Instruction manual

ISO-MIX Skid Mounted Pump Unit

OM SMPU-2011-03, EN1

To the owner

Dear owner,
This Instruction Manual is your instant guide when dealing with your Alfa Laval equipment. Alfa Laval advises you to study it carefully, and to ensure its availability to those who install, maintain and operate the equipment.

Furthermore, it is important that you
- keep this documentation for the life of the equipment.
- incorporate any amendments.
- pass on the documentation to any subsequent holder or user of the equipment.

The equipment described in this manual is only intended for use in nonhazardous applications within food or pharmaceutical industries.
Alfa Laval will not be responsible for any breakdown of the equipment caused by the owner's failure to follow the instructions given in this document.
This Instruction Manual describes the authorized way to use the equipment. Alfa Laval will not be responsible for any injury or damage if the equipment is used in any other way.

CONTENTS PAGE

General information

WARNING! To ensure maximum safety, always read the “Safety instructions” and relevant instructions before carrying out any work or inspection on the equipment.

Service
In case of problems when operating the module, contact the nearest Alfa Laval company.

Manufacturer

Alfa Laval Copenhagen A/S
Maskinvej 5
DK-2860 Søborg/Copenhagen
DENMARK

Product documentation

The documentation for this module consists of this operation manual as well as operation manuals from the individual suppliers of equipment installed on the Skid Mounted Pump Unit. Detailed data for equipment mounted on the SMPU e.g. pump charts can be found in these individual manuals.

This OPERATION MANUAL is intended to be placed at the operator panel in order to at all times provide the operator with guidance and information on how to operate the module. As a consequence of this, certain parts of the different sections are repeated.

It is important to:

- Keep the manuals available and updated for the life of the module
- Pass the manuals on to any subsequent holder or user of the module Abbreviations

Abbreviations

Abbreviations as follows may be used in this documentation.

CIP	Cleaning In Place
HNO_3	Nitric acid
NaOH	Sodium hydroxide (caustic soda)
pH	Determination of acid/base concentration
PHE	Plate Heat Exchanger
SMPU	Skid Mounted Pump Unit

Design modifications

The directives in this documentation are in accordance with the design and construction of the module at the time it was released by the Alfa Laval production facility.

Document producer

Alfa Laval Copenhagen A/S
Maskinvej 5
DK-2860 Søborg/Copenhagen
DENMARK

Further copies

Can be ordered from nearest Alfa Laval company.

Safety instructions

To ensure maximum safety always read this section carefully before carrying out any work or inspection on the equipment. If the safety instructions are not followed, there is a risk of personal injury.

Use of hazard informations

Hazard informations in this documentation have the following significance:

DANGER! **Failure to observe this information results in immediate danger to life.**

WARNING! **Failure to observe this information may result in major personal injury or loss of life.**

Caution! **Failure to observe this information may result in minor personal injury or damage to the equipment.**

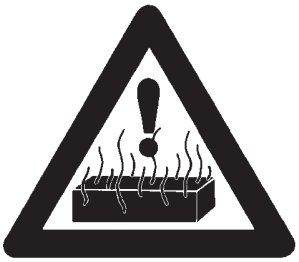
Note! Information requiring special emphasis.

Use of signs

Warning signs are used as below.

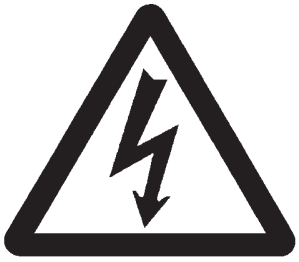
Caustic agent

Substances that may be harmful to body tissues. Do not touch without proper protection.



Hot surface

Temperatures exceeding 60°C may occur. Do not touch without proper protection.



Electrical equipment

An electric shock can injure or kill. Treat all electrical equipment as powered. Switch off power before maintenance or repair.

High noise levels

Noise levels exceeding 85dBA may occur. Use hearing protection.

Cleaning solution

Handling of cleaning solution

Cleaning solution normally contains caustic soda (NaOH) or nitric acid (HNO_3). These chemicals may cause burning of body tissues. Follow the instructions given by the supplier.

Whenever there is a risk of exposure to these chemicals, always wear:

- Safety glasses
- Protection gloves
- Shoes and apron made of PVC/PE plastic, or rubber

In case of an accident involving cleaning solution, the basic rule is to, as soon as possible, rinse the affected area with large amounts of water.

Due to this, always make sure that the emergency and eye showers, and also additional washing facilities are ready for use.

Emergency measures

If swallowed

- immediately drink large amounts of lukewarm water (to dilute what has been swallowed), then seek medical attention

If contact with eyes

- immediately rinse the eyes thoroughly with lukewarm water at least 15 minutes (keep eyelids widely apart), then seek medical attention

If contact with skin or clothes

- immediately remove contaminated clothing
- immediately rinse with large amounts of water. If skin burns appear, seek medical attention
- thoroughly wash the clothing before worn again

If inhaled

- leave the affected area to get fresh air. If any symptoms remain, seek medical attention

Note! Reaction may occur several hours after inhalation.

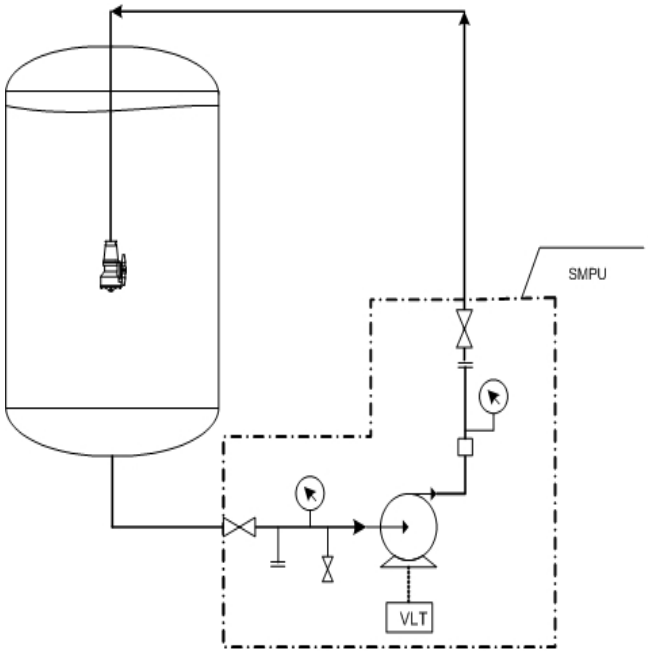
General description

Application

The Alfa Laval SMPU for Mixing and CIP Cleaning is a preassembled skid mounted module for pumping low viscosity liquid. The unit is typically used in combination with either an Alfa Laval Rotary Jet Mixer or a Toftejorg cleaning machine from Alfa Laval.

The SMPU would typically be installed together with an Alfa Laval Rotary jet Mixer in a tank, where the SMPU is used to recirculate the liquid and thereby feed the Rotary Jet Mixer.

Below is an example of such an installation.



The unit contains an Alfa Laval centrifugal pump with suitable frequency converter piping, two pressure gauges, two manual valves at inlet and outlet plus a drain valve. An instrument house prepares the unit for potential installation of instrumentation.

Everything is mounted on a stainless frame with a cover for protection of the frequency converter.

The unit is not electrically wired, nor is the frequency converter programmed. This is done during installation. Start and stop of the unit is expected to be incorporated into the plant´s control system by customer, but can also be done directly from the frequency converter.

The unit is available in three different sizes delivering different flow rates. The individual sizes are designated by pump motor rating; 7.5 kW, 11 kW and 15 kW.

Reference is made to vendor manuals for motor and frequency converter regarding operation, safety instructions etc.

Requirements on personnel

Operator:

Trained in general processing and process controllers.

CAUTION! **Unauthorized personnel**

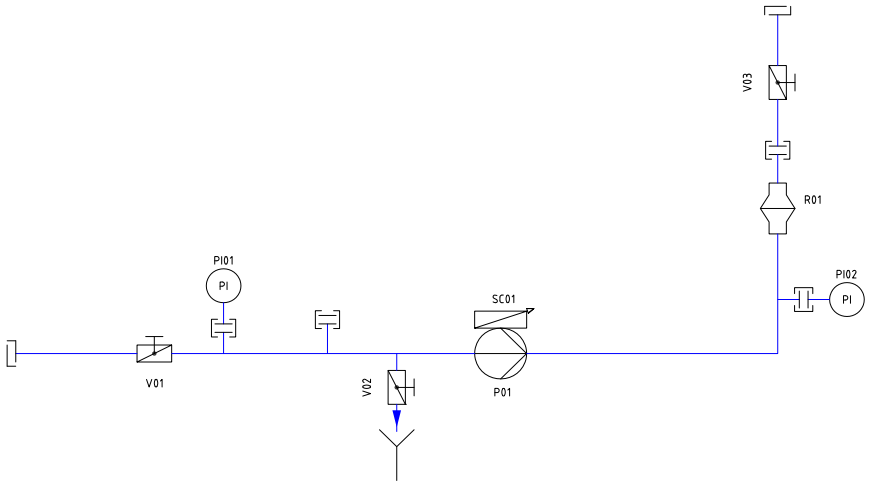
Operation by unauthorized personnel may endanger personnel and property.

Electrical wiring of the unit and programming of VLT is done at site during installation

Risk area

One meter around the equipment due to jets/splashes of harmful liquid in the case a seal is leaking.

Principle Flow Diagram



On the suction side of the pump there is a manual butterfly valve, a pressure gauge and a blind connection plus a drain.

A frequency converter for the pump is mounted on the skid, but no electrical wiring is prepared.

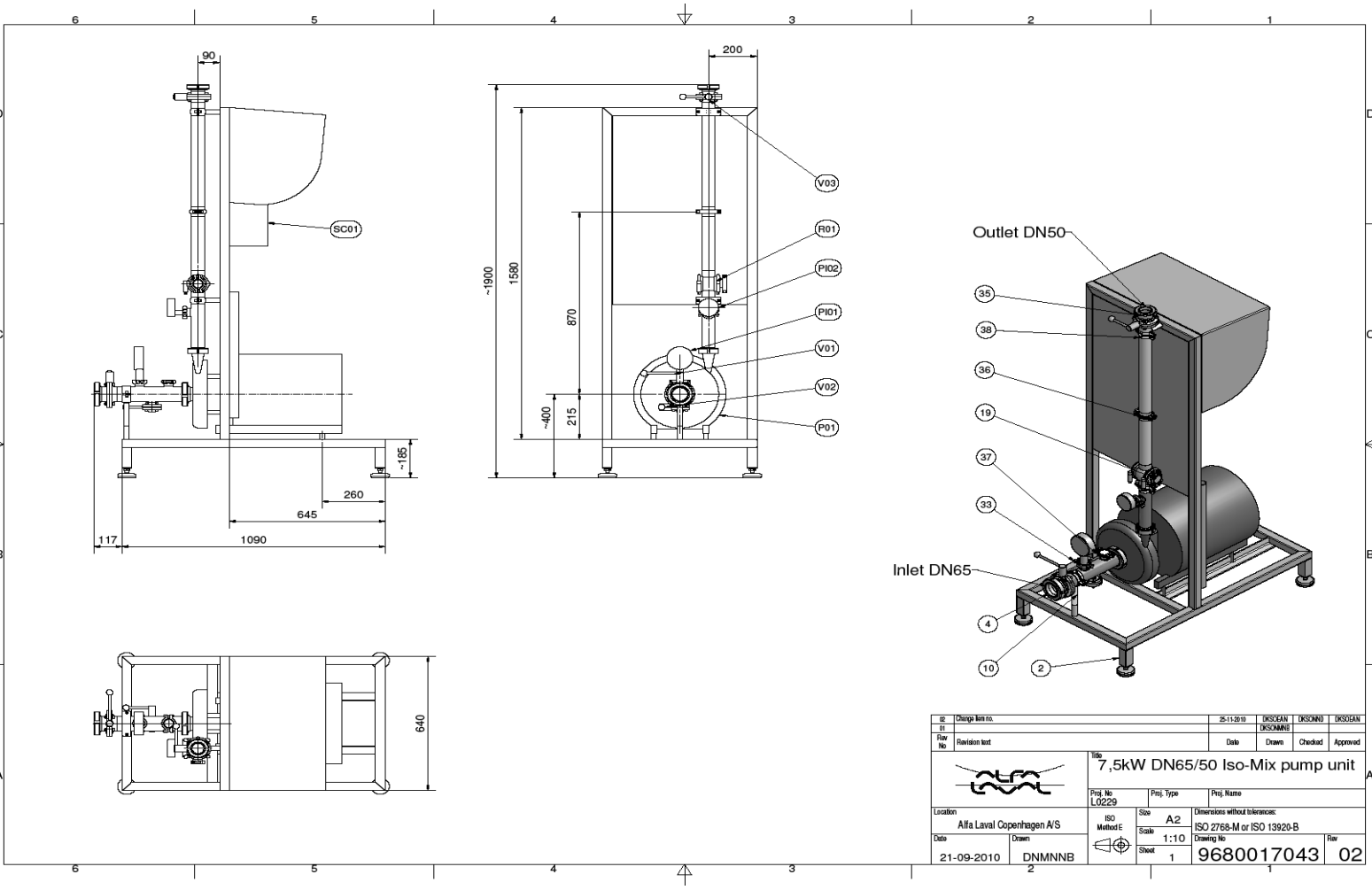
After the pump there is a pressure gauge, and an instrument house where a flow meter (or other) can be mounted if needed.A manual valve is located before the outlet.

Both tie-in end connections are supplied with counter ferule/clamp to ease customer installation.

Layout

Layout of the 3 different sizes is shown below together with bill of material for each size

Layout of 7.5 kW SMPU



BOM for 7.5 kW SMPU

Bill of material

Product no	Rev.	Product description
9680159995	00	7,5KW DN65/50 ISO-MIX PUMPUNIT L0229 MATERIALE PARTS LIST

Drawing number	Rev.	Structure type	Responsible	Change id	Change date (YMD)
9680017043	02	S01	DKSOJKNC	DKSOGKE	11-01-06

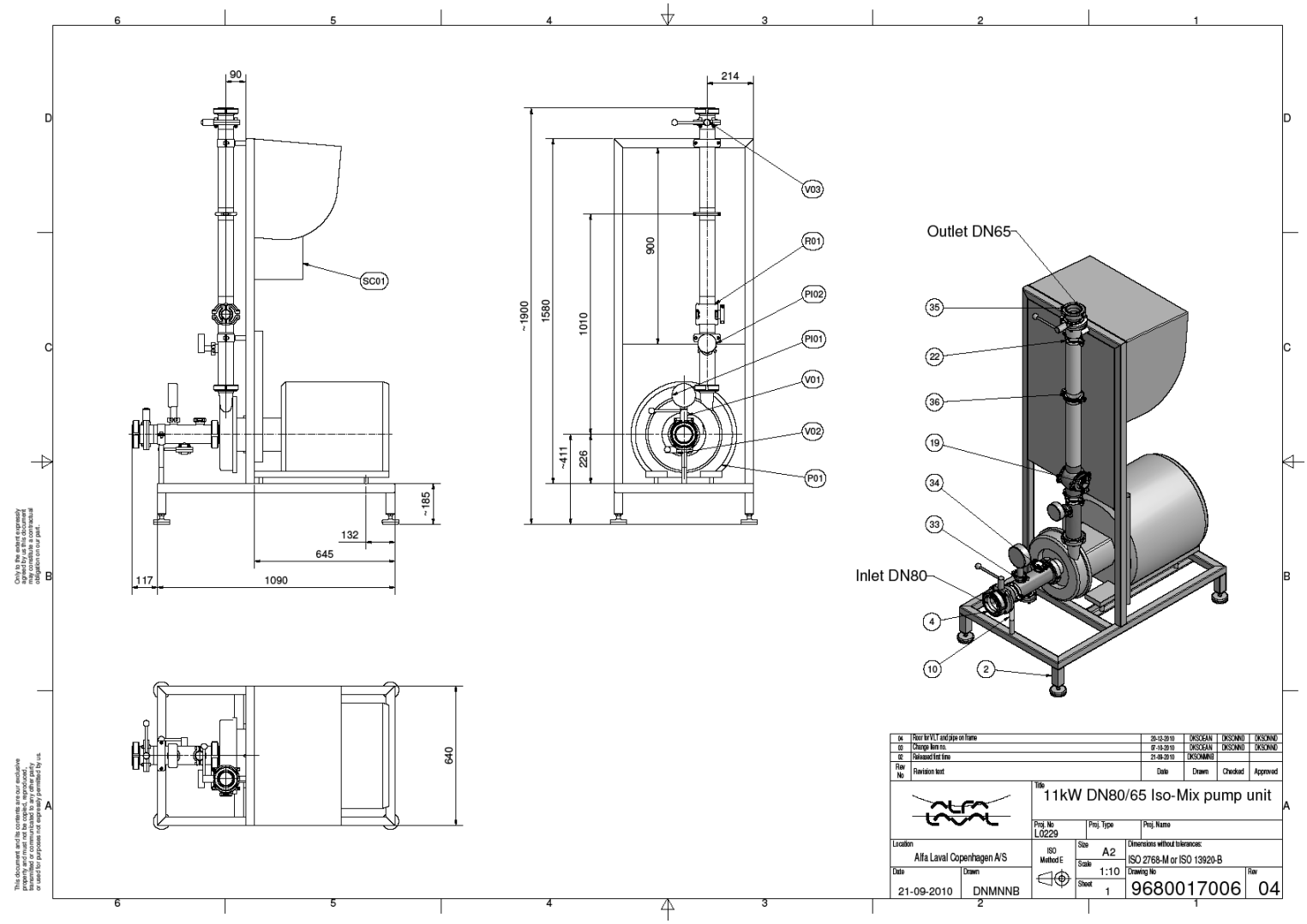
Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
100	9612628110 BUTTERFLY VALVE LKB-2, DIN MALE/WELD NW65 EPDM, 316 HANDLE-2P	V01		01	1	PCE
110	9612628167 BUTTERFLY VALVE LKB-2, DN25, DN25, EN 1.4404 (AISI 316L), PN10, RA<1.6□M	V02		01	1	PCE
120	9612628109 BUTTERFLY VALVE LKB-2 DIN MALE/WELD NW50 EPDM 316L HANDLE - 2 POS.	V03		01	1	PCE
200	TE67D313100140 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BOTTOM	PI01		01	1	PCE
210	TE67D313100150 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BACK	PI02		01	1	PCE
220	9614800367 AL INSTRUMENT HOUSING DN50 FOR CLAMP DN38 (ISO 2852)	R01		01	1	PCE
300	9613274191 CENTRIFUGAL PUMP LKH-35/220 7.5 KW 50 HZ DIN SSS EPDM 400Y/660D	P01		01	1	PCE
310	9680157583 FREQUENCY CONVERTER VLT FC301 380/500 V 7.5 KW IP55 GRAPHIC DISP DISC. SWITCH	SC01		01	1	PCE
400	9680123762 MACHINE SHOE M75-16-070 EN1.4307	2		01	4	PCE
410	9680123764 MALE PART M16, 40X40 PIPE	2	74.31.005 F	01	4	PCE
600	9611310200 CLAMP FERRULE WELDING ISO 38 316L	33		01	3	PCE
610	9611311051 CLAMP RING ALLEN SCREWS 25/38 304	37		01	4	PCE
620	9611991359 SEAL RING EPDM 38MM ISO CLAMP	37		01	4	PCE

BOM for 7.5 kW SMPU

Bill of material

Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
630	9611340600 CLAMP BLANK ISO 25-38 EN1.4404	19		01	2	PCE
640	9612156127 CLAMP LINER WELD.DIN 316L NW50 BR/BR	36		01	2	PCE
650	9611311052 CLAMP RING ALLEN SCREWS 51 304	36		01	1	PCE
660	9611992015 CLAMP SEAL RING EPDM NW50	36		01	1	PCE
800	3131800144 NUT BRIGHT 304L NW50	35		01	1	PCE
810	9611331098 WELDING LINER SHORT NW50 BRIGHT 316L	35		01	1	PCE
820	9611991272 SEAL RING NW50 EPDM	35		01	1	PCE
850	3131800145 NUT BRIGHT 304L NW65	4		01	1	PCE
860	9611331099 WELDING LINER SHORT NW65 BRIGHT 316L	4		01	1	PCE
870	9611991273 SEAL RING NW65 EPDM	4		01	1	PCE
900	9680123956 PIPE HOLDER Ø53, SHORT, TIGHT	38		01	2	PCE
910	9680123959 PIPE HOLDER Ø70, SHORT, TIGHT	10		01	1	PCE

Layout of 11 kW SMPU



BOM for 11 kW SMPU

Bill of material

Product no	Rev.	Product description
9680157589	00	11KW DN80/65 ISO-MIX PUMP UNIT L0229 MATERIALE PARTS LIST

Drawing number	Rev.	Structure type	Responsible	Change id	Change date (YMD)
9680017006	04	S01	DKSOJKNC	DKSOKNNA	11-01-24

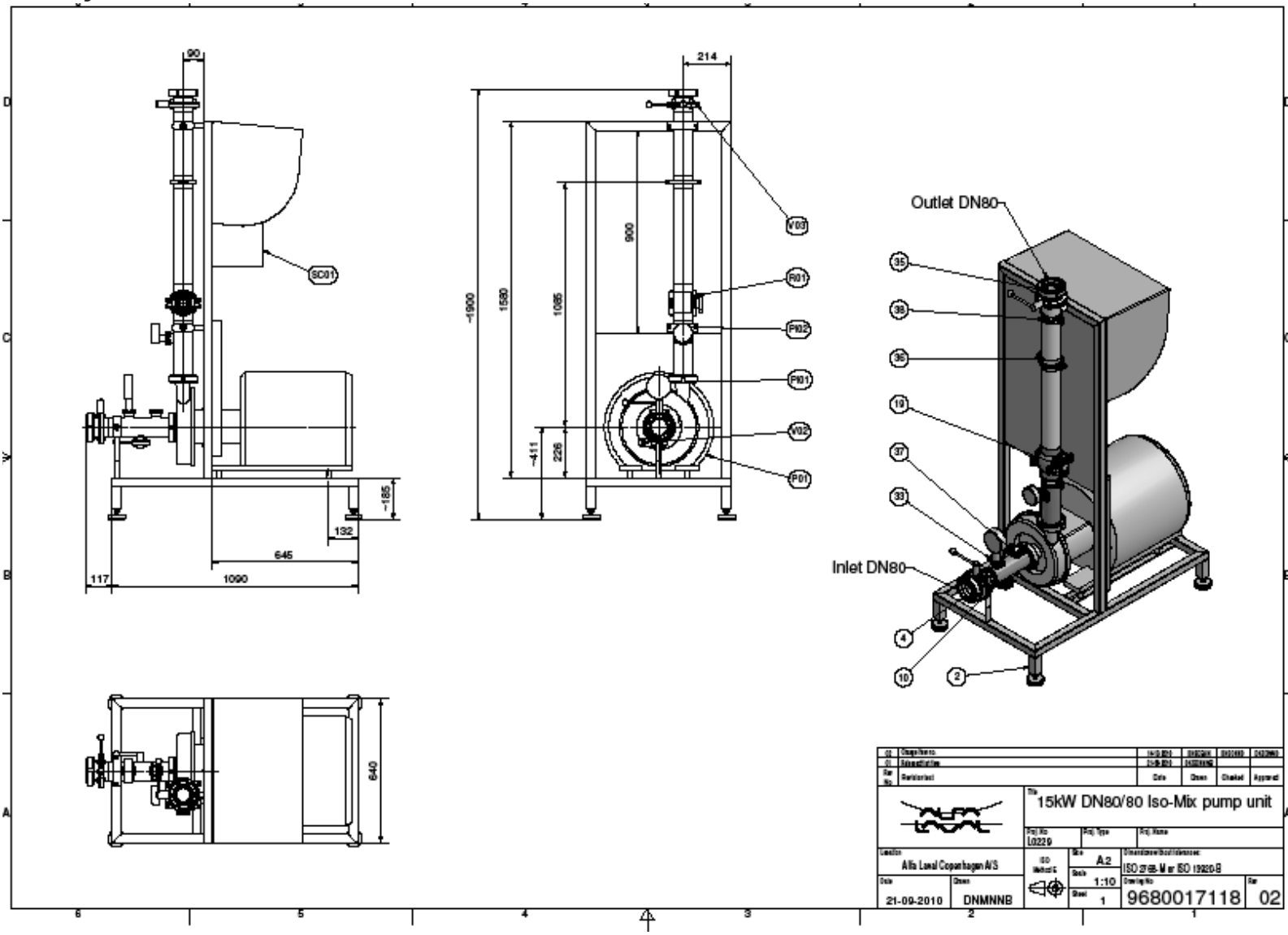
Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
100	9612628111 BUTTERFLY VALVE LKB-2, DIN MALE/WELD NW80 EPDM, 316 HANDLE-2P	V01		01	1	PCE
110	9612628167 BUTTERFLY VALVE LKB-2, DN25, DN25, EN 1.4404 (AISI 316L), PN10, RA<1.6□M	V02		01	1	PCE
120	9612628110 BUTTERFLY VALVE LKB-2, DIN MALE/WELD NW65 EPDM, 316 HANDLE-2P	V03		01	1	PCE
200	TE67D313100140 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BOTTOM	PI01		01	1	PCE
210	TE67D313100150 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BACK	PI02		01	1	PCE
220	9614800368 AL INSTRUMENT HOUSING DN65 FOR CLAMP DN38 (ISO 2852)	R01		01	1	PCE
300	9613220391 CENTRIFUGAL PUMP LKH-25/205 11.0 KW 50 HZ DIN SSS EPDM 400Y/690D	P01		01	1	PCE
310	9680157584 FREQUENCY CONVERTER VLT FC301 380/500 V 11 KW IP55 GRAPHIC DISP DISC. SWITCH	SC01		01	1	PCE
400	9680123762 MACHINE SHOE M75-16-070 EN1.4307	2		01	4	PCE
410	9680123764 MALE PART M16, 40X40 PIPE	2	74.31.005 F	01	4	PCE
600	9611310200 CLAMP FERRULE WELDING ISO 38 316L	33		01	3	PCE
610	9611311051 CLAMP RING ALLEN SCREWS 25/38 304	37		01	4	PCE
620	9611991359 SEAL RING EPDM 38MM ISO CLAMP	37		01	4	PCE

BOM for 11 kW SMPU

Bill of material

Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
630	9611340600 CLAMP BLANK ISO 25-38 EN1.4404	19		01	2	PCE
640	9612156128 CLAMPKRAVE, DIN65, AISI 316L	36		01	2	PCE
650	9611311054 CLAMP RING ALLEN SCREWS 76 304	36		01	1	PCE
660	9611992016 CLAMP-PACKINGS DIN NW65 EPDM	36		01	1	PCE
800	3131800145 NUT BRIGHT 304L NW65	35		01	1	PCE
810	9611331099 WELDING LINER SHORT NW65 BRIGHT 316L	35		01	1	PCE
820	9611991273 SEAL RING NW65 EPDM	35		01	1	PCE
850	9611307141 NUT NW80 MAT 304	4		01	1	PCE
860	9611331100 WELDING LINER SHORT NW80 BRIGHT 316L	4		01	1	PCE
870	9611991275 SEAL RING NW80 EPDM	4		01	1	PCE
900	9680123959 PIPE HOLDER Ø70, SHORT, TIGHT	38		01	2	PCE
910	9680123962 PIPE HOLDER Ø85, LONG, TIGHT	10		01	1	PCE

Layout of 15 kW SMPU



BOM for 15 kW SMPU

Bill of material

Product no	Rev.	Product description
9680159996	00	15KW DN80/80 ISO-MIX PUMPUNIT L0229 MATERIALE PARTS LIST

Drawing number	Rev.	Structure type	Responsible	Change id	Change date (YMD)
9680017118	02	S01	DKSOJKNC	DKSOEAN	11-01-12

Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
100	9612628111 BUTTERFLY VALVE LKB-2, DIN MALE/WELD NW80 EPDM, 316 HANDLE-2P	V01		01	1	PCE
110	9612628167 BUTTERFLY VALVE LKB-2, DN25, DN25, EN 1.4404 (AISI 316L), PN10, RA<1.6□M	V02		01	1	PCE
120	9612628111 BUTTERFLY VALVE LKB-2, DIN MALE/WELD NW80 EPDM, 316 HANDLE-2P	V03		01	1	PCE
200	TE67D313100140 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BOTTOM	PI01		01	1	PCE
210	TE67D313100150 PRESSURE GAUGE AL PRESSURE GAUGE, CLAMP DN38, 100 MM, 0-10 BAR BACK	PI02		01	1	PCE
220	9614800369 AL INSTRUMENT HOUSING DN80 FOR CLAMP DN38 (ISO 2852)	R01		01	1	PCE
300	9613274192 CENTRIFUGAL PUMP LKH-25/205 15.0 KW 50 HZ DIN SSS EPDM 400Y/690D	P01		01	1	PCE
310	9680157585 FREQUENCY CONVERTER VLT FC301 380/500 V 15 KW IP55 GRAPHIC DISP DISC. SWITCH	SC01		01	1	PCE
400	9680123762 MACHINE SHOE M75-16-070 EN1.4307	2		01	4	PCE
410	9680123764 MALE PART M16, 40X40 PIPE	2	74.31.005 F	01	4	PCE
600	9611310200 CLAMP FERRULE WELDING ISO 38 316L	33		01	3	PCE
610	9611311051 CLAMP RING ALLEN SCREWS 25/38 304	37		01	4	PCE
620	9611991359 SEAL RING EPDM 38MM ISO CLAMP	37		01	4	PCE

BOM for 15 kW SMPU

Bill of material

Line	Item no. Description	Pos.	Drawing no. Revision	Level	Qty	U/M
630	9611340600 CLAMP BLANK ISO 25-38 EN1.4404	19		01	2	PCE
640	9612156129 CLAMPKRAVE, DIN80, AISI 316L	36		01	2	PCE
650	9611311054 CLAMP RING ALLEN SCREWS 76 304	36		01	1	PCE
660	9611992017 GASKET CLAMP DIN80	36		01	1	PCE
800	9611307141 NUT NW80 MAT 304	35		01	1	PCE
810	9611331100 WELDING LINER SHORT NW80 BRIGHT 316L	35		01	1	PCE
820	9611991275 SEAL RING NW80 EPDM	35		01	1	PCE
850	9611307141 NUT NW80 MAT 304	4		01	1	PCE
860	9611331100 WELDING LINER SHORT NW80 BRIGHT 316L	4		01	1	PCE
870	9611991275 SEAL RING NW80 EPDM	4		01	1	PCE
900	9680123966 PIPE HOLDER Ø84, SHORT,TIGHT	38		01	2	PCE
910	9680123962 PIPE HOLDER Ø85, LONG, TIGHT	10		01	1	PCE

Process description

Operation

Liquid is fed to the suction side of the SMPU and delivered from the SMPU at a higher pressure on the outlet side.

Inlet and outlet pressure can be read locally on the manometers

The unit can be mounted in combination with a Rotary Jet Mixer or a Rotary jet cleaning machine in which case the unit is used to deliver the required flow and pressure for mixing and CIP cleaning of the tank.

Start and stop of the pump on the unit is recommemded to be incorporated into the plant´s control system, but can also be done directly from the frequency converter.

Cleaning

Cleaning of the Skid Mounted Pump Unit is done as part of the cleaning of surrounding pipework or together with the tank. Follow the cleaning instructions for up- and downstream equipment.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website.

Please visit www.alfalaval.com to access the information direct.