

US

US 62
US 73
US 75

US 102
US 103
US 105

US 152
US 153
US 155

US 73 H

US 151

US 103 H

EN Instruction Manual



You have purchased a product made by Pentair Jung Pumpen and with it, therefore, also excellent quality and service. Secure this service by carrying out the installation works in accordance with the instructions, so that our product can perform its task to your complete satisfaction. Please remember that damage caused by incorrect installation or handling will adversely affect the guarantee.

This appliance can be used by children aged 8 years or over and by persons with limited physical, sensory or intellectual capabilities, or with limited experience and knowledge, provided that they are supervised or have been instructed in the safe use of the appliance and are aware of the dangers involved. Children must not be allowed to play with the appliance. Cleaning and user maintenance must not be carried out by children unless they are supervised.

If this unit is equipped with a mains connection line without a plug or other means of disconnection from the mains. A complete disconnecting device must be installed on site in the fixed electrical installation in accordance with the installation regulations. A main switch of overvoltage category III can be installed as a complete disconnecting device. If the mains connection cable of this unit is damaged, it must be replaced by the manufacturer or its customer service or a similarly qualified person in order to avoid hazards.

Damage prevention in case of failure

Like any other electrical device, this product may fail due to a lack of mains voltage or a technical defect.

If damage (including consequential damage) can occur as a result of product failure, the following precautions can be taken at your discretion:

- Installation of a water level dependent (under circumstances, mains-independent) alarm system, so that the alarm can be heard before damage occurs.
- Inspection of the collecting tank/chamber for tightness up to the top edge before – or at the latest, during – installation or operation of the product.
- Installation of backflow protection for drainage units that can be damaged by wastewater leakage upon product failure.
- Installation of a further product that can compensate in case of failure of the other product (e.g. duplex unit).
- Installation of an emergency power generator.

As these precautions serve to prevent or minimise consequential damage upon product failure, they are to be strictly observed as the manufacturer's guideline – in line with the standard DIN EN specifications as state of the art – when using the product (Higher Regional Court Frankfurt/Main, Ref.: 2 U 205/11, 06/15/2012).

SAFETY INSTRUCTIONS

This instruction manual contains essential information that must be observed during installation, operation and servicing. It is therefore important that the installer and the responsible technician/operator read this instruction manual before the equipment is installed and put into operation. The manual

must always be available at the location where the pump or the plant is installed.

Failure to observe the safety instructions can lead to the loss of all indemnity.

In this instruction manual, safety information is distinctly labelled with particular symbols. Disregarding this information can be dangerous.



General danger to people



Warning of electrical voltage

NOTICE! Danger to equipment and operation

Qualification and training of personnel

All personnel involved with the operation, servicing, inspection and installation of the equipment must be suitably qualified for this work and must have studied the instruction manual in depth to ensure that they are sufficiently conversant with its contents. The supervision, competence and areas of responsibility of the personnel must be precisely regulated by the operator. If the personnel do not have the necessary skills, they must be instructed and trained accordingly.

Safety-conscious working

The safety instructions in this instruction manual, the existing national regulations regarding accident prevention, and any internal working, operating and safety regulations must be adhered to.

Safety instructions for the operator/user

All legal regulations, local directives and safety regulations must be adhered to.

The possibility of danger due to electrical energy must be prevented.

Leakages of dangerous (e.g. explosive, toxic, hot) substances must be discharged such that no danger to people or the environment occurs. Legal regulations must be observed.

Safety instructions for installation, inspection and maintenance works

As a basic principle, works may only be carried out to the equipment when it is shut down. Pumps or plant that convey harmful substances must be decontaminated.

All safety and protection components must be re-fitted and/or made operational immediately after the works have been completed. Their effectiveness must be checked before restarting, taking into account the current regulations and stipulations.

Unauthorised modifications, manufacture of spare parts

The equipment may only be modified or altered in agreement with the manufacturer. The use of original spare parts and accessories approved by the manufacturer is important for safety reasons. The use of other parts can result in liability for consequential damage being rescinded.

Unauthorised operating methods

The operational safety of the supplied equipment is only guaranteed if the equipment is used for its intended purpose. The limiting values given in the "Technical Data" section may not be exceeded under any circumstances.

Instructions regarding accident prevention

Before commencing servicing or maintenance works, cordon off the working area and check that the lifting gear is in perfect condition.

Never work alone. Always wear a hard hat, safety glasses and

safety shoes and, if necessary, a suitable safety belt.

Before carrying out welding works or using electrical devices, check to ensure there is no danger of explosion.

People working in wastewater systems must be vaccinated against the pathogens that may be found there. For the sake of your health, be sure to pay meticulous attention to cleanliness wherever you are working.

Make sure that there are no toxic gases in the working area.

Observe the health and safety at work regulations and make sure that a first-aid kit is to hand.

In some cases, the pump and the pumping medium may be hot and could cause burns.

For installations in areas subject to explosion hazards, special regulations apply!

APPLICATION

Submersible pumps from the US series are suitable for pumping domestic waste water without stones.

When using the pumps, the relevant national laws, regulations and stipulations must be adhered to, for example:

- Domestic contaminated and waste water (e.g. EN 12056 in Europe)
- Installation of low voltage systems (e.g., VDE 0100 in Germany)

For non-standard utilisation conditions, further regulations must be observed (e.g. VDE 0100 in Germany, part 701: bathrooms and shower rooms; part 702: swimming pools and fountains and part 737: outdoor use).

Where no explosion protection is stipulated for the pumping of foul wastewater at the installation location, US 75, US 105, US 155 may also be used.

Modes of operation

with the pumped medium at a temperature of 104°F (40°C) or 194°F (90°C) in the case of HE and HES hot water pumps:

Motor submersed: continuous operation S1

Motor at the surface: short duration operation S2; see "Technical Data"

Motor at the surface; intermittent operation S3; see "Technical Data"

DANGER!

Scalding by hot water - risk of injury!

The submersible pump is frost-resistant down to -20°C when stored in dry conditions. When installed, however, it must not be allowed to freeze in the water.

Transport

The pump must always be lifted by the handle and never by the power supply cable! The pump should only be lowered into deeper chambers or pits using a rope or chain.

ELECTRICAL CONNECTION

NOTICE! Only qualified electricians may carry out electrical works to the pump or the controls.

WARNING!

The pump must only be connected to electric circuits that are installed according to specifications and are protected with at least 10 A (slow) and FI-safety switches (30mA).

WARNING!

Before carrying out any works: disconnect the pump and the controls from the mains and take steps to ensure that it cannot be energized again.

The relevant standards (such as EN standards), country-specific regulations (such as BS), and the regulations of the local power supply companies must be observed.

NOTICE! Never put the mains plug or a free lead end in water! If water gets into the plug, this can cause malfunctions and damage.

Observe the operating voltage (see the type plate)!

The pump is provided with a winding thermostat. In case of unacceptably high temperatures it switches off the pump to protect it against possible damage. Unacceptably high temperatures may result e.g. from dry running or mechanical or electrical overload.

CAUTION!

The pump is switched on again automatically after cooling down - risk of injury!

For this reason, always disconnect the device from the mains before remedying the fault! In order to do this, unplug the pump from the mains supply or remove the pre-fuses of the pump controls!

US 62 to US 105

Observe the operating voltage (see the type plate)! Only connect the pump to sockets that have been installed properly in accordance with the regulations and are fitted with a 16 A (delay) fuse.

Pumps without built-in level control can also be operated automatically through the use of our level controls. Our ready to connect level controls can be installed without specific electrotechnical skills.

US 151 to US 253

Observe the operating voltage (see the type plate)! Only connect the pump to sockets that have been installed properly in accordance with the regulations and are fitted with a 16 A (delay) fuse.

The pump must only be operated with the standard motor protection plug. Models without motor protection plug must only be operated using the level controls with integrated motor protection that are approved by JUNG PUMPEN. These pumps must be connected by a qualified electrician.

The overload protection (only for D and DS) must be set to the nominal current of the pump (see type plate). If the motor protection plug or the level control require to be opened in order to reset or set the overload protection, this must only be done by a qualified electrician!

If there is a blockage in the pump, the overload protection may be triggered. After rectifying the fault the "reset" button on the motor protection plug must be pressed to switch the pump on again. Pumps which are operated with a separate level control have the overload protection in the level control.

Rotational direction

The rotational direction must be checked before installation! If the rotational direction is correct, the start-up jolt should be in the opposite direction to the rotational direction arrow on the motor housing. The wrong rotational direction is also indicated if the pump performs inadequately when installed, or if loud noises can be heard during operation. If the rotational direction is wrong, 2 phases of the supply cable must be swapped over.

CAUTION!

The start-up jolt can be very forceful.

INSTALLATION

The pump must be installed as shown in the examples. For installations in accordance with EN 12056-4, the pressure pipe must be laid in a loop above the local backflow level and protected with a backflow prevention valve.

A correspondingly larger diameter pipe should be used for longer pressure pipelines to avoid pipe friction losses.

In contrast to pumps with built-in level control, the ON and OFF switching heights of pumps without built-in level control are variable by the use of a separate level control.

Permanent venting of the ring housing may be necessary if the pump runs dry from time to time (pressure outlet surfaced). This can occur for example if the residual water in the collecting chamber evaporates or if the pump runs in "snore" mode during the test run.

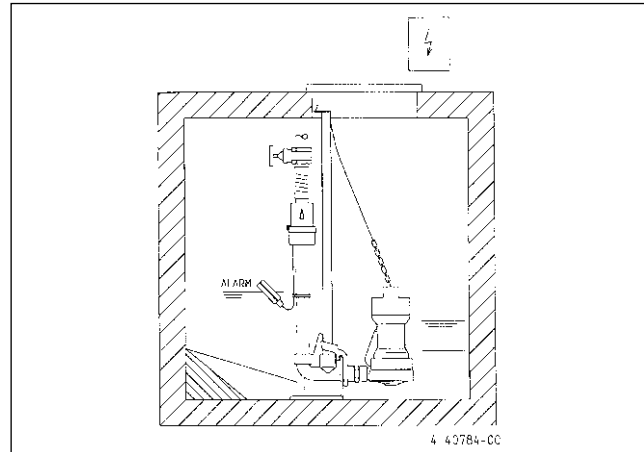
To vent the pump housing on pumps US 151, US 251 and US 253 the pressure pipe must be drilled above the pressure outlet to provide a 6 mm drill-hole. On all other pumps, the M8 hexagon socket screw under the (brass) oil screw must be removed.

NOTICE! If the pump is malfunctioning, part of the contents of the oil reservoir could escape into the pumping medium.

Dimensions of sump

- Single installation with pump base: 40 x 50 cm
- Single installation with guide rail system: 40 x 70 cm
- Duplex installation: 70 x 70 cm

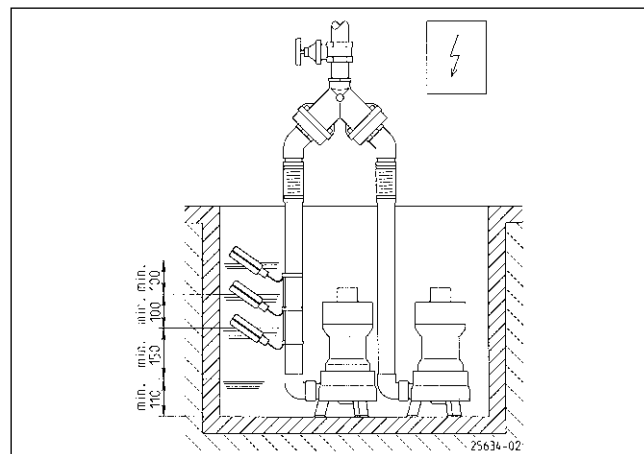
Example of installation with guide rail system for pumping stations at a permanent location.



Installation: Fix the coupling base firmly to the floor of the collection chamber using wall plugs and then mount the guide rail. Next, install the pressure pipe including the necessary fittings, such as the non-return valve and shut-off valves.

Finally, fit the pump with the screwed-on coupling catch onto the guide rail and lower it into place using a chain fixed to the handle.

Example of installation with pump base



NOTICE! The floats of the level control and alarm system are installed so that they are freely movable but not under the inlet. Please observe the minimum distances. The controls must only be installed in a dry and well ventilated room!

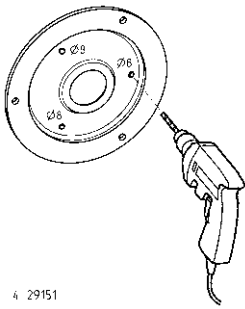
Mobile operation

For safety reasons, mobile operation is only allowed vertically and with a foot strainer. In the case of pumps without a standard foot strainer, a separate foot strainer must be ordered and fitted under the pump in place of the three base feet.

If a hose is used as a pressure line, care must be taken to ensure that for every pumping operation the hose is completely empty before the pump is submerged. Any residual liquid would obstruct the ventilation of the pump housing and therefore also hinder the pumping operation. For the same reason, the pump would not operate if it was switched on before being submerged.

Flushing device

(not applicable for US 151 and US 251). The pump can keep the intake section at the bottom of the chamber clear of deposits to a large extent if you carry out a small modification. This reduces the performance of the pump only insignificantly.



This modification is carried out as follows:
Detach the foot strainer or the 3 base feet and remove the cover. Carefully drill a hole into the 3 markings with the ø 8 symbols. Deburr the drill-holes. Re-attach the cover with the round sealing ring and the foot strainer or base feet.

MAINTENANCE

Maintenance and inspection of this product must be carried out in accordance with EN 12056-4. To ensure continued reliability of service, we recommend that you take out a service contract.



WARNING!

Before carrying out any works: disconnect the pump and the controls from the mains and take steps to ensure that it cannot be energized again.



WARNING!

Check the mains cable for signs of mechanical and chemical damage. Damaged or kinked cables must be replaced by the manufacturer.

NOTICE! When using a chain to lift the pump, please observe the relevant national regulations regarding accident prevention. Lifting gear must be checked regularly by an expert in accordance with the legal regulations

Oil check

The oil reservoir is sealed on the outside with a brass screw. In order to check the mechanical seal, the oil, including any residue, must be drained from the oil reservoir and collected in a clean measuring container.

- If the oil is contaminated with water (milky), an oil change must be carried out. Check again after a further 300 operating hours, but at the very latest after 6 months!
- However, if the oil is contaminated with both water and pollutants, then not only the oil must be replaced, but the mechanical seal as well.

For monitoring the oil reservoir, it is also possible to retrofit the electrode of our "DKG" seal leak control device in place of the brass screw on the oil reservoir.

Changing the oil

To ensure operational reliability, the first oil change should be carried out after 300 operating hours, with further oil changes carried out after every 1000 operating hours.

If the number of operating hours is very low, an oil change should still be carried out at least once a year.

If wastewater with strongly abrasive constituents is being pumped, the oil changes should be carried out at correspondingly shorter intervals.

Use HLP hydraulic mineral oil, viscosity class 22 to 46, e.g. Mobil DTE 22, DTE 24, DTE 25, to replace the oil in the oil reservoir. The quantity of oil required is 700 cm³ for the US 253, 500 cm³

for the US 251 and US 251 and 300 cm³ for all other US pumps.
NOTICE! The oil reservoir must only be filled with the specified quantity of oil. Overfilling will result in the pump being rendered inoperable.

Cleaning

The foot strainer prevents coarse impurities from entering the pump. Regular cleaning of the float and the foot strainer ensures optimum performance and operation.

To clean the impeller in the event of an obstacle or blockage, the hexagon socket screws on the underside of the pump must be removed and the foot strainer or cover must be levered off. On pumps with a 10 mm free passage, the wear plate must be removed. The impeller can now be cleaned.



CAUTION!

Worn impellers can have sharp edges.

Tightening torque M_A for A2 screw materials

- for M 6 $M_A = 8 \text{ Nm}$
- for M 8 $M_A = 20 \text{ Nm}$
- for M 10 $M_A = 40 \text{ Nm}$
- for M 12 $M_A = 70 \text{ Nm}$

QUICK TIPS FOR REMEDYING FAULTS

Pump does not work

- Check mains current (do not use a pin gauge)
- Fuse faulty = may be too weak (please refer to Electrical Connection)
- Mains supply cable damaged = repair to be carried out by manufacturer only

Pump runs but does not pump

- Empty the pressure pipe or hose to allow the non-return valve to open and the air to escape from the pump housing.

Impeller blocked

- Solids and fibrous matter have become lodged in the pump housing = clean

Decreased pumping performance

- Pump housing obstructed = clean
- Impeller worn = replace
- Wrong direction of rotation (for a three-phase current) = ask a qualified electrician to change 2 phases of the supply line



UKCA-Declaration of Conformity

Legislation - Designated Standards

- **Supply of Machinery (Safety) Regulations 2008 (MD)** EN 809:1998/AC:2010, EN ISO 12100:2010, EN 60335-1: 2012/A13:2017
- **The Restriction of the Use of Certain Hazardous Substance in Electrical and Electronic Equipment Regulations 2012 (RoHS)**
- **Electromagnetic Compatibility Regulations 2016 (EMC)** EN 55014-1: 2017/A11:2020, EN 55014-2:1997/A2:2008, EN 60034-1: 2010/AC: 2010
EN 61000-3-2:2014, EN 61000-3-3:2013

Name and address of the manufacturer: JUNG PUMPEN GmbH - Industriestr. 4-6 - 33803 Steinhagen - Germany - www.jung-pumpen.de

We hereby declare, under our sole responsibility, that the product is in accordance with the specified Legislation.

US 62 E (JP50668)	US 103 E (JP50662)	US 155 E (JP09388)
US 62 ES (JP50696)	US 103 ES (JP50663)	US 155 ES (JP50700)
US 102 E (JP50697)	US 153 E (JP09311/1)	US 151 E (JP09310/0)
US 102 ES (JP50698)	US 153 ES (JP09247/2)	US 151 ES (JP50656)
US 152 E (JP09435/0)	US 75 E (JP50657)	
US 152 ES (JP50699)	US 75 ES (JP50658)	
US 73 E (JP50659)	US 105 E (JP50702)	
US 73 ES (JP50660)	US 105 ES (JP50701)	

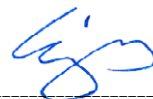
Other normative documents:

EN 60335-2-41: 2003/A2:2010
EN 62233:2008/AC:2008

Authorized person for technical documentation

JUNG PUMPEN - Stefan Sirges - Industriestr. 4-6 - 33804 Steinhagen

Steinhagen, 19-09-2022



Stefan Sirges, General Manager



i.V. Pascal Kölkebeck, Sales Manager



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Legislation - Designated Standards

- **Supply of Machinery (Safety) Regulations 2008 (MD)** EN 809:1998/AC:2010, EN ISO 12100:2010
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- **Electromagnetic Compatibility Regulations 2014 (EMC)** EN 55014-1: 2017/A11:2020, EN 55014-2:1997/A2:2008, EN 60034-1: 2010/AC: 2010, EN 61000-3-2:2014, EN 61000-3-3:2013

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US 73 HE (JP50665)
US 73 HES (JP50664)
US 103 HE (JP50666)
US 103 HES (JP50667)

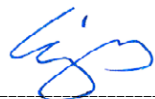
Other normative documents:

EN 62233:2008/AC:2008

Authorized person for technical documentation

JUNG PUMPEN - Stefan Sirges - Industriestr. 4-6 - 33804 Steinhagen

Steinhagen, 19-09-2022



Stefan Sirges, General Manager



i.V. Pascal Kölkebeck, Sales Manager



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JUNG PUMPEN GmbH - Industriestr. 4-6 33803 Steinhagen, Germany
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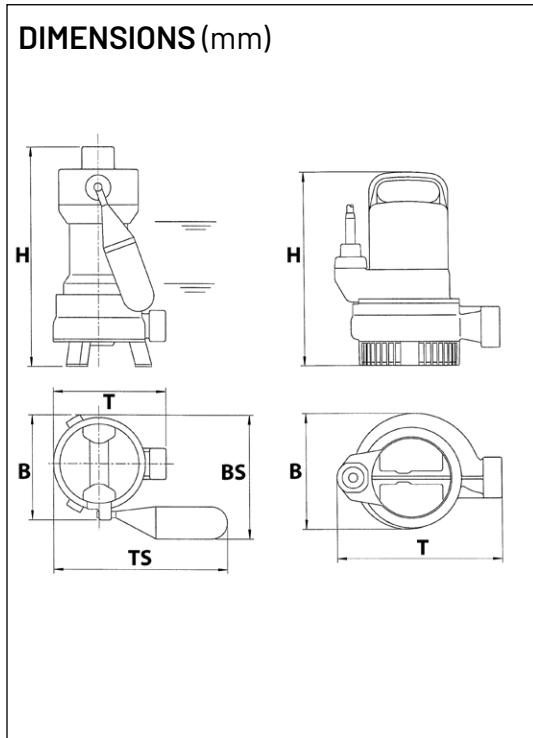
EN 12050-2:2001
Lifting plant for faecal-free wastewater

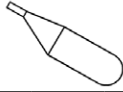
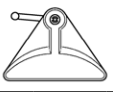
US 62 E (JP50668)	US 73 HE (JP50665)
US 62 ES (JP50696)	US 73 HES (JP50664)
	US 103 HE (JP50666)
US 102 E (JP50697)	US 103 HES (JP50667)
US 102 ES (JP50698)	
	US 151 E (JP09310/0)
US 152 E (JP09435/0)	US 151 ES (JP50656)
US 152 ES (JP50699)	
US 73 E (JP50659)	
US 73 ES (JP50660)	
US 103 E (JP50662)	
US 103 ES (JP50663)	
US 153 E (JP09311/1)	
US 153 ES (JP09247/2)	
US 75 E (JP50657)	
US 75 ES (JP50658)	
US 105 E (JP50702)	
US 105 ES (JP50701)	
US 155 E (JP09388)	
US 155 ES (JP50700)	

Collecting and automatically lifting faecal-free waste water above the backflow level in buildings and sites

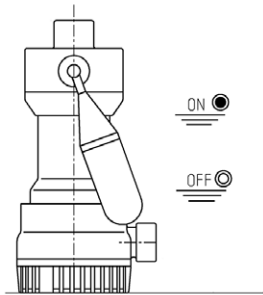
REACTION TO FIRE	NPD
WATERTIGHTNESS	Pass
EFFECTIVENESS (LIFTING EFFECTIVENESS)	
- Pumping of solids	Pass
- Pipe connections	Pass
- Ventilation	NPD
- Minimum flow velocity	Pass
- Minimum free passage of the plant	Pass
- Minimum useful volume	NPD
MECHANICAL RESISTANCE	
- Load bearing capacity and structural stability of collection tank for use outside buildings	NPD
- Structural stability of collection tank for use inside buildings	NPD
NOISE LEVEL	70 dB(A)
DURABILITY	
- of structural stability	Pass
- of lifting effectiveness	Pass
- of mechanical resistance	Pass
DANGEROUS SUBSTANCES	NPD

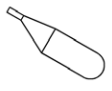

TECHNICAL DATA

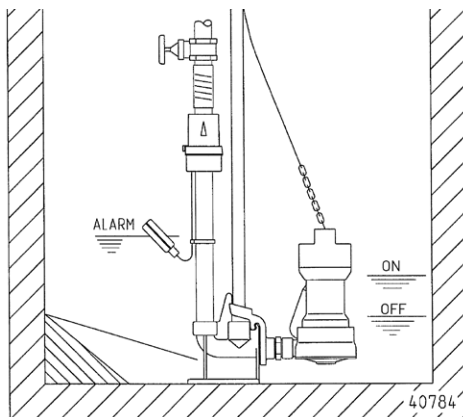


									
	H	B	T	H	BS	TS	H	BS	BT
US 62	380	190	210	380	225	325	380	255	280
US 73	380	195	210	380	230	325	380	255	280
US 75	395	200	230	395	240	335	395	205	290
US 102	410	190	210	410	225	325	410	255	280
US 103	410	195	210	410	230	325	410	255	280
US 105	425	200	230	425	240	335	425	265	290
US 152	435	190	210	435	225	325	435	255	280
US 153	435	190	210	435	225	325	435	255	280
US 155	450	200	230	450	240	335	450	205	290
US 151	360	220	310						
US 251	360	220	310						
US 253	400	190	280						


ON - OF (mm)





				
	ON	OFF	ON	OFF
US 62, US 73	240	125	155	105
US 75	255	140	170	120
US 102, US 103	270	155	185	135
US 105	285	170	200	150
US 152, US 153	295	180	210	160
US 155	310	195	225	175




	ON	OFF	ALARM
US 62, US 73	265	150	> 385
US 102, US 103	295	180	> 415
US 75	260	145	> 380
US 105	290	175	> 410
US 155	315	200	> 435
US 152, US 153	320	205	> 440
US 151, US 251	>270	>120	> 370
US 253	>270	>120	> 370

	US 62 E / ES US 73 E / HE / ES / HES	US 62 D / DS US 73 D / DS	US 102 E / ES US 103 E / HE / ES / HES	US 102 D / DS US 103 D / DS
[kg]	12,6 / 12,7 12,4 / 12,4 / 12,5 / 12,5	12,8 / 12,9 12,6 / 12,7	14,3 / 14,4 14,0 / 14,0 / 14,1 / 14,1	14,3 / 14,4 14,6 / 14,7
 DN [mm]	1½" 10 / 30	1½" 10 / 30	1½" 10 / 30	1½" 10 / 30
S2 / S3*	8 min / 10 %	8 min / 10 %	8 min / 10 %	15 min / 15 %
P1 [kW]	0,83	0,85	1,37	1,36
P2 [kW]	0,50	0,60	0,98	1,06
U [V]	1/N/PE ~230	3/PE ~400	1/N/PE ~230	3/PE ~400
f [Hz]	50	50	50	50
I [A]	3,9	1,4	6,0	2,4

	US 75 E / ES	US 75 D / DS	US 105 E / ES	US 105 D / DS
[kg]	12,9 / 13,0	13,1 / 13,2	14,5 / 14,6	15,1 / 15,2
 DN [mm]	2" 50	2" 50	2" 50	2" 50
S2 / S3*	8 min / 10 %	8 min / 10 %	8 min / 10 %	15 min / 15 %
P1 [kW]	0,83	0,85	1,37	1,36
P2 [kW]	0,50	0,60	0,98	1,06
U [V]	1/N/PE ~230	3/PE ~400	1/N/PE ~230	3/PE ~400
f [Hz]	50	50	50	50
I [A]	3,9	1,4	6,0	2,4

	US 151 E / ES	US 151 D / DS	US 152 E / ES US 153 E / ES	US 152 D / DS US 153 D / DS
[kg]	12,6 / 12,7 12,4 / 12,5 / 12,4 / 12,5	12,8 / 12,9 12,6 / 12,7	14,3 / 14,4 14,0 / 14,1 / 14,0 / 14,1	14,3 / 14,4 14,6 / 14,7
 DN [mm]	2" 10	2" 10	1½" 10 / 30	1½" 10 / 30
S2 / S3*	20 min / 25 %	25 min / 40 %	12 min / 10 %	15 min / 10 %
P1 [kW]	1,68	1,60	1,60	1,70
P2 [kW]	1,19	1,30	1,21	1,41
U [V]	1/N/PE ~230	3/N/PE ~400	1/N/PE ~230	3/N/PE ~400
f [Hz]	50	50	50	50
I [A]	7,6	3,0	7,5	3,1

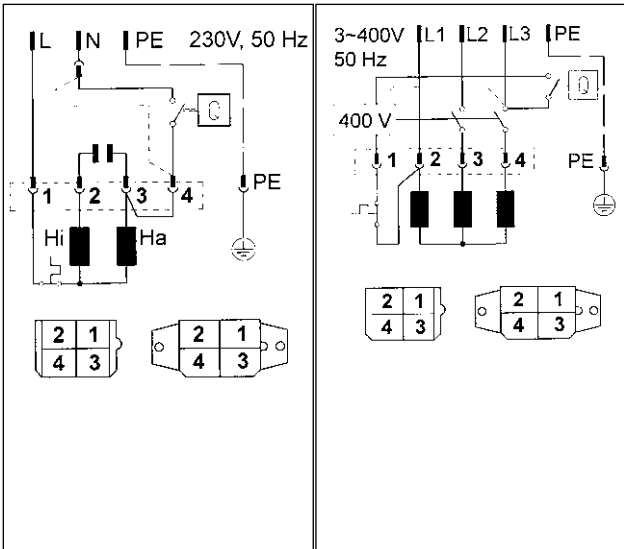
	US 155 E / ES	US 155 D / DS	US 251 D / DS	US 253 D / DS
m [kg]	16,0 / 16,3	16,5 / 17,2	27,5 / 29,5	26,5 / 28,0
 DN [mm]	2" 50	2" 50	2" 10	2" 40
S2 / S3*	12 min / 10 %	15 min / 10 %	15 min / 25 %	15 min / 25 %
P1 [kW]	1,60	1,70	2,60	2,60
P2 [kW]	2,21	1,41	2,10	2,10
U [V]	1/N/PE ~230	3/PE ~400	3/N/PE ~400	3/N/PE ~400
f [Hz]	50	50	50	50
I [A]	7,5	3,1	4,4	4,4

Example for 40%: 4 min. operation and 6 min. rest (Cycle duration 10 min.) *

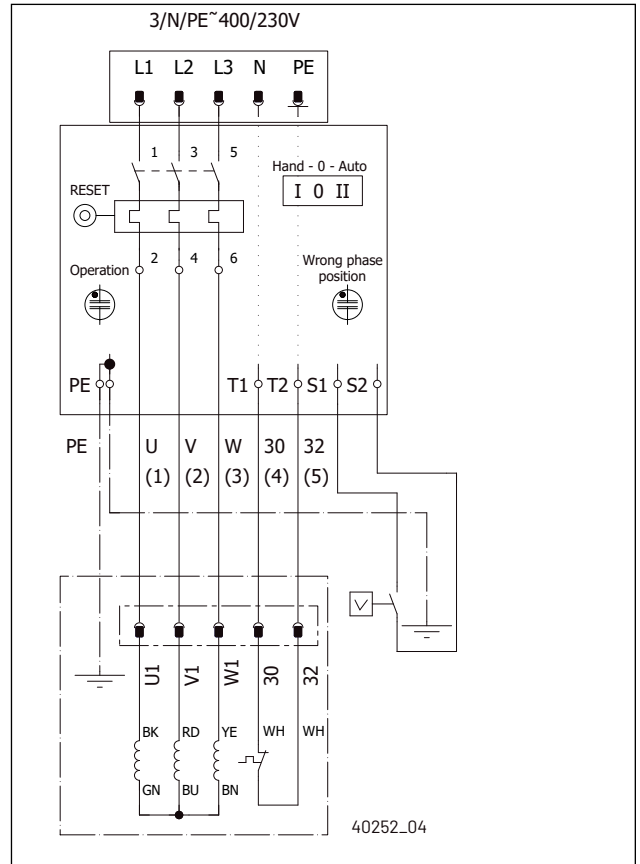
PERFORMANCE

H[m]	1	2	3	4	5	6	7	8	9	10	11	12	14	16
	Q [m/h]													
US 62 E / ES	19	17	15	12	10	8	6	4	2					
US 62 D / DS	22	20	17	15	12	10	8	6	4					
US 102 E / ES	28	26	23	21	19	17	15	12	10	8	5	2		
US 102 D / DS	28	26	23	21	19	17	15	12	10	8	5	2		
US 152 E / ES	30	29	27	24	22	20	18	15	13	11	8	6		
US 152 D / DS	31	30	28	26	23	21	19	17	14	12	10	8		
US 73 E / ES	19	17	15	12	10	8	6	4	2					
US 73 HE / HES	19	17	15	12	10	8	6	4	2					
US 73 D / DS	22	20	17	15	12	10	8	6	4					
US 103 E / ES	28	26	23	21	19	17	15	12	10	8	5	2		
US 103 HE / HES	28	26	23	21	19	17	15	12	10	8	5	2		
US 103 D / DS	28	26	23	21	19	17	15	12	10	8	5	2		
US 153 E / ES	30	29	27	24	22	20	18	15	13	11	8	6		
US 153 D / DS	31	30	28	26	23	21	19	17	14	12	10	8		
US 75 E / ES		20	16	13	10	7	4							
US 75 D / DS		23	19	16	12	10	7	3						
US 105 E / ES			28	25	22	19	16	13	10	7	3			
US 105 D / DS			29	26	23	20	17	14	11	8	4			
US 155 E / ES				29	26	22	20	16	14	11	8	2		
US 155 D / DS				31	28	25	21	19	16	13	10	6		
US 151 E / ES	40	39	37	35	33	31	29	26	23	20	17	14		
US 151 D / DS	40	39	37	35	33	31	29	26	23	20	17	14		
US 251 D / DS	54	52	51	49	47	45	43	40	38	35	32	29	21	10
US 253 D / DS	40	38	36	34	32	30	28	25	23	20	17	14	7	

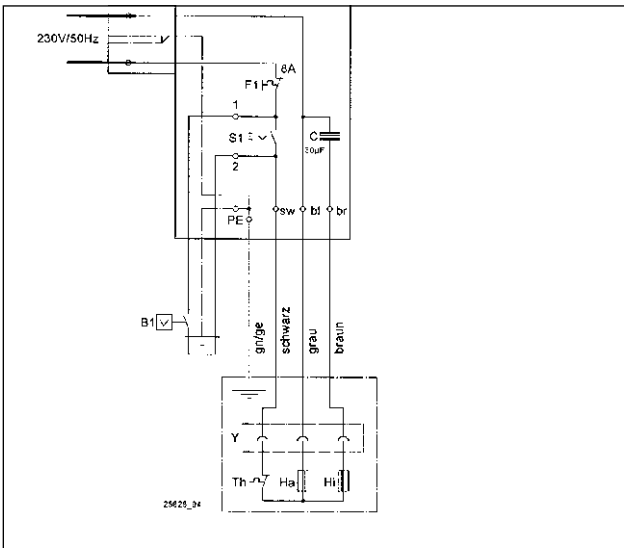
US 62 to US 105



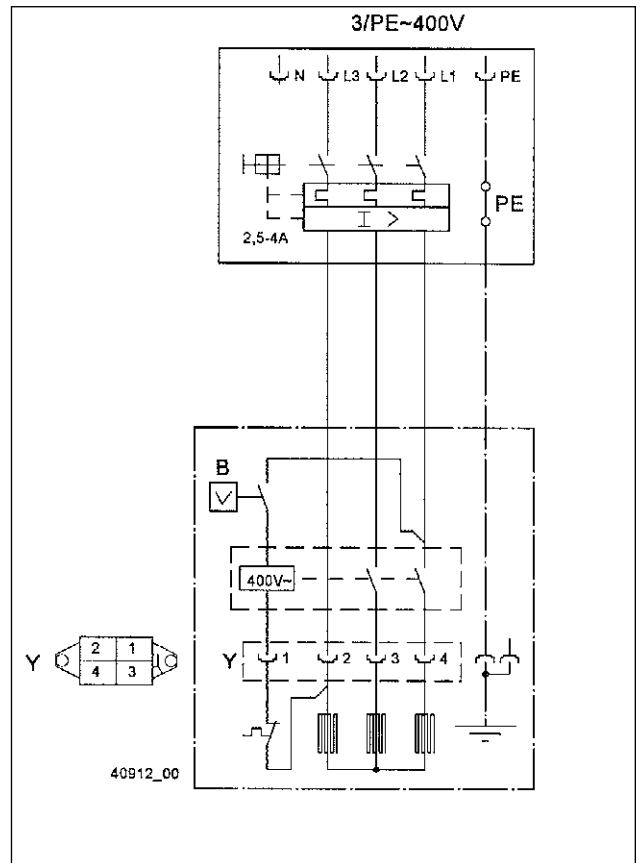
US 151, US 251, US 253 D / DS



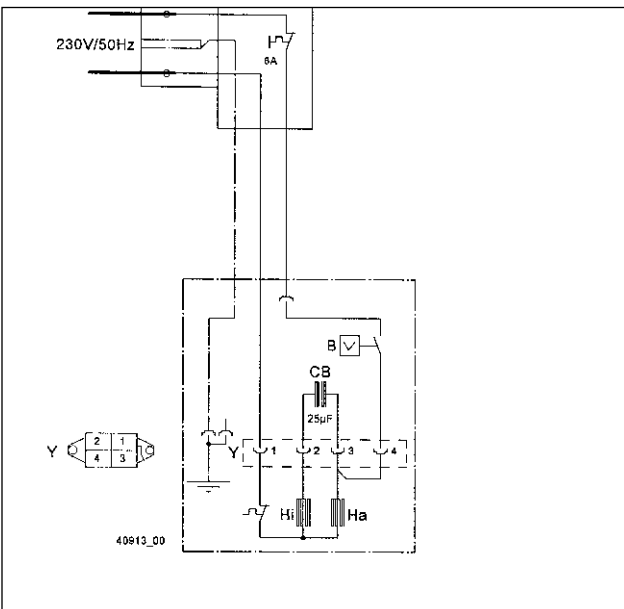
US 151 E / ES



US 152, US 153, US 155 D / DS



US 152, US 153, US 155 E / ES





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