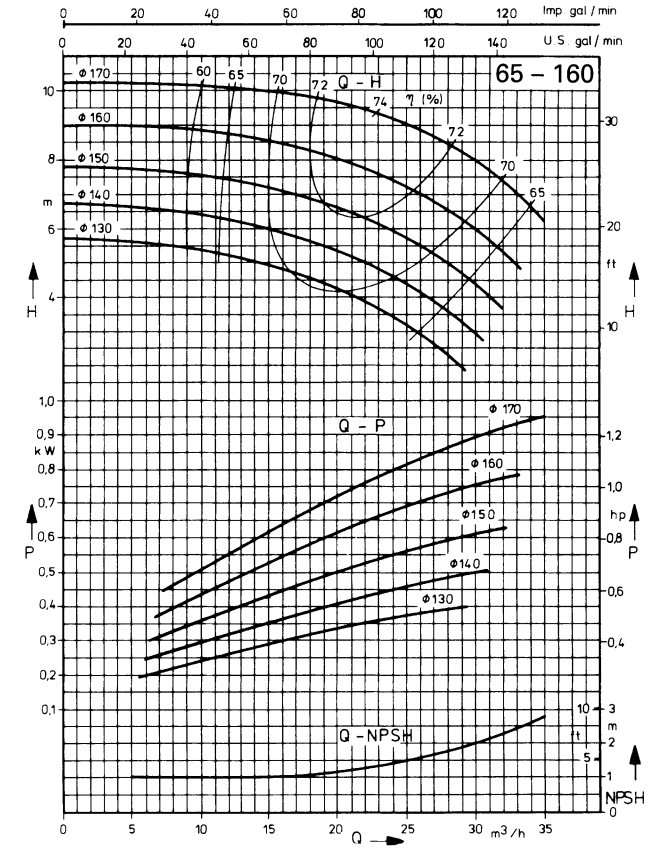


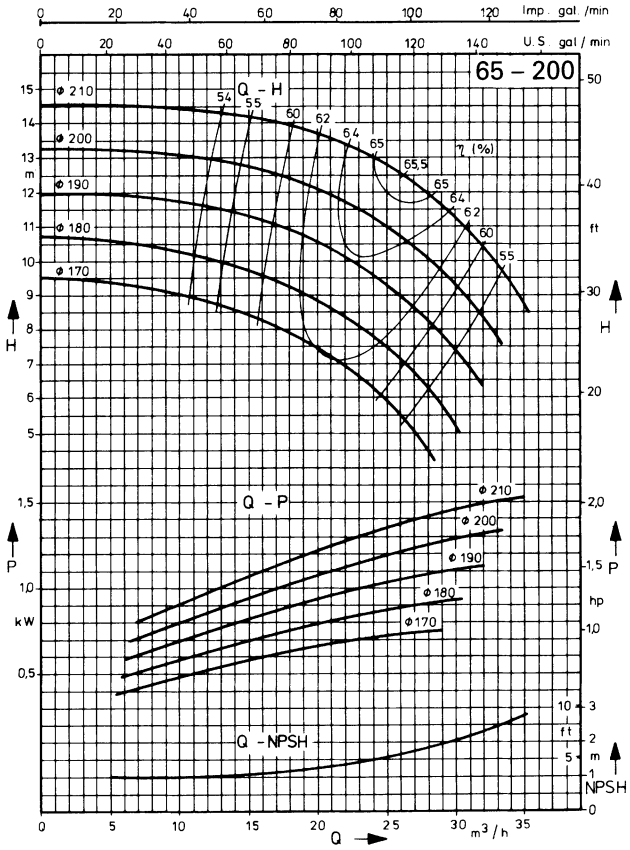


Characteristic curves **n = 1450 rpm**









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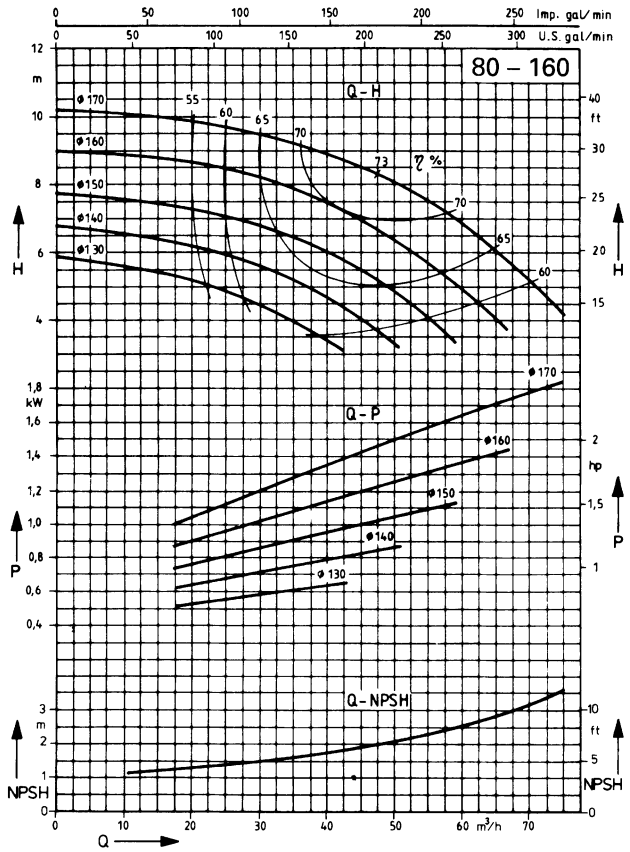
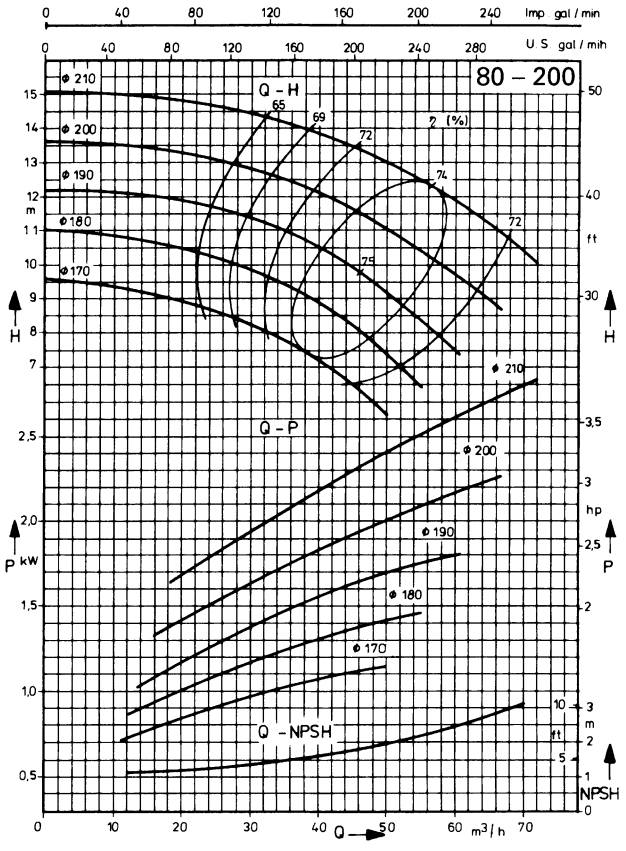
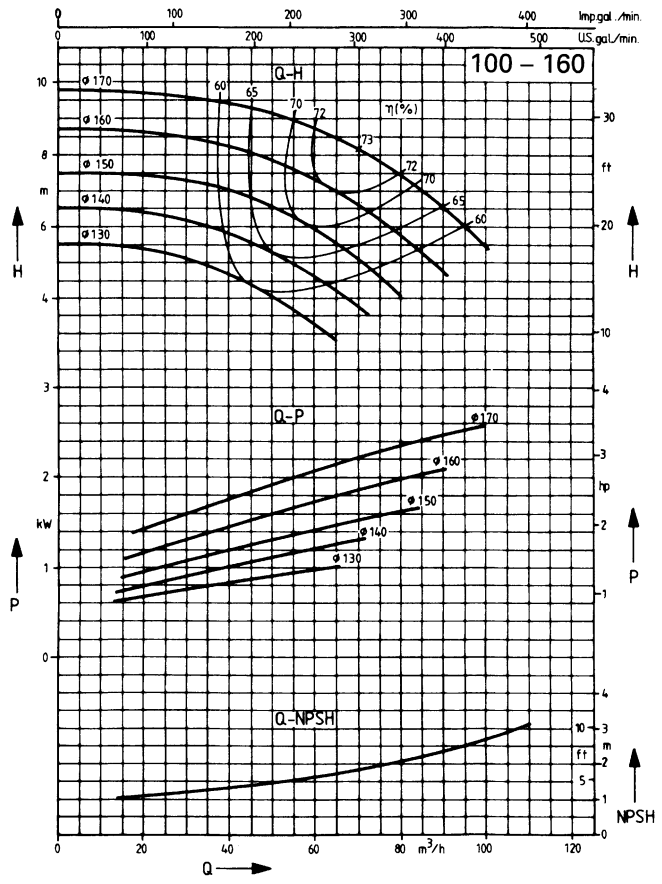
n = 1450 rpm

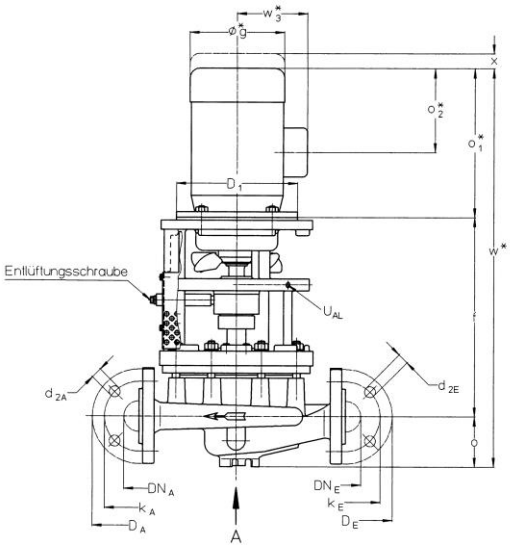


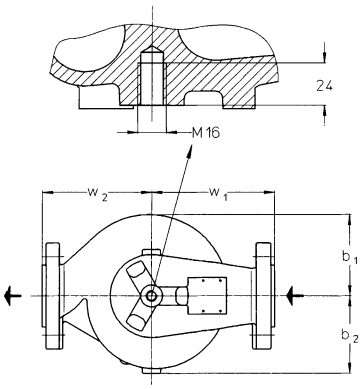




values are valid for water ρ = 1 kg/l

Dimension table **n = 2900 rpm**





U_{AL} = connection for leak liquid G ¼

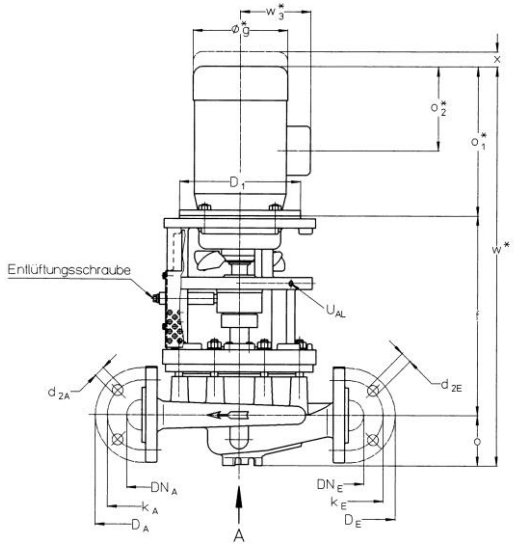
size	motor size	motor kW	$DN_{A, E}$	b_1	b_2	D_1	f	g*	o	o_1*	o_2*	w*	w_1	w_2	w_3*	x	weight kg pump	weight kg motor
	80 a	0,75				200		157		204	108	613			126			9
	80 b	1,1								219	115	628						10
40-160	90 S	1,5		115	115			186	82	249	161	658	180	160	125		49	14
	90 L	2,2					327			274	185	683						18
	100 L	3,0	40			250		206		323	234	732			133			24
	90 L	2,2				200		186		274	185	691			125			18
	100 L	3,0				250		206		323	234	740			133		55	24
40-200	112 M	4,0		138	138			220			183		200	180	186			41
	132 S1	5,5				300	352	260		386	227	828			213		61	56
	132 S2	7,5																59
	90 L	2,2				200		186		274	185	666			125			18
50-160	100 L	3,0		120	120	250	327	206	90	323	234	691	190	160	133		50	24
	112 M	4,0						220			283				186			41
	132 S1	5,5				300	352	260		386	227	828			213		58	56
	90 L	2,2	50			200		186		274	185	691			125	80	53	18
	100 L	3,0				250	327	206		323	234	740			133		54	24
50-200	112 M	4,0		138	138			220			183				186			41
	132 S1	5,5				300	352	260		386	227	828			213		60	56
	132 S2	7,5											200	180				59
	90 L	2,2				200		186		274	185	707			125			18
	100 L	3,0				250	327	206		323	234	756			133		54	24
65-160	112 M	4,0		132	126			220			183				186			41
	132 S1	5,5	65						106								63	56
	132 S2	7,5				300	352	260		386	227	844			213			59
	132 S1	5,5															64	56
65-200	132 S2	7,5			143								215					59
	160 M1	11,0				350	377	310		521	308	1004			245		71	110
	132 S1	5,5		150		300	352	260		386	227	858		200	213		69	56
80-160	132 S2	7,5			135								240					59
	160 M1	11,0															73	110
	160 M2	15,0	80						120	521	308	1018						112
	160 M1	11,0						310							245			110
80-200	160 M2	15,0			155								255				79	112
	160 L	18,5				350	377			565	330	1062						135
	180 M	22,0		165				341		592	350	1089		225	279	100		155
	160 M1	11,0								521	308	1048						110
100-160	160 M2	15,0	100		145			310	150				275		245		82	112
	160 L	18,5								565	330	1092						135

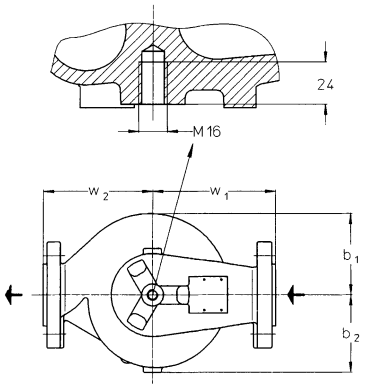
Flange connections according to DIN 2501 PN 16					
DN_A/DN_E	40	50	65	80	100
D	150	165	185	200	220
k	110	125	145	160	180
d_2 x numberl	18x4	18x4	18x4	18x8	18x8

Standard motors DIN 42677.
Truth of rotation, centricty and right angle of shaft ends and mounting flanges to DIN 42955, normal precision.

*protection type of the motors IP 54, dimensions depending on motor make.

Dimension table **n = 1450 rpm**





U_{AL} = connection for leak liquid G ¼

size	motor size	motor kW	$DN_{A,E}$	b_1	b_2	D_1	f	g*	o	o_1*	o_2*	w*	w_1	w_2	w_3*	x	weight kg pump	weight kg motor
40-160	80 a	0,55	40	115	115	200	327	160	82	227	131	636	180	160	143	80	49	9
40-200	80 a	0,55		138	138				90			644	200	180			54	9
	80 b	0,75									123							10
	90 S	1,1						178		243	154	660			150			14
50-160	80 a	0,55	50	120	120			160		227	131	644	190	160	143		51	9
	80 b	0,75									123							10
50-200	80 a	0,55		138	138						131		200	180			54	9
	80 b	0,75									123							10
	90 S	1,1						178		243	154	660			150			14
65-160	80 a	0,55	65	132	126			160		227	131				143		55	9
	80 b	0,75									123							10
	90 S	1,1						178		243	154	676			150			14
65-200	80 b	0,75		150	143			160	106	227	123	660	215	200	143		61	10
	90 S	1,1						178		243	154	676			150			14
	90 L	1,5								268	179	701						18
	100 L1	2,2				250		198		305	215	738			188			24
80-160	80 b	0,75	80		135	200		160	120	227	123	674	240		143		59	10
	90 S	1,1						178		243	154	690			150			14
	90 L	1,5								268	179	715						18
	100 L1	2,2				250		198		305	215	752			188			24
80-200	90 S	1,1		165	155	200		178		243	154	690	255	225	150	100	66	14
	90 L	1,5								268	179	715						18
	100 L1	2,2				250		198		305	215	752			188			24
	100 L2	3,0																25
100-160	90S	1,1	100		145	200		178	150	243	154	720	275		150		69	14
	90 L	1,5								268	179	745						18
	100 L1	2,2				250		198		305	215	782			188			24
	100 L2	3,0																25

Flange connections according to DIN 2501 PN 16					
DN_A/DN_E	40	50	65	80	100
D	150	165	185	200	220
k	110	125	145	160	180
d_2 x number	18x4	18x4	18x4	18x8	18x8

Standard motors DIN 42677.
Truth of rotation, centricty and right angle of shaft ends and mounting flanges to DIN 42955, normal precision.

*protection type of the motors IP 54, dimensions depending on motor make.

Data regarding the pump size - Instructions for placing orders

series + size		hydraulic + bearing	shaft sealing	material design	casing seal
		A· hydraulic A ·A one grease-lubricated groove ball bearing and one liquid surrounded step bearing	002 radial shaft seal rings CDC unbalanced mechanical seal	1B main parts of spheroidal graphite iron	2 flat seal
ZTI	40-160	AA	alternatively 002 CDC	1B	2
	40-200				
	50-160				
	50-200				
	65-160				
	65-200				
	80-160				
	80-200				
	100-160				

Motor selection table

motor n = 2900 rpm			motor n = 1450 rpm		
kW	size	code	kW	size	code
0,75	80 a	FA			
1,1	80 b	GA	0,55	80 a	FB
1,5	90 S	HA	0,75	80 b	GB
2,2	90 L	JA	1,1	90 S	HB
3,0	100 L	KA	1,5	90 L	JB
4,0	112 M	MA	2,2	100 L1	KB
5,5	132 S1	NA	3,0	100 L2	LB
7,5	132 S2	OA			
11	160 M1	SA			
15	160 M2	TA			
18,5	160 L	UA			
22	180 M	VA			

Example for ordering:
The pump size ZTI 40-160 AA 002 1B 2 with 11 kW 3-phase a.c. motor of (50 cs, 380 VΔ) 2900 rpm
has the complete order No.: **ZTI ·40-160 AA 002 1B 2 GA**

If type of construction IM V 1 (vertical installation) is concerned, please indicate expressly.

On delivery, the point (·) in the fourth place of the type designation will be replaced by a letter in our works..

Any changes in the interest of the technical development are reserved.

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