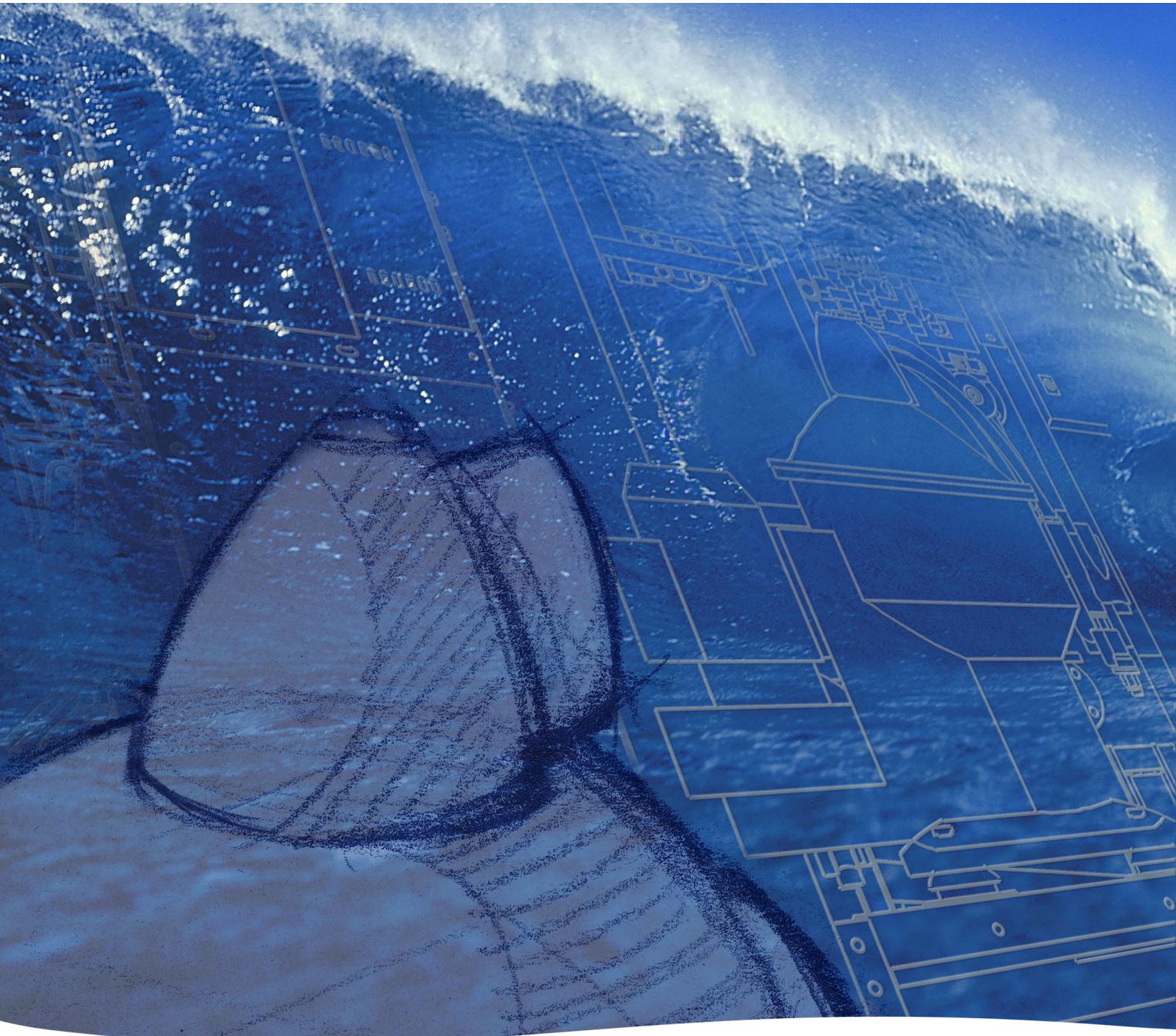


Flex Separation System

Installation System Reference

Printed 11-2011
Book No. 584682-02, rev.6



Published By:

Alfa Laval Tumba AB
SE-147 80 Tumba, Sweden

Telephone: +46 8 530 650 00

Telefax: +46 8 530 310 40

© Alfa Laval Tumba AB 11-2011
Original instructions

This publication or any part thereof may not be reproduced or transmitted by any process or means without prior written permission of Alfa Laval Tumba AB.

Contents

| | | |
|------------|----------------------------------------------|-----------|
| 1 | Technical Data | 7 |
| 1.1 | Demand Specifications Water | 7 |
| 1.2 | Demand Specifications Air | 7 |
| 1.3 | System Data | 8 |
| 2 | Mechanical Drawings | 11 |
| 2.1 | Flow Charts | 12 |
| 2.1.1 | S-separator Basic and Optional Components | 12 |
| 2.1.2 | P-Separator Basic and Optional Components | 13 |
| 2.2 | Mounting Drawings | 14 |
| 2.2.1 | S-Separator DIN Mounting Drawing | 14 |
| 2.2.2 | S-Separator JIS Mounting Drawing | 15 |
| 2.2.3 | P-Separator DIN Mounting Drawing | 16 |
| 2.2.4 | P-Separator JIS Mounting Drawing | 17 |
| 2.3 | Installation Drawings | 18 |
| 2.3.1 | S 831 - S 937 Separator Installation Drawing | 18 |
| 2.3.2 | S 841 - S 947 Separator Installation Drawing | 19 |
| 2.3.3 | P 635/636 Separator Installation Drawing | 20 |
| 2.4 | Basic Size Drawings | 21 |
| 2.4.1 | S 831 - S 937 Separator Basic Size Drawing | 21 |
| 2.4.2 | S 841 - S 947 Separator Basic Size Drawing | 23 |
| 2.4.3 | P 635/636 Separator Basic Size Drawing | 25 |
| 2.5 | Foundation Drawings | 26 |
| 2.5.1 | S 831 - S 937 Foundation Drawing | 26 |
| 2.5.2 | S 841 - S 947 Foundation Drawing | 27 |
| 2.5.3 | P 635/636 Foundation Drawing | 28 |

| | | |
|-------------|-----------------------------------------------------------|-----------|
| 2.6 | S-Separator Pipe Arrangement | 29 |
| 2.7 | P-Separator Pipe Arrangement | 30 |
| 2.8 | Valve Block Oil Assembly Drawing | 31 |
| 2.9 | Valve Block Oil Assembly Drawing cont. | 33 |
| 2.10 | Valve Block Water Assembly Drawing | 34 |
| 2.11 | Air Distributer Kit | 35 |
| 2.12 | Control Cabinet Dimension Drawing | 36 |
| 2.13 | Control Cabinet Assembly Drawing, External | 37 |
| 2.14 | Control Cabinet Assembly Drawing, Internal | 39 |
| 2.15 | Change of EPC 60 Components | 40 |
| 3 | Electrical Drawings | 43 |
| 3.1 | Electrical System Layout S 831 – S 947 | 44 |
| 3.2 | Electrical System Layout P 635/636 | 45 |
| 3.3 | Control and Starter Electrical Diagrams | 46 |
| 3.3.1 | Starter cable list | 46 |
| 3.3.2 | Separator Interconnection Diagram | 49 |
| 3.3.3 | Separator Interconnection Diagram | 52 |
| 3.3.4 | Steam Regulating Valve (optional) Interconnection Diagram | 55 |
| 3.3.5 | Speed Transmitter (optional) Interconnection Diagram | 56 |
| 3.3.6 | Vibration Transmitter (optional) Interconnection Diagram | 57 |
| 3.3.7 | Electric Heater (optional) Interconnection Diagram | 58 |
| 3.3.8 | I/O (optional) Interconnection Diagram | 59 |
| 3.3.9 | Heat Tracing (optional) Interconnection Diagram | 61 |
| 3.3.10 | Emergency Shutdown Interconnection Diagram | 62 |
| 3.3.11 | Circuit Diagram | 63 |
| 3.3.12 | Circuit Diagram | 71 |
| 3.3.13 | Steam Regulating Valve (optional) Circuit Diagram | 79 |
| 3.3.14 | Speed Transmitter (optional) Circuit Diagram | 80 |
| 3.3.15 | Vibration Transmitter (optional) Circuit Diagram | 81 |
| 3.3.16 | Electric Heater (optional) Circuit Diagram | 82 |
| 3.3.17 | I/O (optional) Circuit Diagram | 84 |
| 3.3.18 | Heat Tracing (optional) Circuit Diagram | 86 |
| 3.3.19 | Emergency Shutdown Circuit Diagram | 88 |

| | | |
|----------|------------------------------------------------------------------|-----|
| 4 | Specifications | 89 |
| 4.1 | Cables | 90 |
| 4.2 | Cable Routing | 91 |
| 4.3 | Oil, Water, Steam, and Condensate Piping | 92 |
| 4.4 | Ambient Temperature Limitation | 92 |
| 4.5 | Heat Tracing and Insulation of Fuel Oil, Sludge, and Steam Pipes | 93 |
| 4.6 | More than one Oil Tank | 93 |
| 4.7 | Sludge Removal Kit (Optional Equipment) | 94 |
| 4.8 | Sludge Tank | 96 |
| 4.9 | Sludge Piping | 98 |
| 5 | Commissioning and Initial Start | 99 |
| 5.1 | Completion Check List | 99 |
| 5.2 | Initial Start-up | 100 |
| 5.2.1 | Calculating Operating Pressure | 103 |
| 6 | Shut-down and Storage | 105 |
| 6.1 | Shut-down after Use | 105 |
| 6.2 | Protection and Storage | 106 |
| 6.3 | Reassembly and Start up | 108 |

1 Technical Data

1.1 Demand Specifications Water

Alfa Laval ref. 574487 Rev. 1

Poor quality of the operating water may with time cause erosion, corrosion and/or operating problems. The water shall be treated to meet certain demands.

The following requirements are important:

1. Turbidity-free water, solids content <0,001% by volume.
Max. particle size 50 µm.
Deposits shall not be allowed to form in certain areas in the system.
2. Total hardness less than 180 mg CaCO₃ per litre, which corresponds to 10 °dH or 12,5 °E.
Hard water may with time form deposits in the operating mechanism. The precipitation rate is accelerated with increased operating temperature and low discharge frequency. These effects become more severe the harder the water is.
3. Chloride content max. 100 ppm NaCl (equivalent to 60 mg Cl/l). Chloride ions contribute to corrosion on surfaces in contact with the operating water. Corrosion is a process that is accelerated by increased separating temperature, low pH, and high chloride ion concentration.
4. 6,5 < pH < 9
Bicarbonate content (HCO₃) min. 70mg HCO₃ per litre, which corresponds to 3,2 °dKH.
5. Pressure 200 – 800 kPa (2 – 8 bar).

NOTE

Alfa Laval accepts no liability for consequences arising from unsatisfactorily purified operating water supplied by the customer.

1.2 Demand Specifications Air

Specific requirements regarding the quality of air

1. Pressure 500 – 800 kPa (5 – 8 bar).
2. Free from oil, and solid particles larger than 0.01 mm.
3. Dry, with dew point min. 10 °C below ambient temperature.

NOTE

Electrical interconnections must be made by qualified electricians.

Mechanical interconnections must be made by qualified mechanical technicians.

1.3 System Data

Application

| Cleaning of fuel and lubricating oils | |
|----------------------------------------------|------------------------------------------------------------------------------------------------|
| Min. density | 820 kg/m ³ at 15°C |
| Max. density | 1010 Kg/m ³ at 15°C in ALCAP mode 991 kg/m ³ at 15°C in Purifier mode |
| Max. viscosity | 55 cSt at 100°C (700 cSt at 50°C) |
| Feed temperature | 5°C to 100°C |
| Ambient temperature | 5°C to 55°C |
| Feed capacity | In accordance with the separator size capacity table |

Media inlet/outlet data at separator connections

| Pressure | |
|--------------------------------|---------------------------------------------------------------------------|
| Oil inlet | Max. 2 bar at separator inlet |
| Oil outlet | Max. 2.5 bar |
| Sludge outlet from separator | without pressure |
| Sludge outlet from sludge pump | Max. 5 bar at 6 bar air pressure |
| Separated water | Max. 4 bar (if not diverted into sludge outlet) |
| Temperature | According to capacity table, depending on oil viscosity ±2 °C Max. 100 °C |

Sludge Removal kits (optional)

The systems can be equipped with their own sludge tank for collecting the sludge discharge from the separator.

Sludge Removal Kit tank volumes: 11.5 Litres.

| Auxiliary systems | |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Operating water | |
| - Operating water flow S 831, S 836, S 841, S 846 S 936, S 937, S 946, S 947 | SV 10: 1.6 l/m SV 15: 11.0 l/m SV 16: 2.8 l/m |
| - Operating water flow P 635, P 636 | SV 10: 15 l/m SV 15: 11 l/m SV 16: 2.8 l/m |
| | For further details see " 1.1 Demand Specifications Water on page 7 ". |
| Quality | |
| Pressure | 2 – 8 bar |
| Temperature | 5 °C – 55 °C (unheated water) |
| Air | |
| Quality | Instrument air |
| Pressure | 5 – 8 bar (an optional pressure reducer is available for above 8 bar) |
| Consumption | |
| Air operated valves | 10 N l/h |
| Sludge pump (pneumatic) | 1000 N l/h at max. 1l/s For further details see " 1.2 Demand Specifications Air on page 7 ". |
| Mechanical design part: | |
| Oil and heating media piping | |
| Design pressure | Max. 6 bar (for steam / condensate Max. 9 bar) |
| Test pressure | Max. 9 bar (for steam/condensate Max. 14 bar) |
| Design temperature | 5 °C – 180 °C |
| Flange connections | PN 16 DIN 2573/2633 |
| Pipe data | Material ; ASTM A 106 gr. B seamless schedule 40 thickness. Sizes ; from ½" upto 4" |
| Auxiliary media - Operating water | |
| Design pressure | Max. 6 bar |
| Design temp. | 5 °C – 55 °C |
| Auxiliary media - Air | |
| Design pressure | Max 10 bar |
| Material | Nitrile rubber-steel braided hose or PTFE pipes where possible. |
| Drip tray volume | Max. 19 litres |
| Drip tray Material | Steel sheet laser cut and welded parts |
| Drip tray Drain connection size | 2 x 1" G (internally threaded) |
| Frame Baseplate Material | Steel sheet laser cut and welded parts |
| Electrical design | |

| Auxiliary systems | |
|-----------------------------------|-----------------------------------------------------------------------|
| Mains supply | |
| Voltage | 3x 230 /400V/ 440V / 480V / 575V / 690V ± 10 % |
| Frequency | 50 / 60 Hz |
| Separator el.motor | In accordance with the separator size selected and related data sheet |
| Separator el motor power range | From 7.5 kW up to 11 kW |
| Feed Pump el. Motor | In accordance with the pump size selected and related data sheet |
| Feed Pump el motor power range | from 1.1 kW up to 4 kW |
| EPC | |
| Voltage | 24 V DC (internal) |
| Control voltage, operating supply | 24 V AC (from internal transformer) |
| Frequency | 50 or 60 Hz ± 5 % |
| Control cabinet | |
| Enclosure class | IP 55 |
| Material | Steel sheet |
| Ambient temp. | Max 55 °C |

| Planned Maintenance Kits (not including wear items) | | | | | | | | |
|------------------------------------------------------------|------------------|---------------|-----------------------------|----------------|--------------|--------------------|------------|-----|
| Hours | Period | Separ- tor | Module | Sludge pump | Feed pump | Control cabinet | El. heater | CBM |
| 1000 | | | | | | | | |
| 2000 | | | | | | | | |
| 4000 | 6 months | Inspection | | | | | | |
| 12000 | 18 months | Overhaul | | Overhaul | | | | |
| 24000 | 3 years | Overhaul | Overhaul | Overhaul | Overhaul | | | |
| As necessary | | CIP | Repair (compon- ents) | | | | Repair | CIP |
| With delivery | | Inspection | | | | | | |
| Backup | | Tools | | | | Support | | |
| | | Support | | | | | | |

NOTE

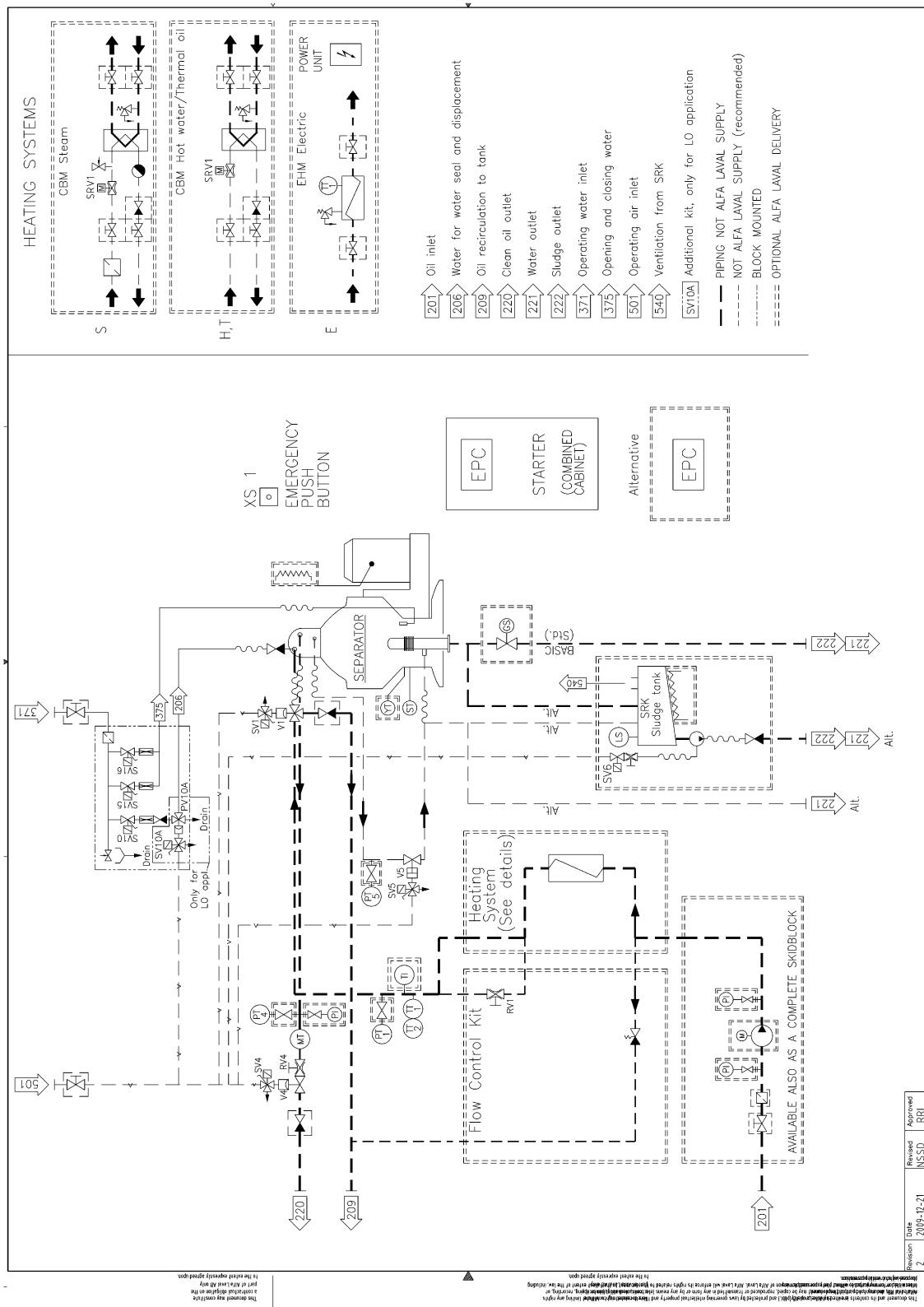
The lifespan of wear items, such as friction blocks and main seal ring, depends on the number of startups, as well as plant and feed conditions. Check wear items regularly and change when necessary.

2 Mechanical Drawings

2.1 Flow Charts

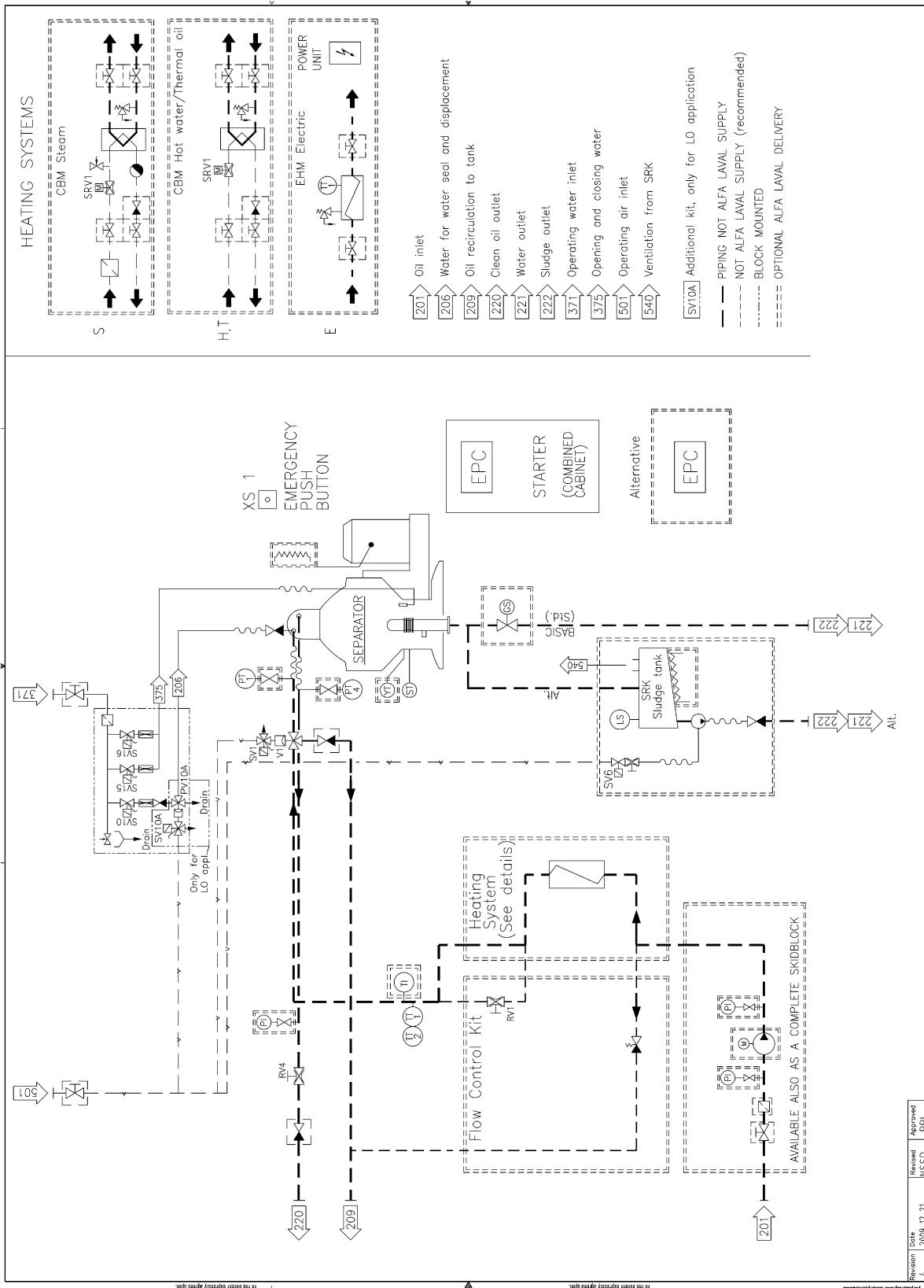
2.1.1 S-separator Basic and Optional Components

Alfa Laval ref. 584767 Rev. 2



2.1.2 P-Separator Basic and Optional Components

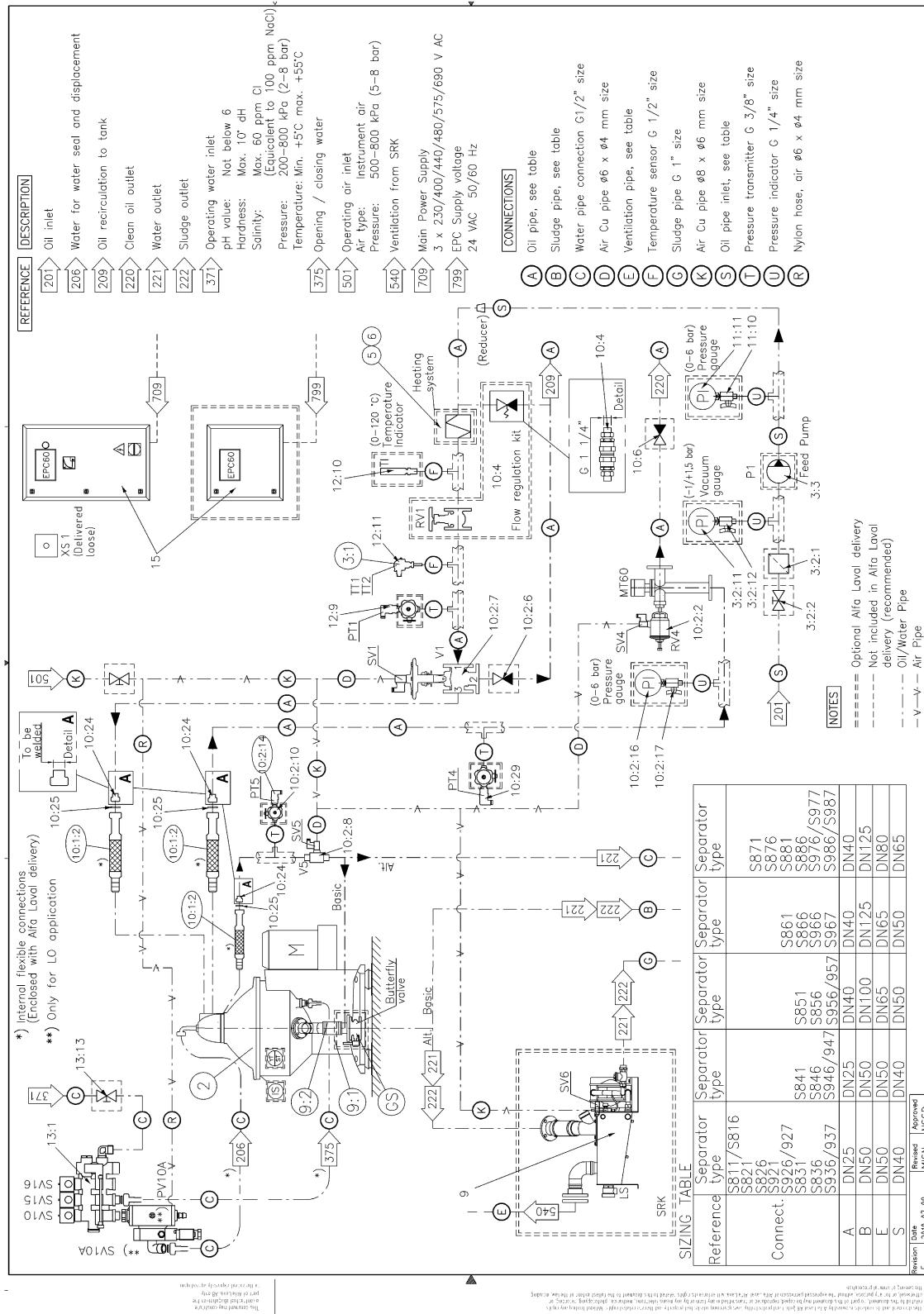
Alfa Laval ref. 584768 Rev. 4



2.2 Mounting Drawings

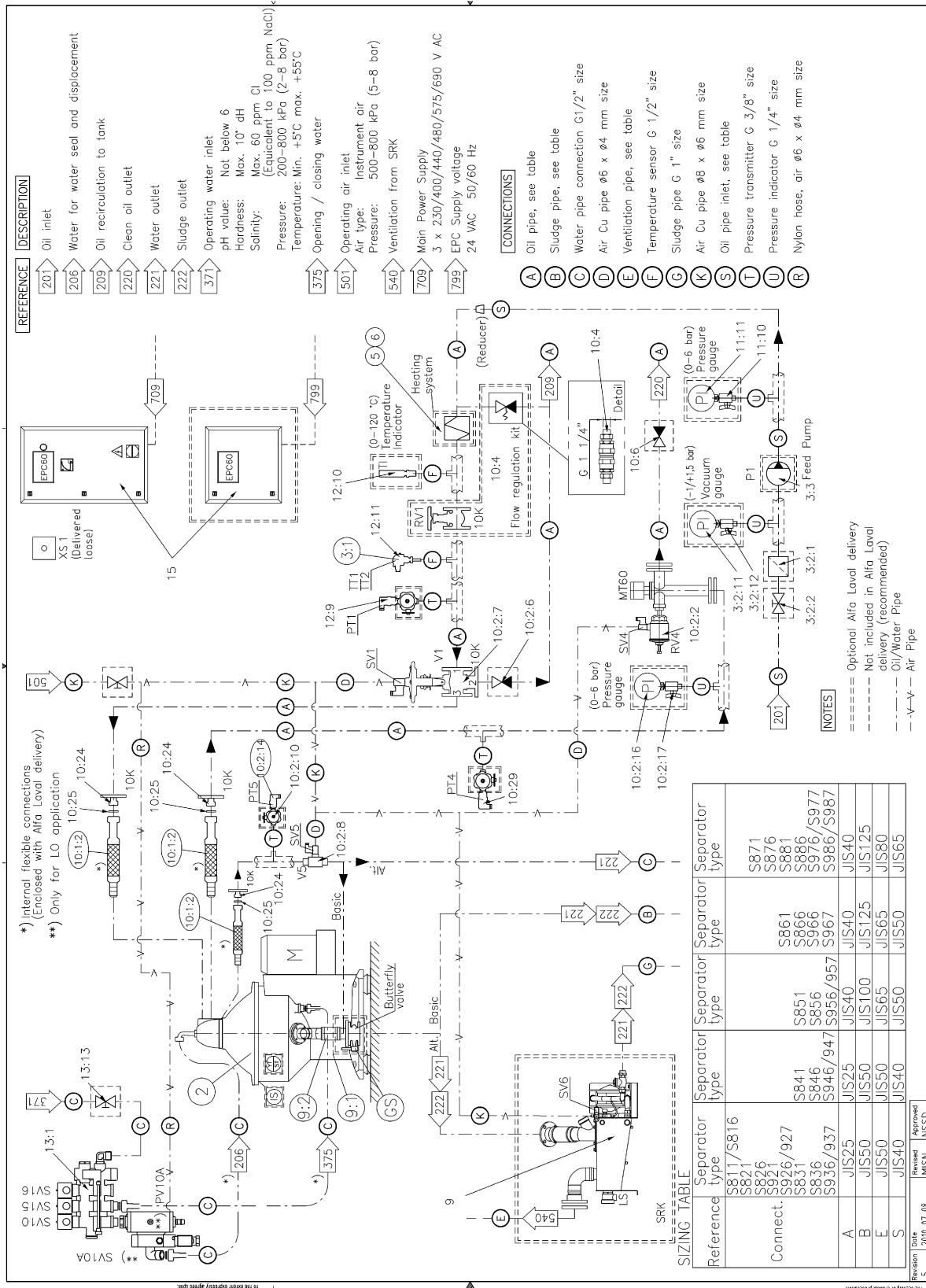
2.2.1 S-Separator DIN Mounting Drawing

Alfa Laval ref. 584354 Rev. 5



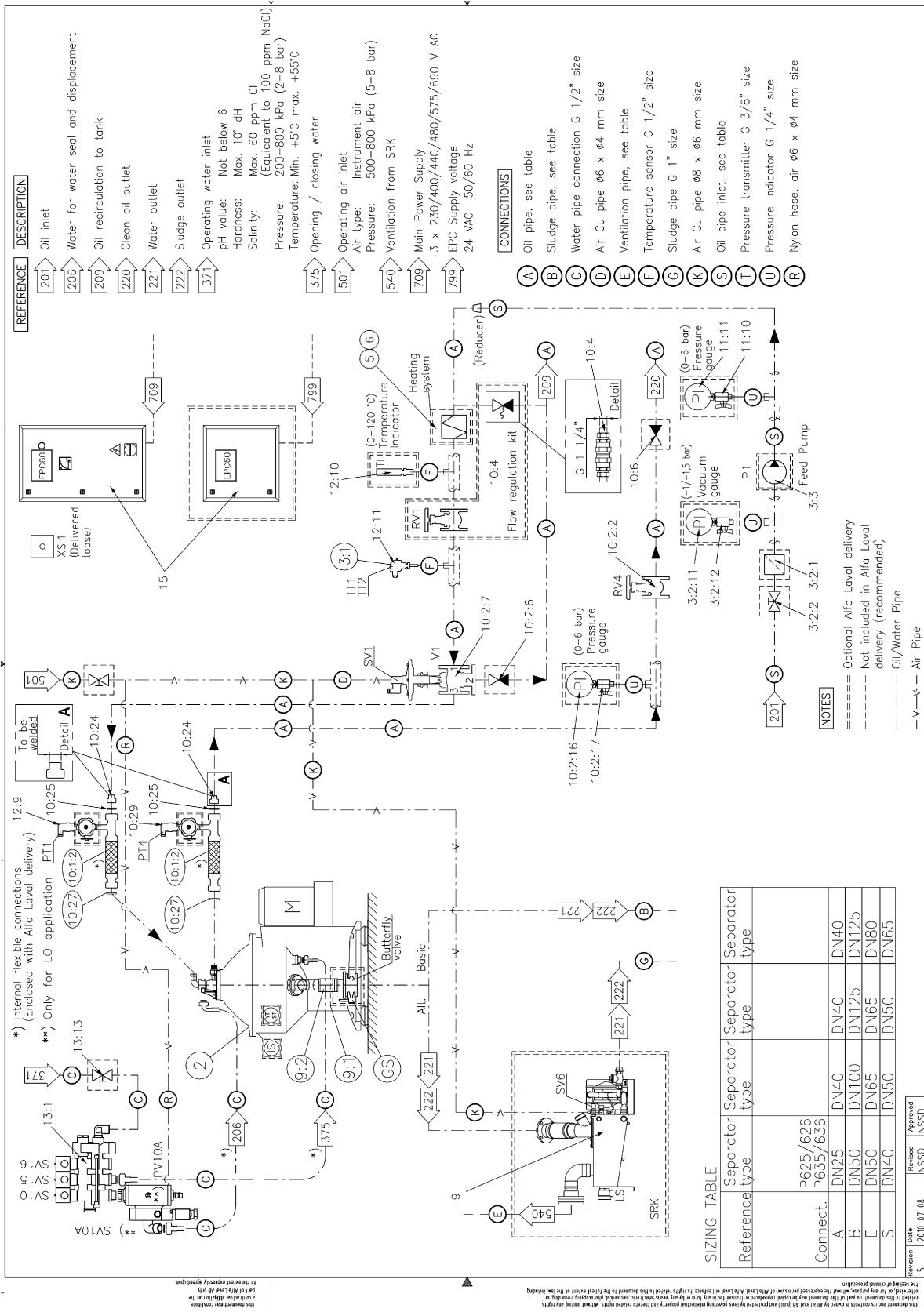
2.2.2 S-Separator JIS Mounting Drawing

Alfa Laval ref. 584355 Rev. 5



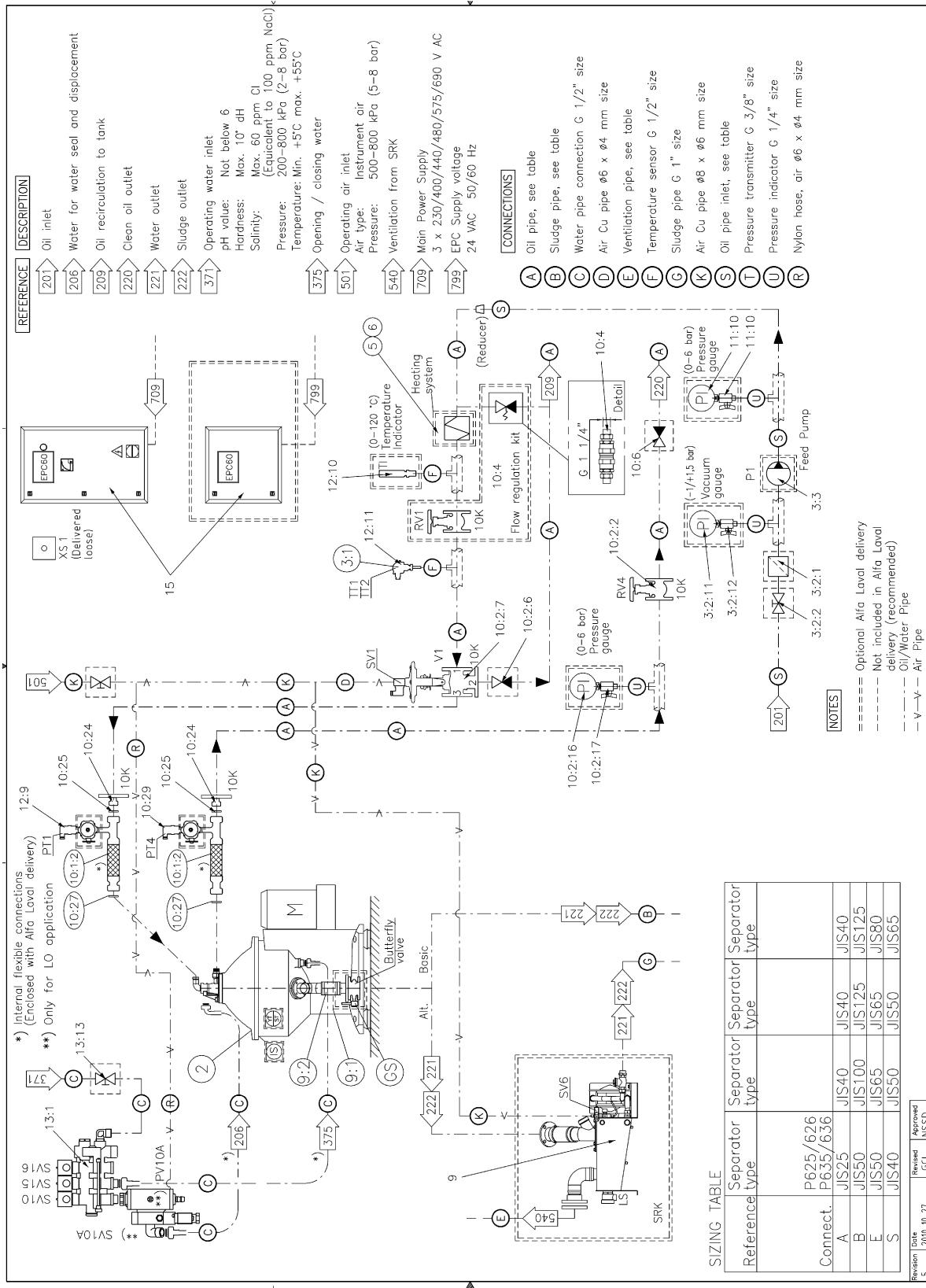
2.2.3 P-Separator DIN Mounting Drawing

Alfa Laval ref. 584356 Rev. 5



2.2.4 P-Separator JIS Mounting Drawing

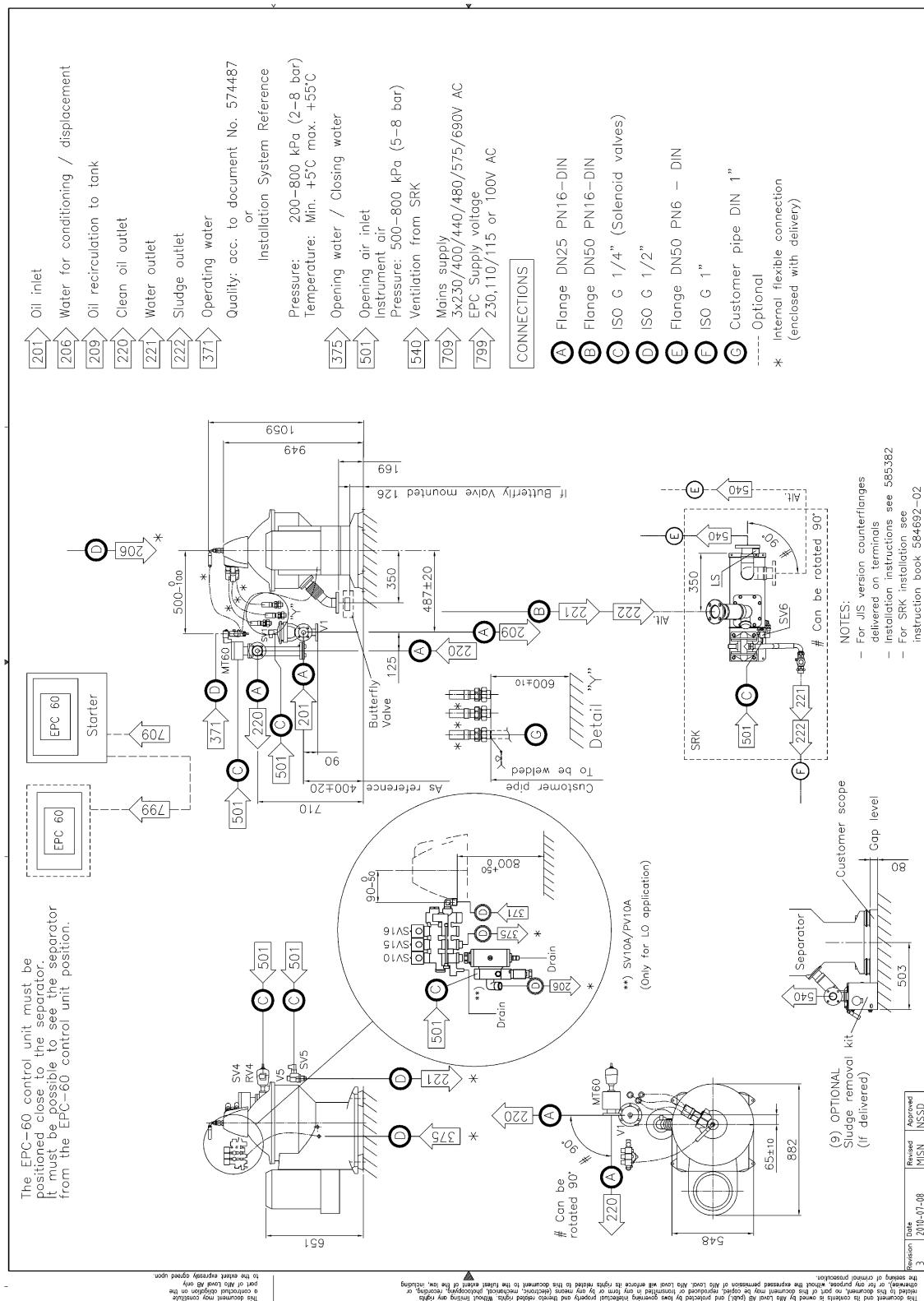
Alfa Laval ref. 584357 Rev. 5



2.3 Installation Drawings

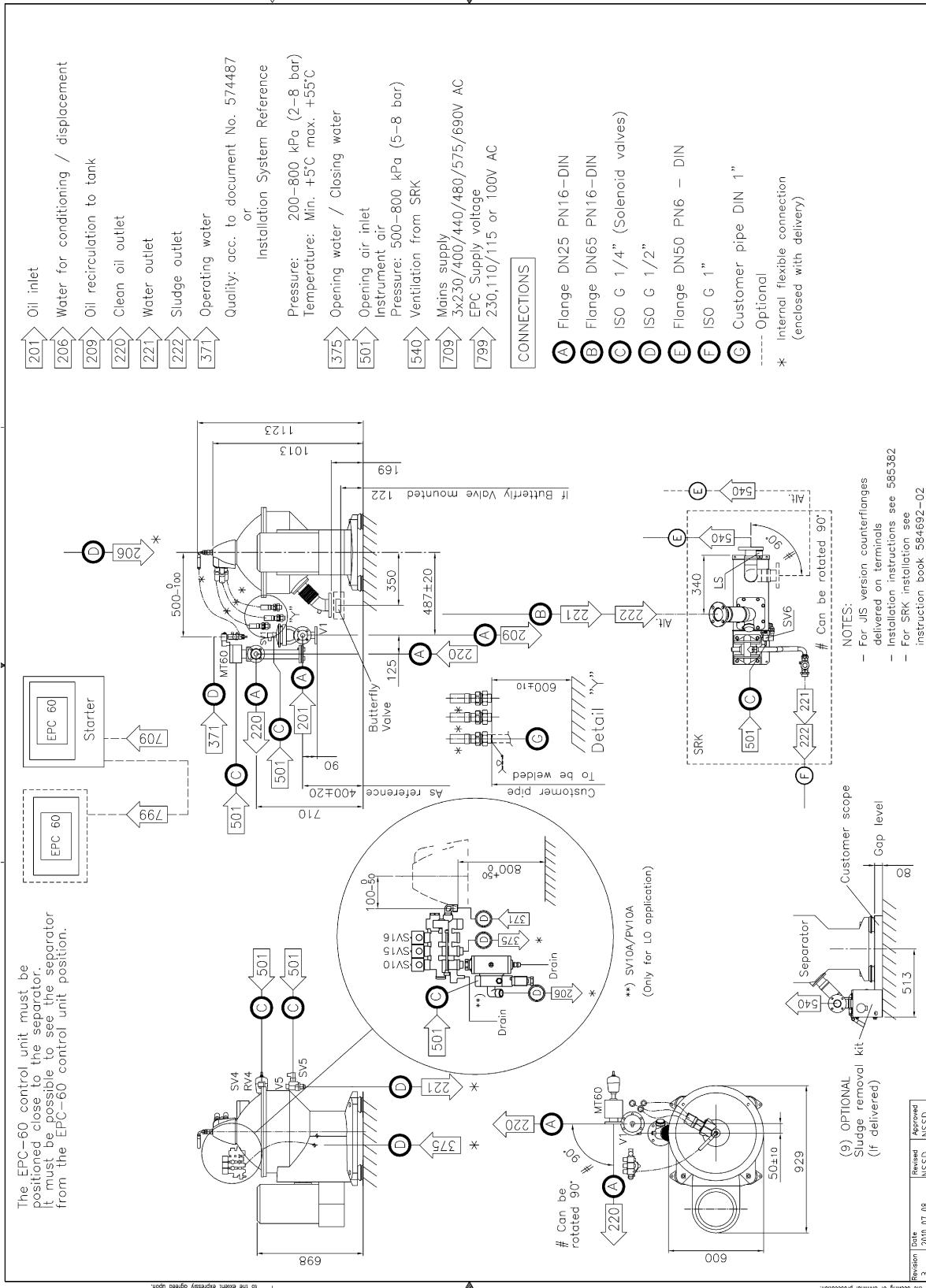
2.3.1 S 831 - S 937 Separator Installation Drawing

Alfa Laval ref. 585170 Rev. 3



2.3.2 S 841 - S 947 Separator Installation Drawing

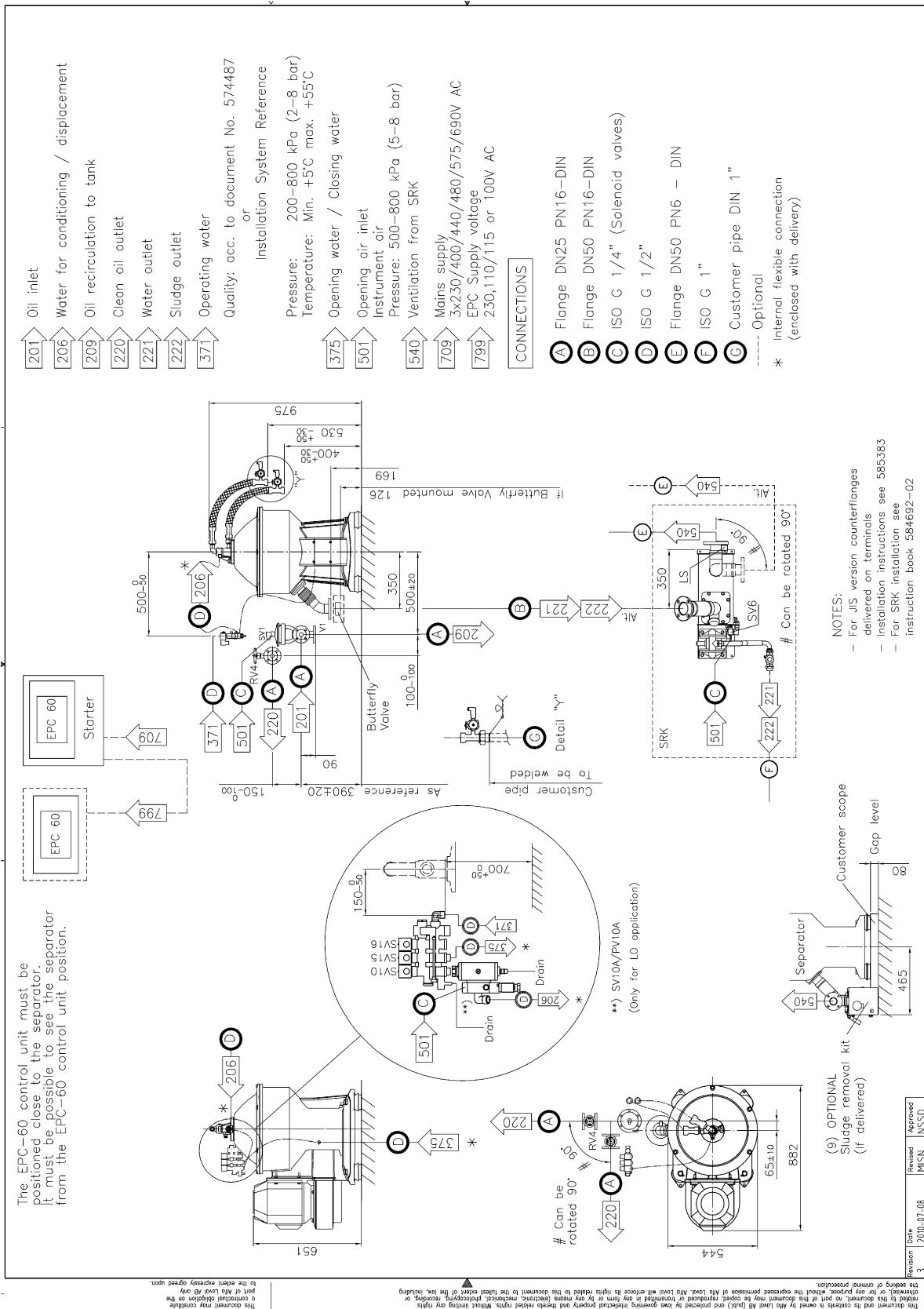
Alfa Laval ref. 585171 Rev. 3



This document may contain trade secrets and/or confidential information of Alfa Laval AB (publ) and protected by law. Any unauthorized disclosure or use of such information without the express written permission of Alfa Laval AB (publ) will entitle Alfa Laval AB (publ) to take all legal steps to protect its trade secrets and/or confidential information. This document may also contain forward-looking statements which involve risks and uncertainties. Actual results may differ materially due to changes in economic conditions or other factors.

2.3.3 P 635/636 Separator Installation Drawing

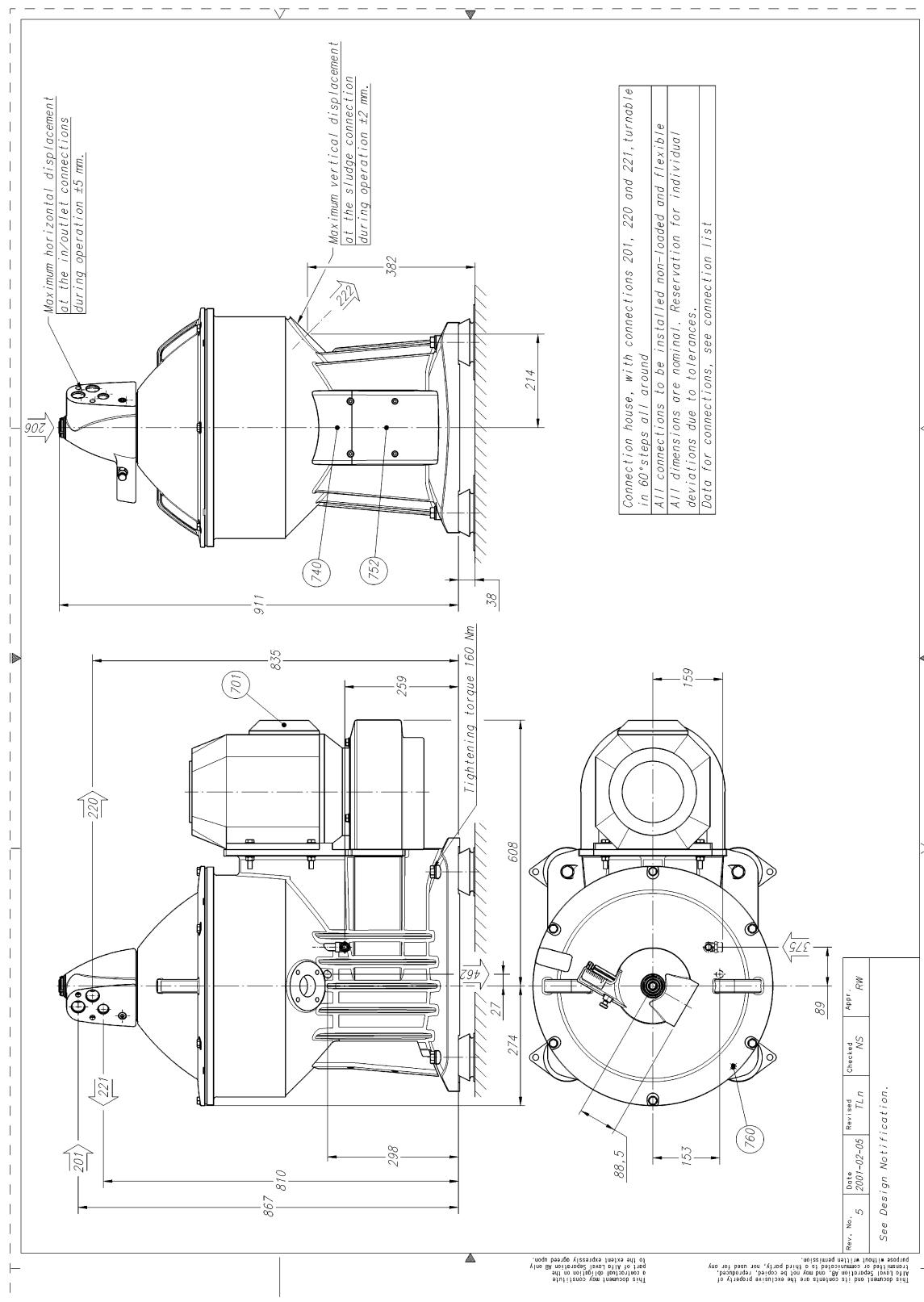
Alfa Laval ref. 585167 Rev. 3



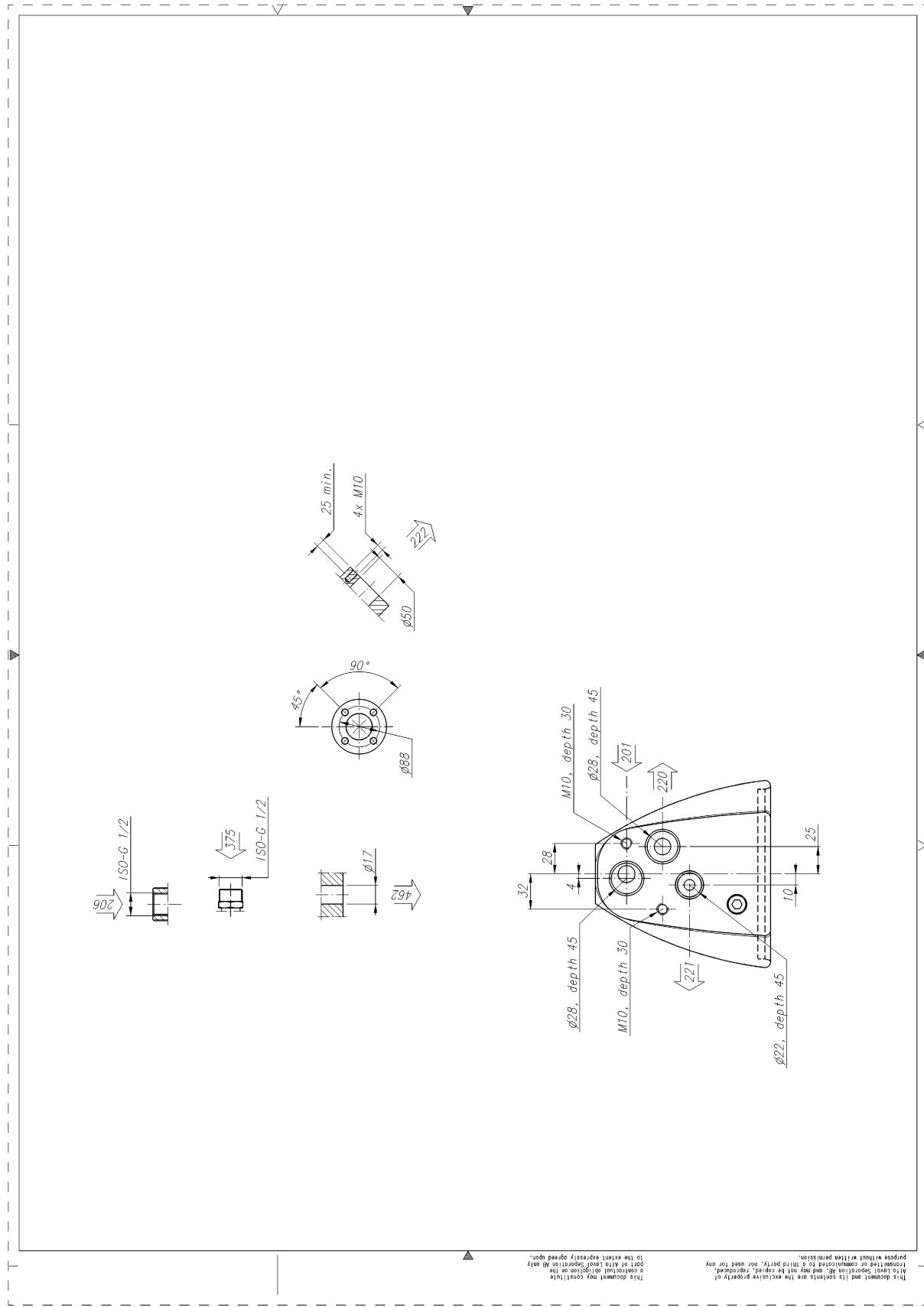
2.4 Basic Size Drawings

2.4.1 S 831 - S 937 Separator Basic Size Drawing

Alfa Laval ref. 561693 Rev. 5



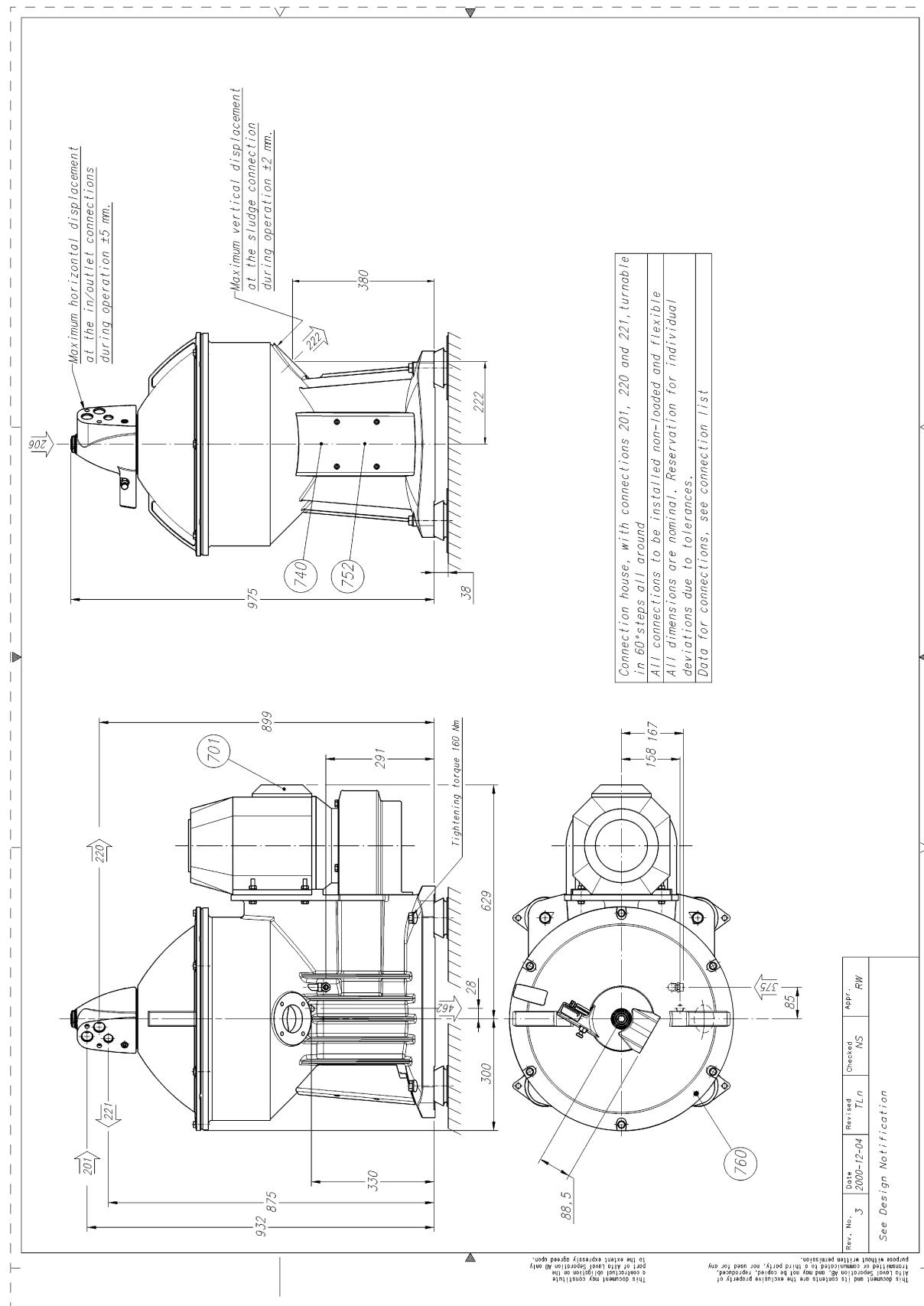
Alfa Laval ref. 561693 Rev. 5



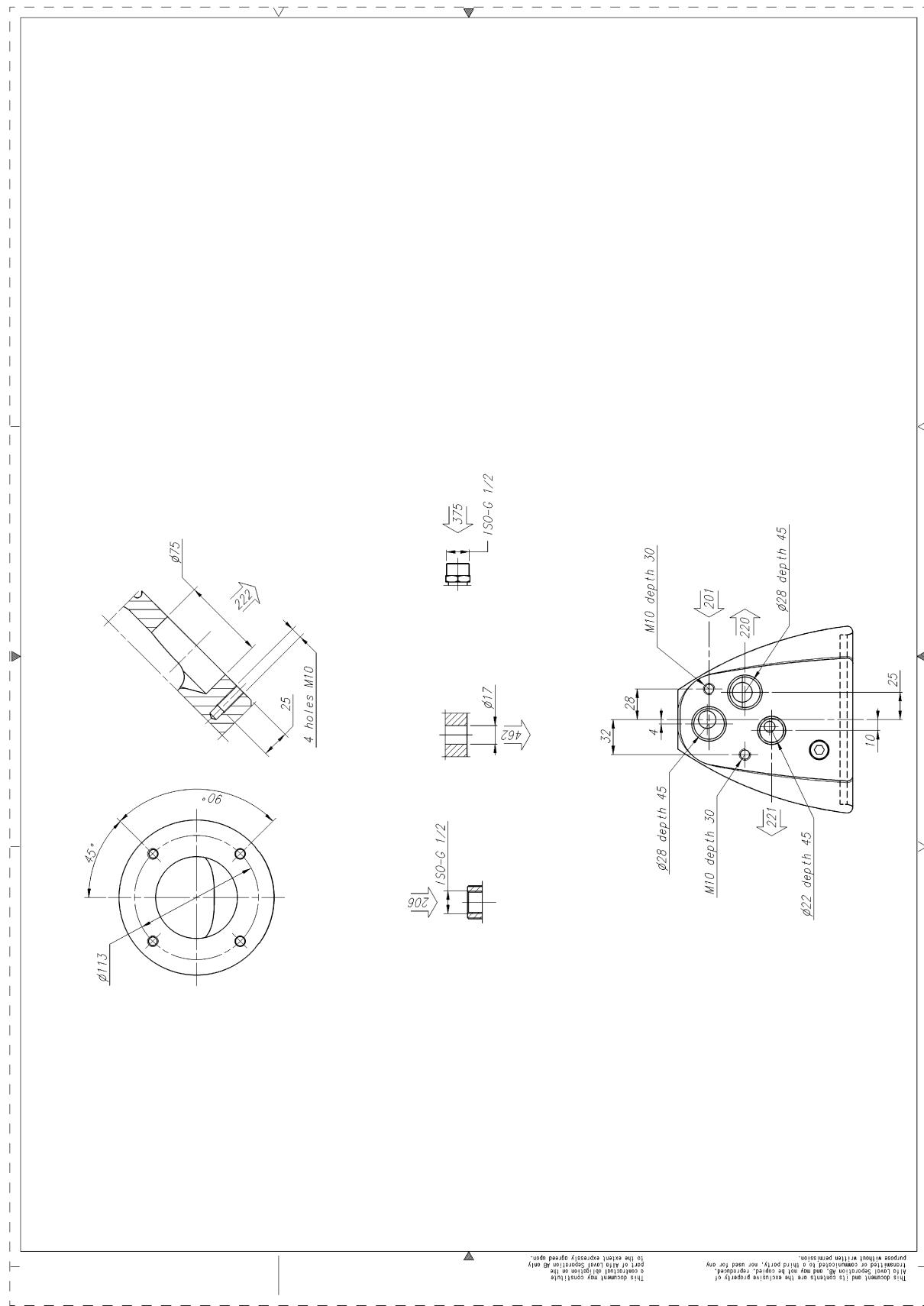
561693 v5_01

2.4.2 S 841 - S 947 Separator Basic Size Drawing

Alfa Laval ref. 562557 Rev. 3



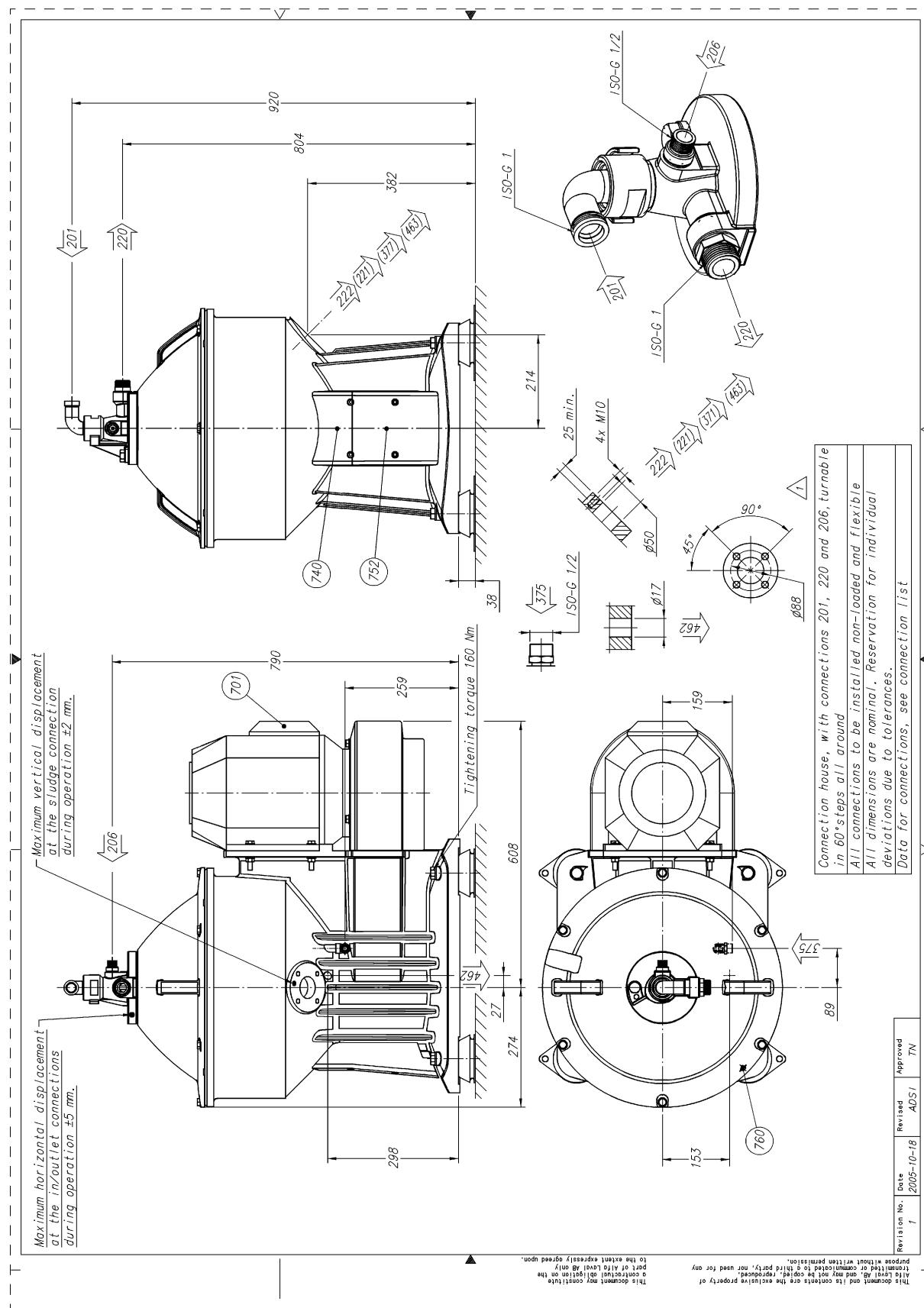
Alfa Laval ref. 562557 Rev. 3



562557 v3_01

2.4.3 P 635/636 Separator Basic Size Drawing

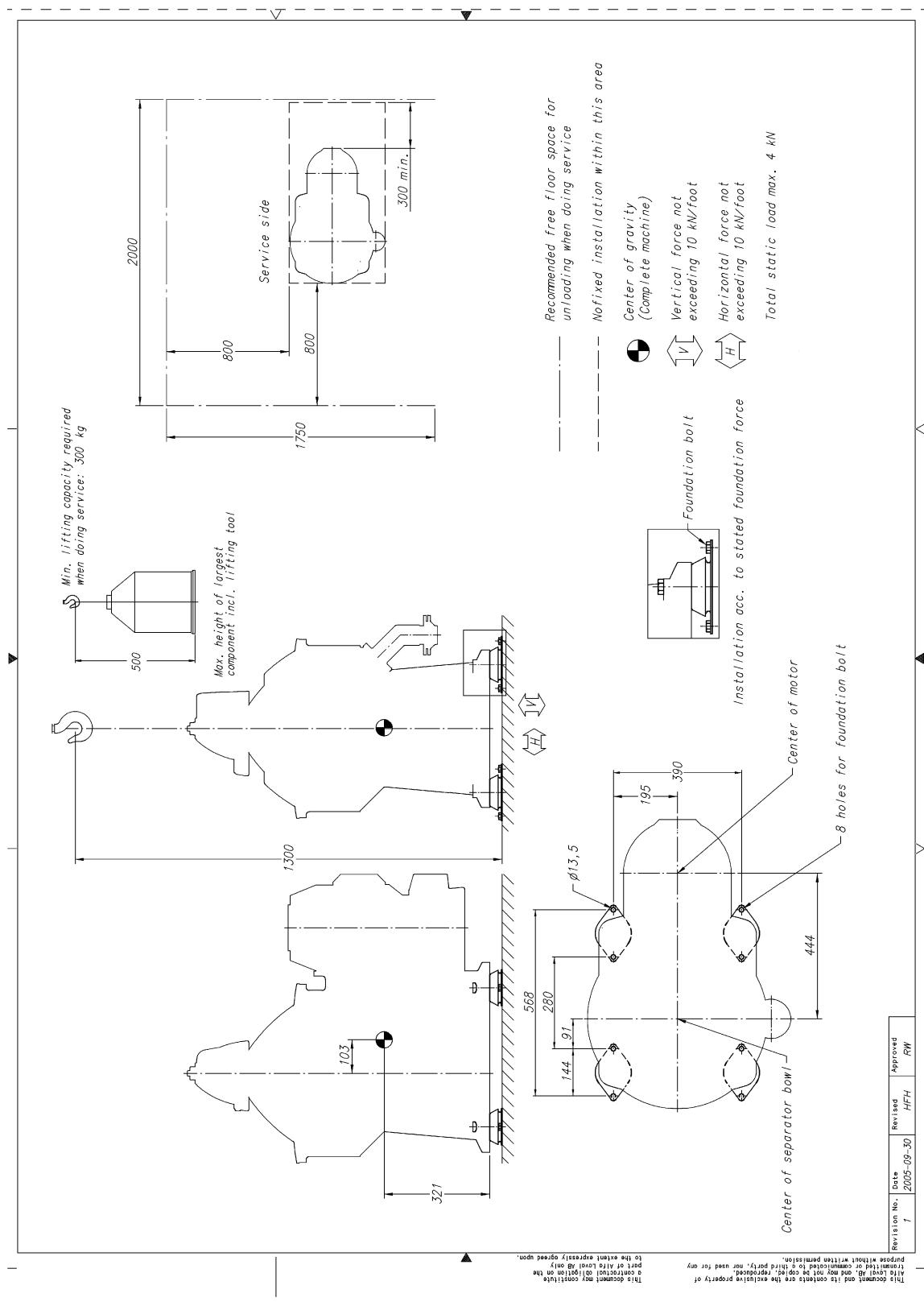
Alfa Laval ref. 578121 Rev. 1



2.5 Foundation Drawings

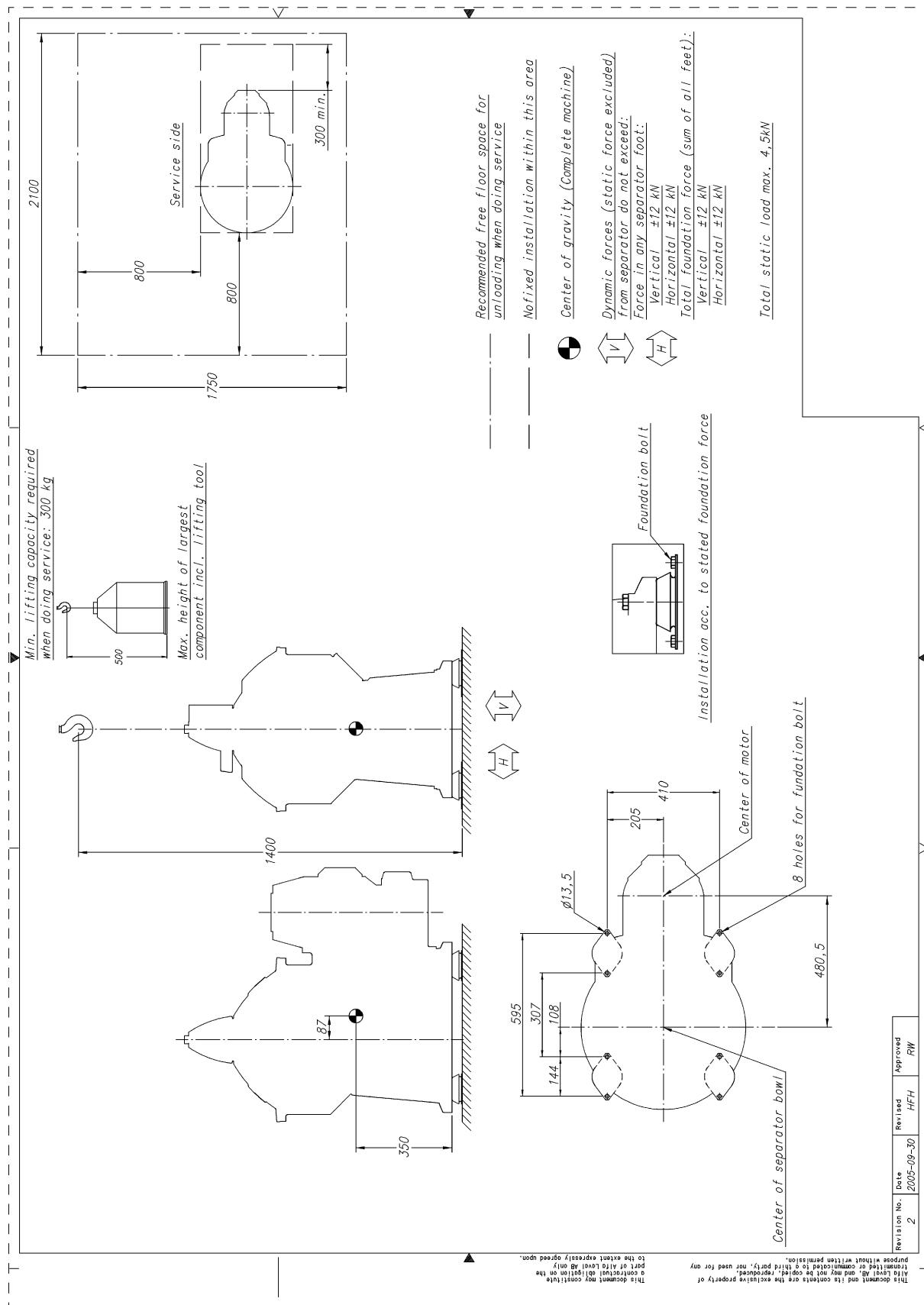
2.5.1 S 831 - S 937 Foundation Drawing

Alfa Laval ref. 561726 Rev. 1



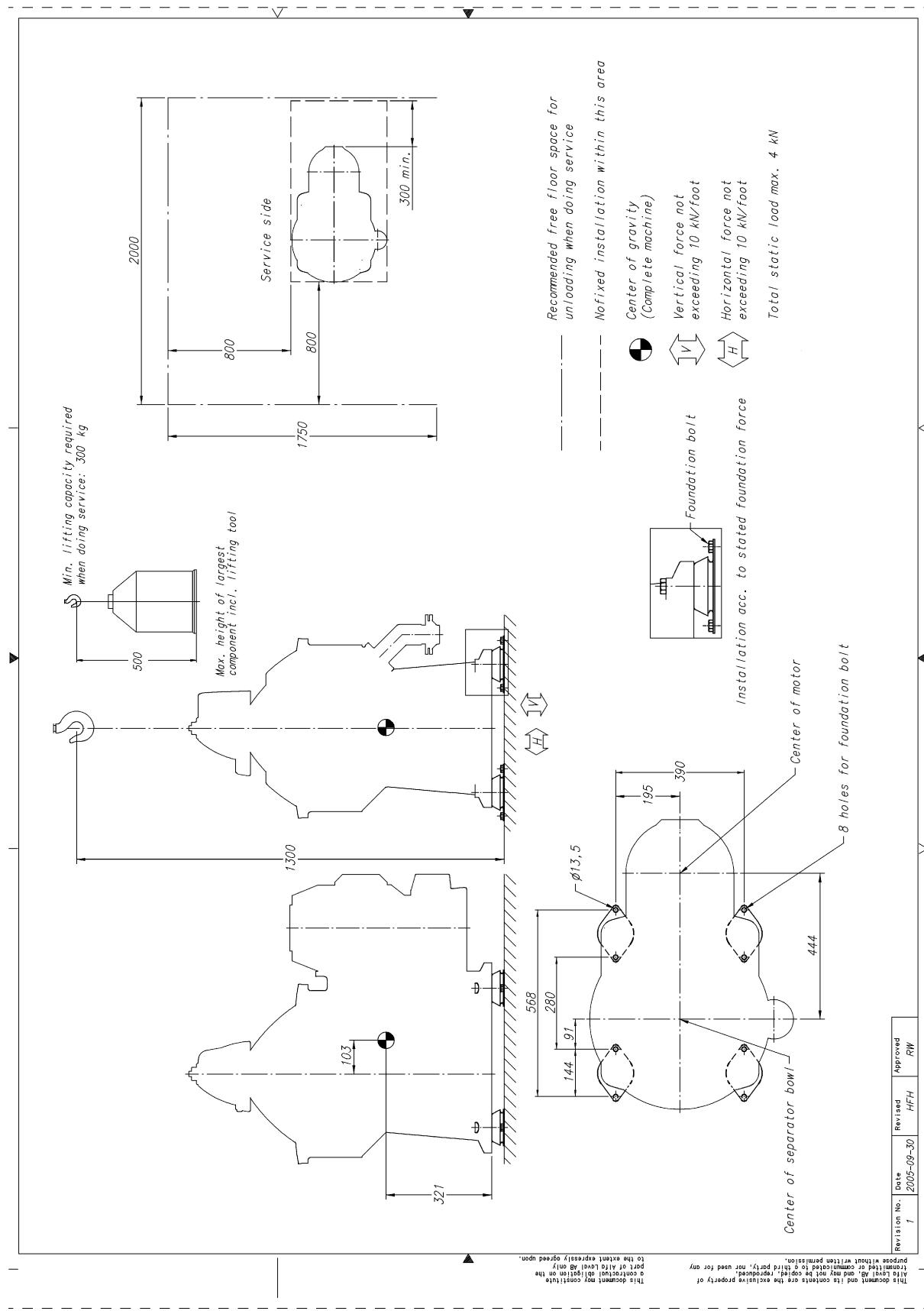
2.5.2 S 841 - S 947 Foundation Drawing

Alfa Laval ref. 562553 Rev. 2



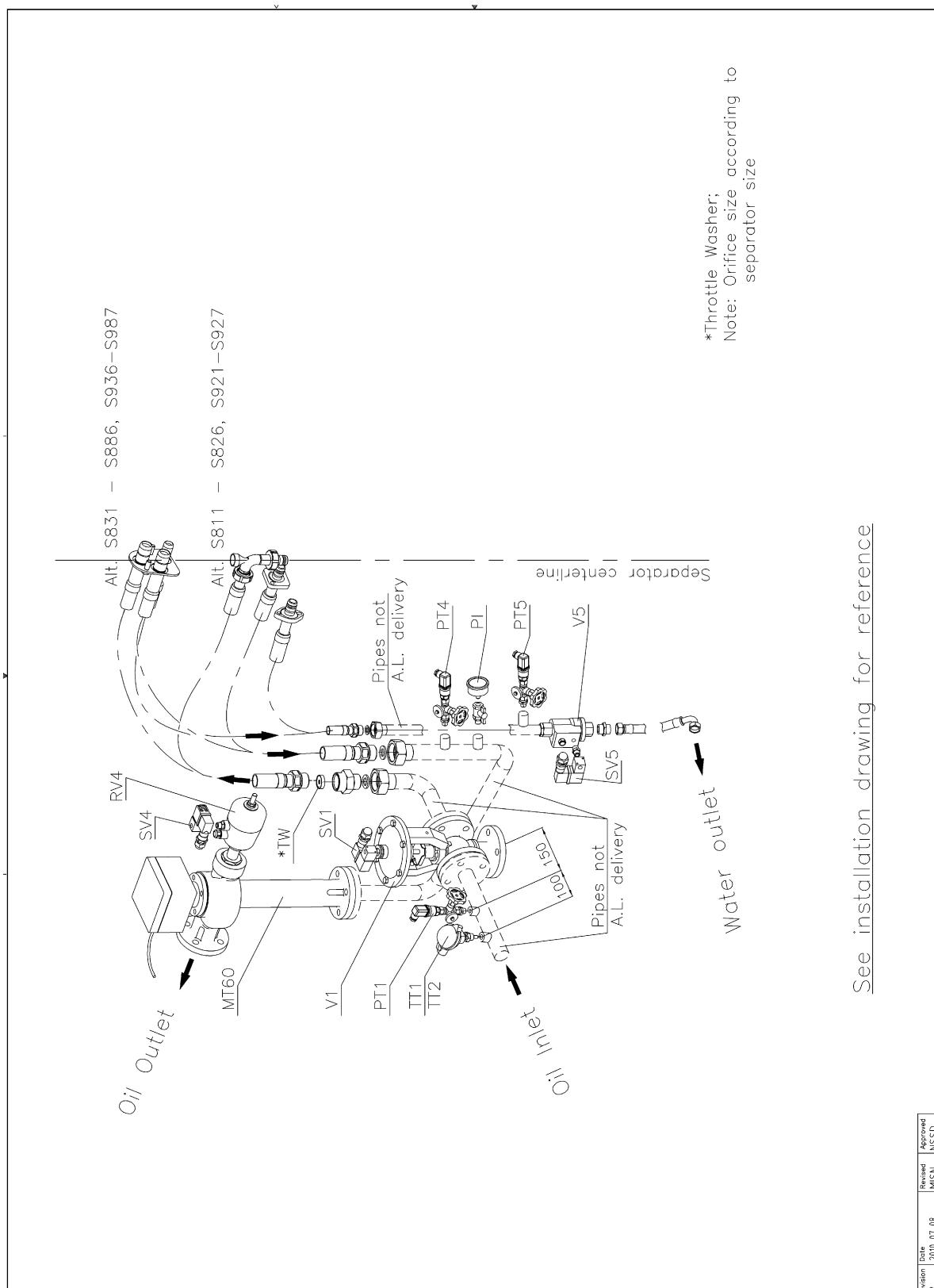
2.5.3 P 635/636 Foundation Drawing

Alfa Laval ref. 561726 Rev. 1



2.6 S-Separator Pipe Arrangement

Alfa Laval ref. 585382 Rev. 2

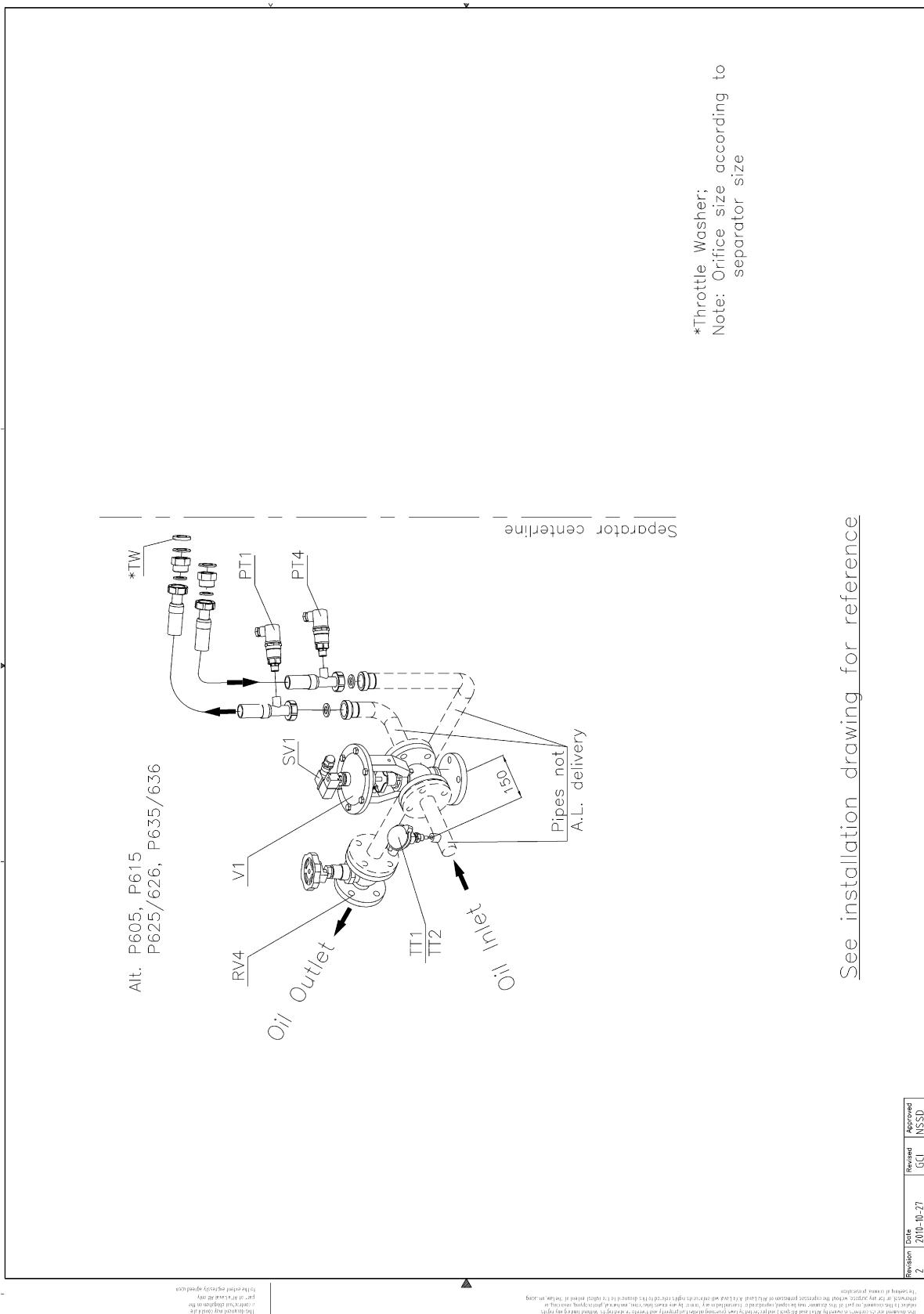


This document and its contents are the copyright of Alfa Laval AB (publ) and protected by law. All rights reserved. Any unauthorized copying or distribution of this document may result in legal action. This document may contain confidential information of Alfa Laval. It is the customer's responsibility to use this document in accordance with applicable laws and regulations. Alfa Laval AB (publ) reserves the right to change the design of its products without prior notice or obligation. Alfa Laval AB (publ) is not liable for any damages resulting from the use of this document.

| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 2 | 2010-07-08 | MISN | NSSD |

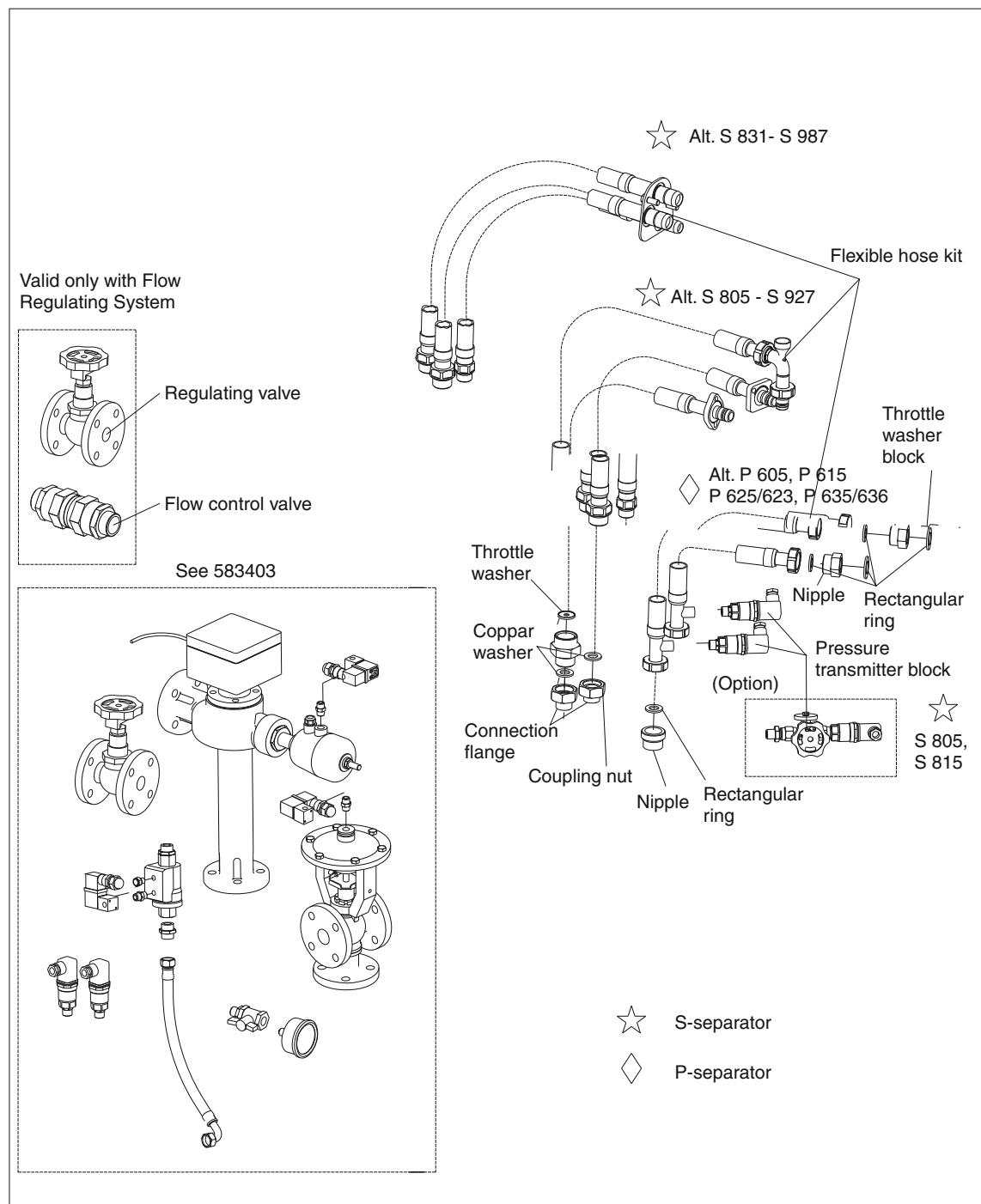
2.7 P-Separator Pipe Arrangement

Alfa Laval ref. 585383 Rev. 2



2.8 Valve Block Oil Assembly Drawing

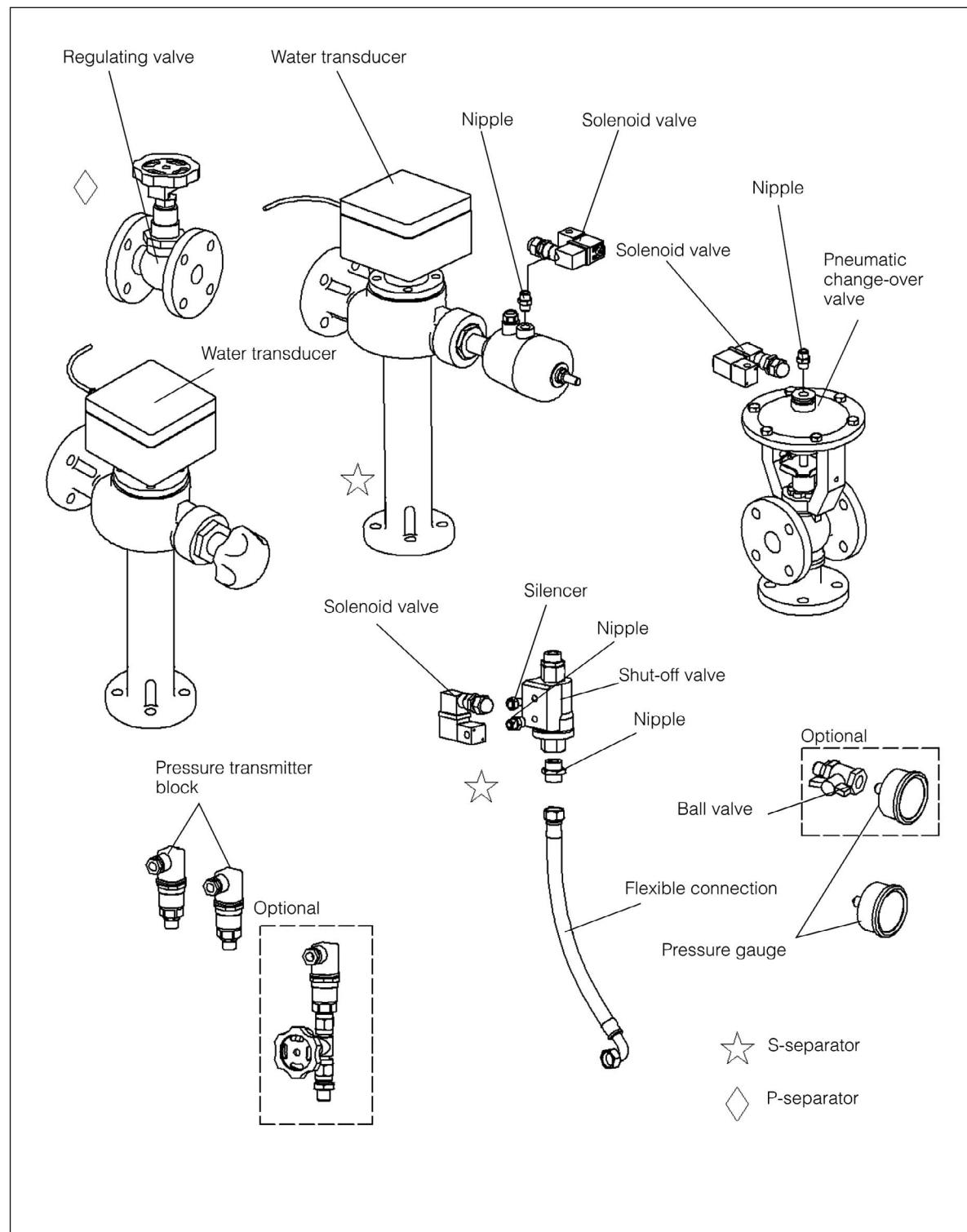
Alfa Laval ref. 583476 Rev. 2



| Throttle washers | | |
|-------------------------|---------------------------------------------------------------|-----------------|
| | Oil type | Hole diam. (mm) |
| P 635/636 | IF60, IF100, LOTP, LOXH, HFO180, HFO380, HFO460, HFO600 | 10.2 |
| S 831 — S 937 | LOTP, LOXH, HFO180, HFO380, HFO460, HFO600, HFO700 | 10.5 |
| S 841 — S 947 | LOTP, LOXH, HFO180, HFO380, HFO460, HFO600, HFO700 | 12.3 |

2.9 Valve Block Oil Assembly Drawing cont.

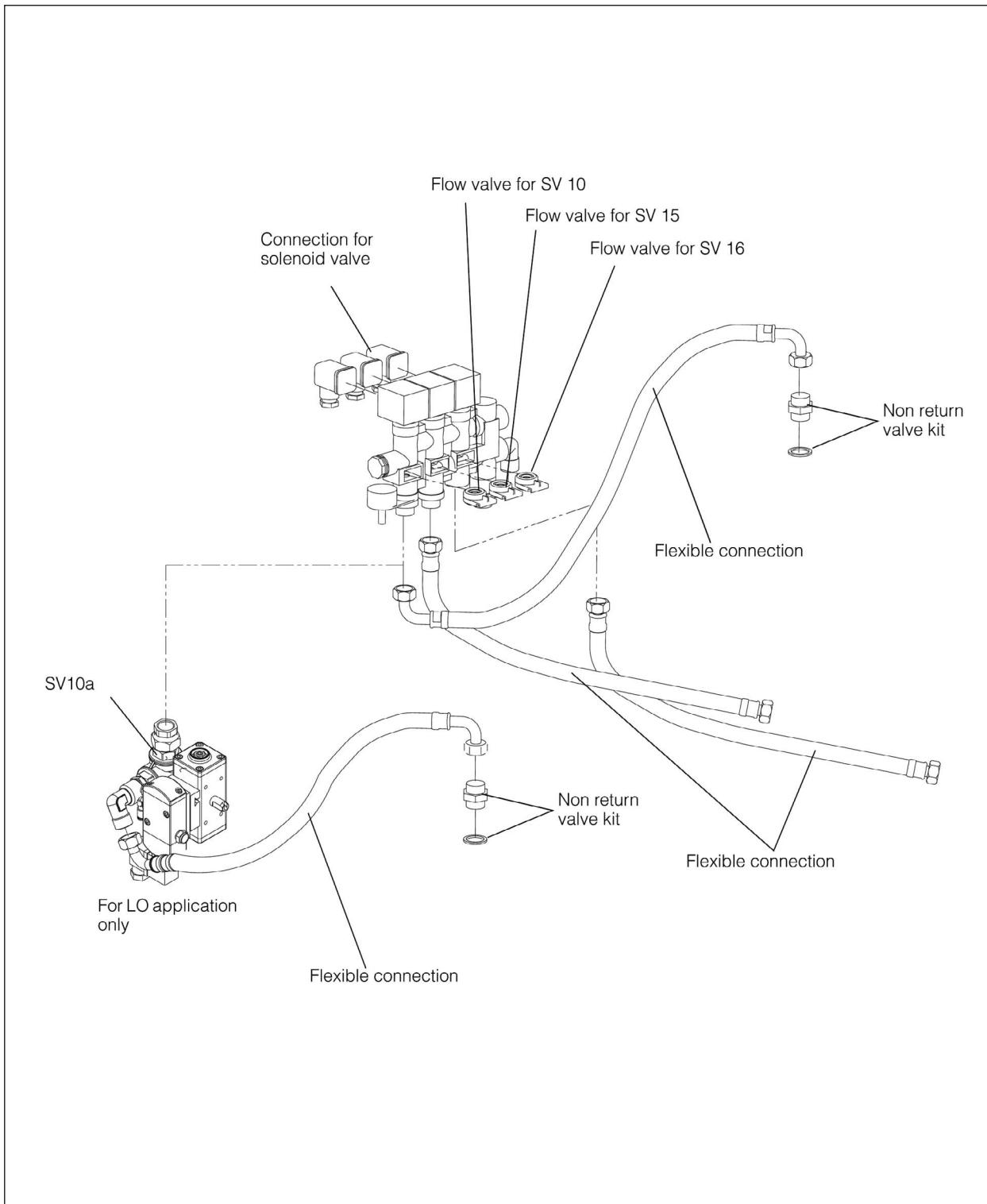
Alfa Laval ref. 583403 Rev. 2



G091051A

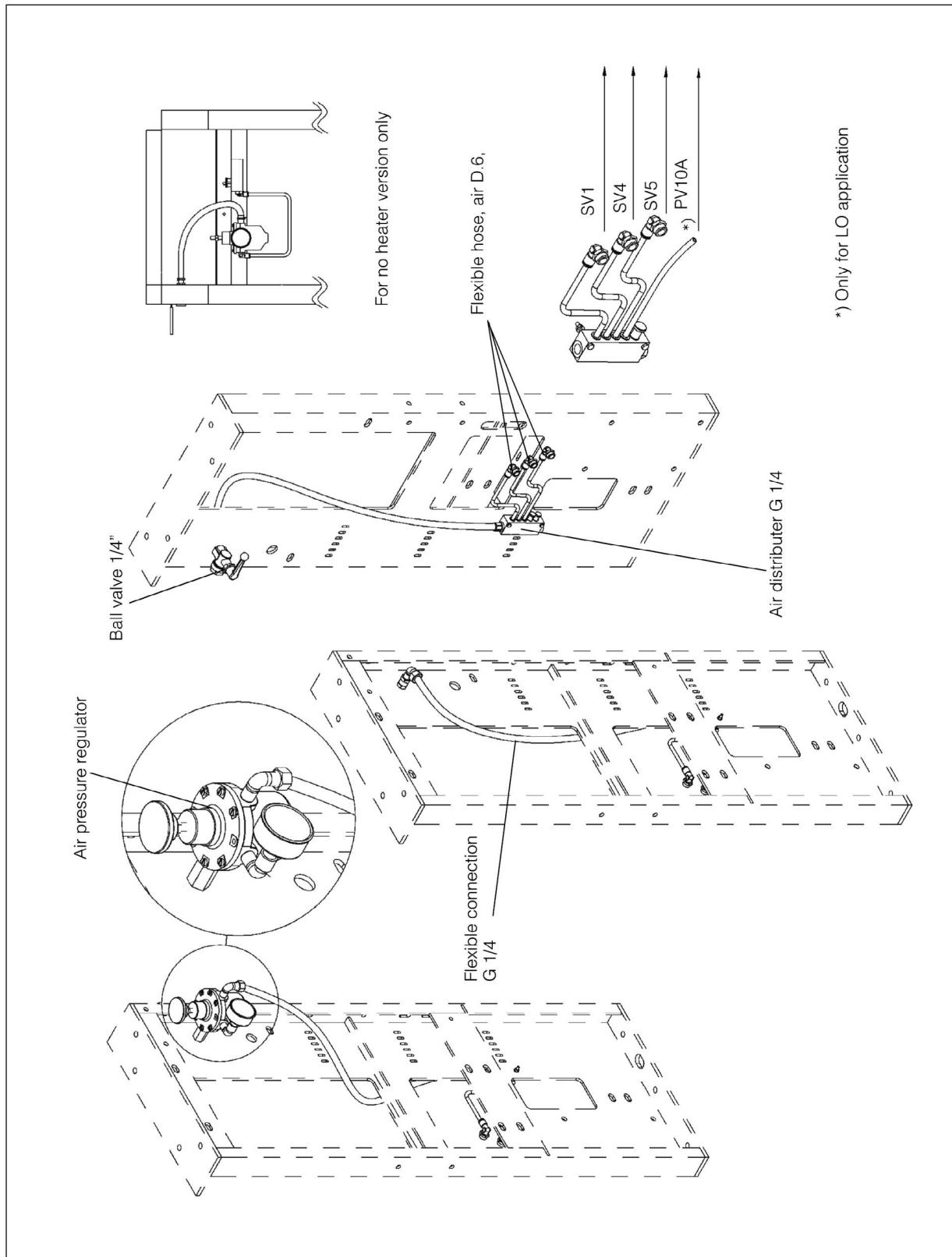
2.10 Valve Block Water Assembly Drawing

Alfa Laval ref. 583410 Rev. 1



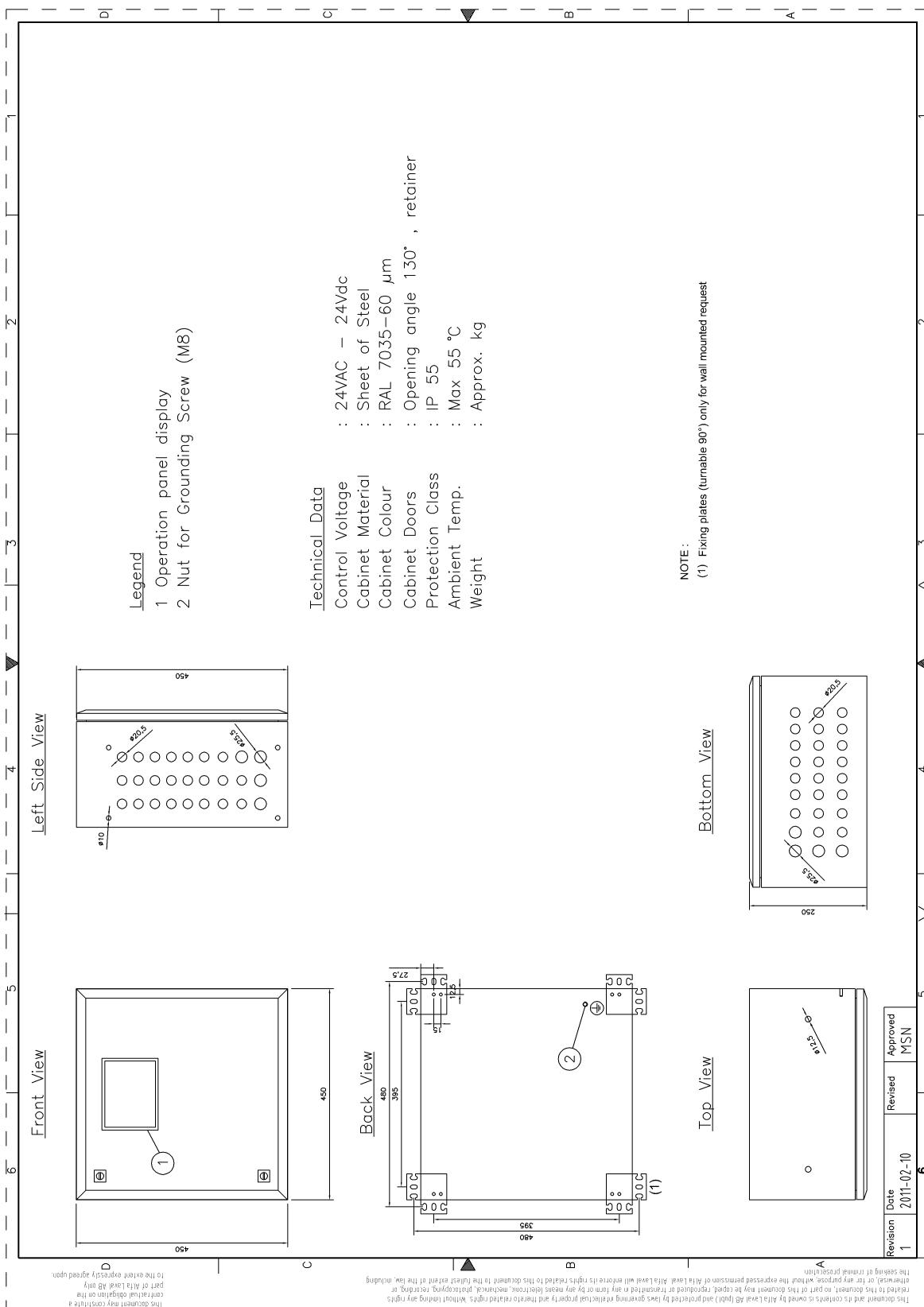
2.11 Air Distributer Kit

Alfa Laval ref. 582806 Rev. 3



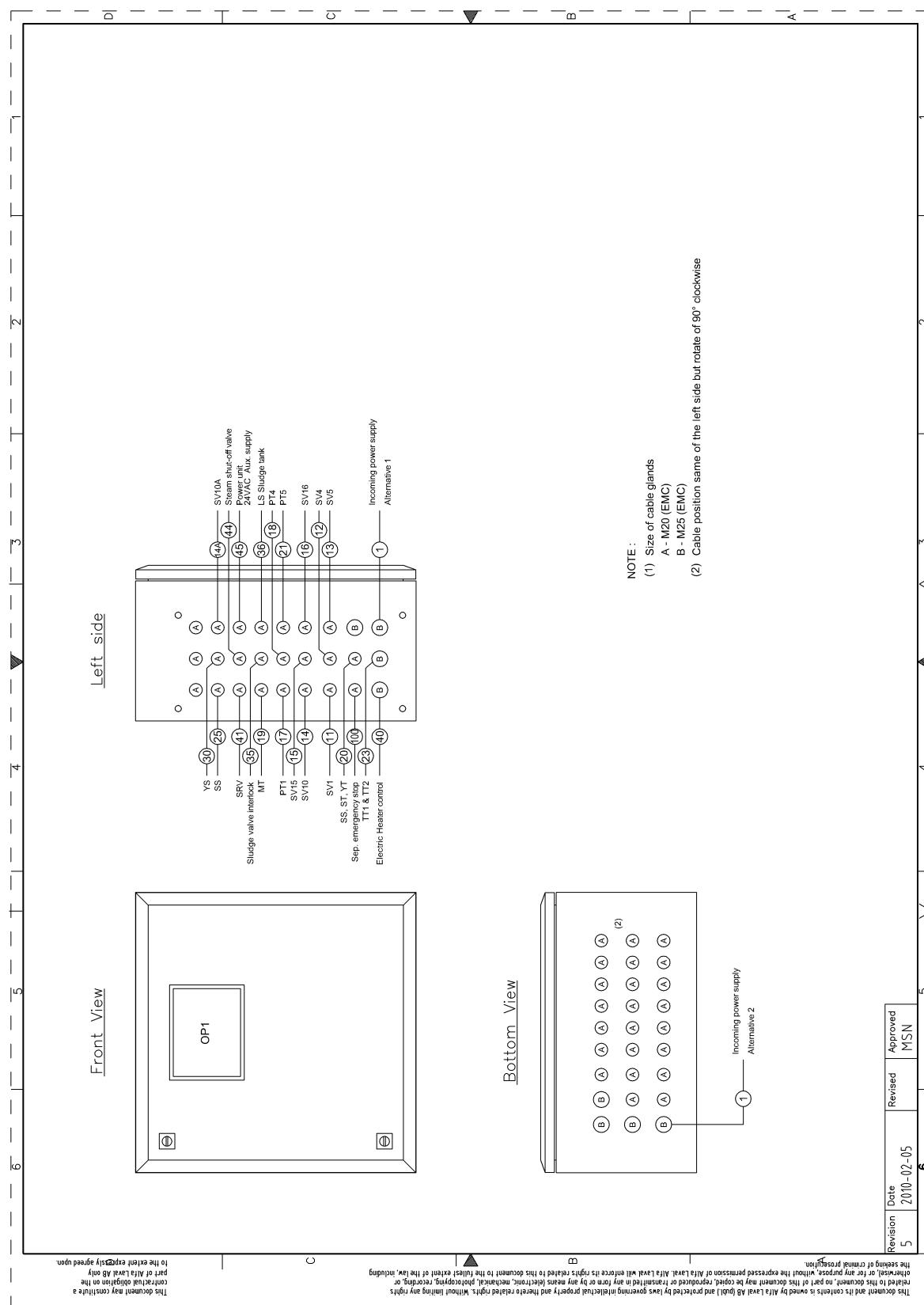
2.12 Control Cabinet Dimension Drawing

Alfa Laval ref. 580903 Rev. 1



2.13 Control Cabinet Assembly Drawing, External

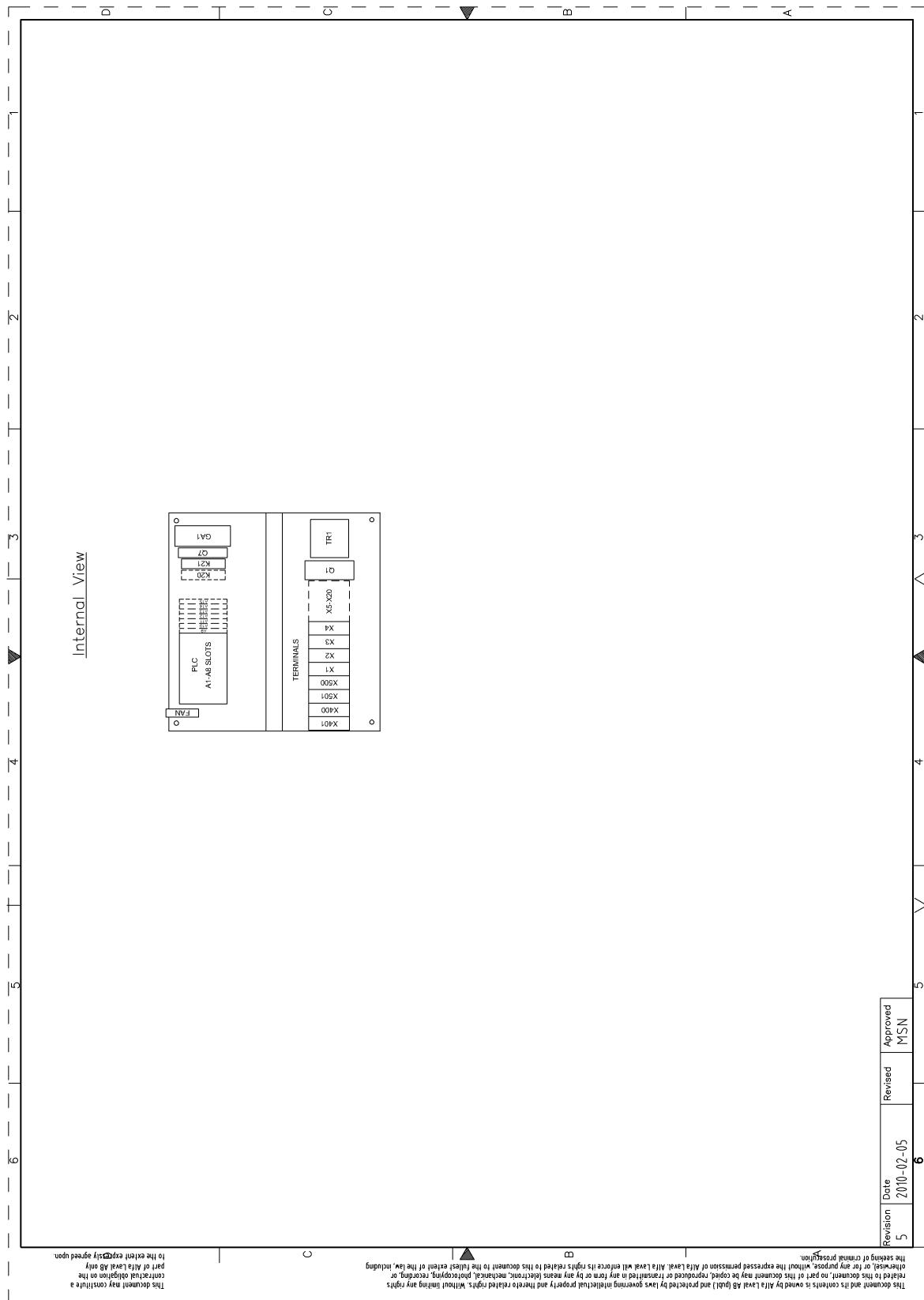
Alfa Laval ref. 580904 Rev. 5



2.13 Control Cabinet Assembly Drawing, External

2 Mechanical Drawings

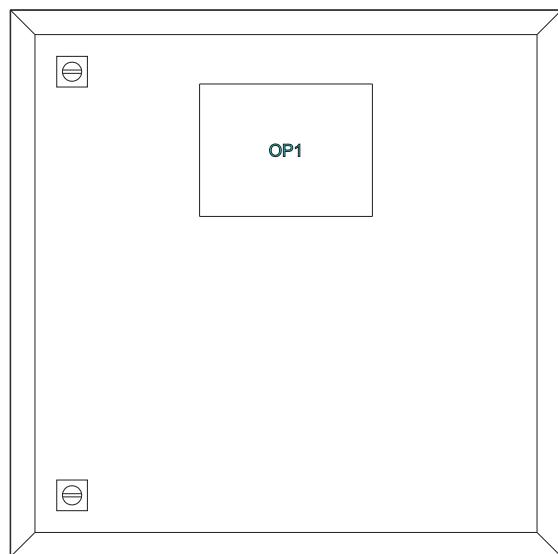
Alfa Laval ref. 580904 Rev. 5



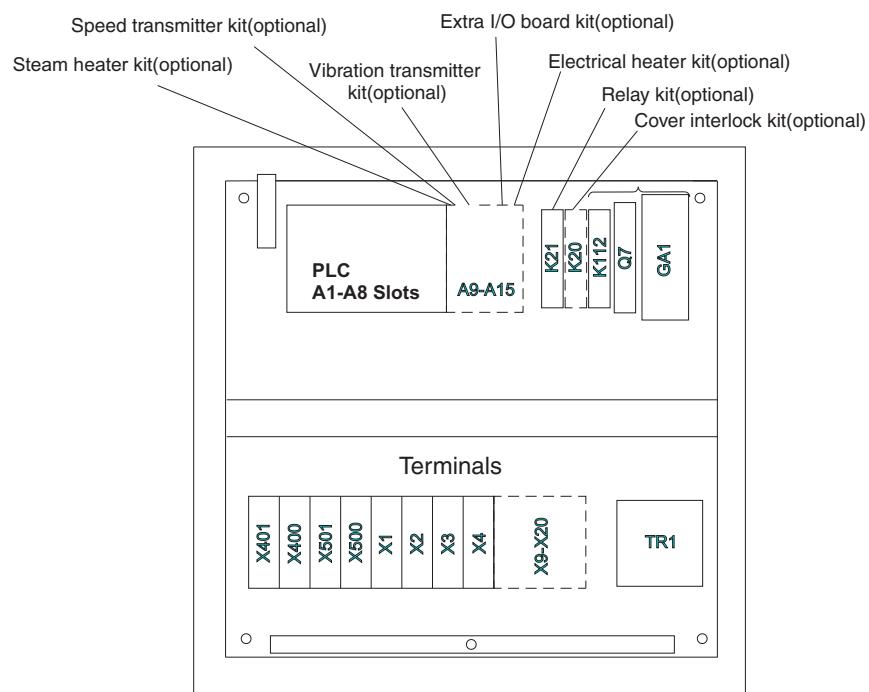
2.14 Control Cabinet Assembly Drawing, Internal

Alfa Laval ref. 581002 Rev. 6

Front view



Internal view



X024902D

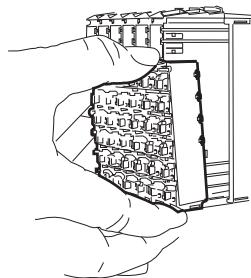
2.15 Change of EPC 60 Components

Operating Panel

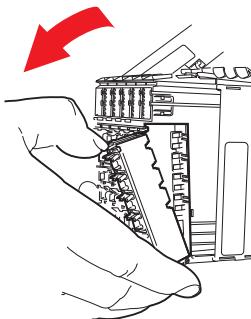
- Switch power off.
- Remove the connections on the reverse side of the panel.
- Unscrew the four screws holding the panel and remove the panel.
- Mount the new panel and connect in reverse order.

I/O-Board

- Switch power off.
- Hold down the plastic clip on the top of the cable terminal and pivot the cable terminal towards you.

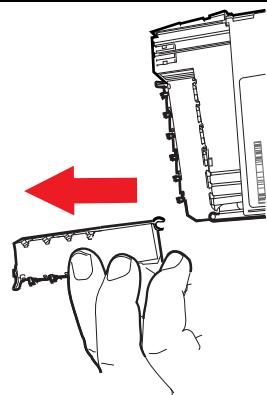


X025001A



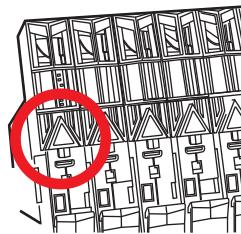
X025002A

- Pull away the cable terminal.



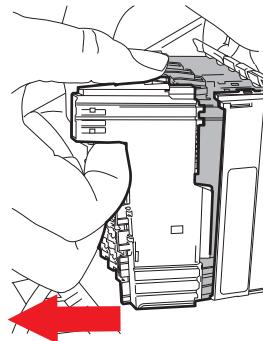
X025008A

- Hold down the triangle on the top of the I/O board and loosen the board.



X025003A

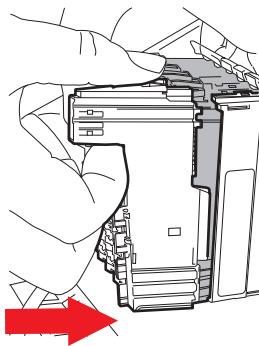
- Pull the board straight out (otherwise it can fasten in one of its guides)



X025004A

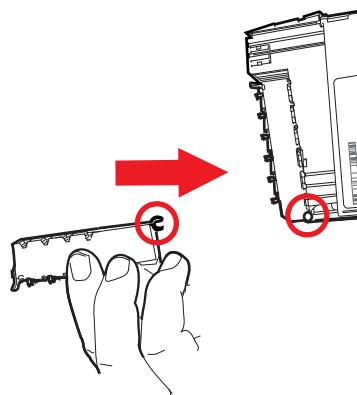
- Compare the part number of the new I/O board to the old board to make sure it is correct.
- If changing more than one board at a time, check with the electrical diagram to ensure that the boards are mounted in the right places.

- Mount the new I/O board by pressing it straight into place. Make sure the board is firmly in place otherwise it will be impossible to mount the cable terminal.



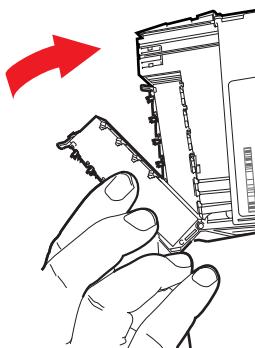
X025005A

- Remount the cable terminal. Make sure that the clip on the bottom of the terminal fastens properly in place on the axel on the bus holder.



X025006A

- Pivot the terminal on the axel until the clip on the terminal top fastens into place in the I/O board.

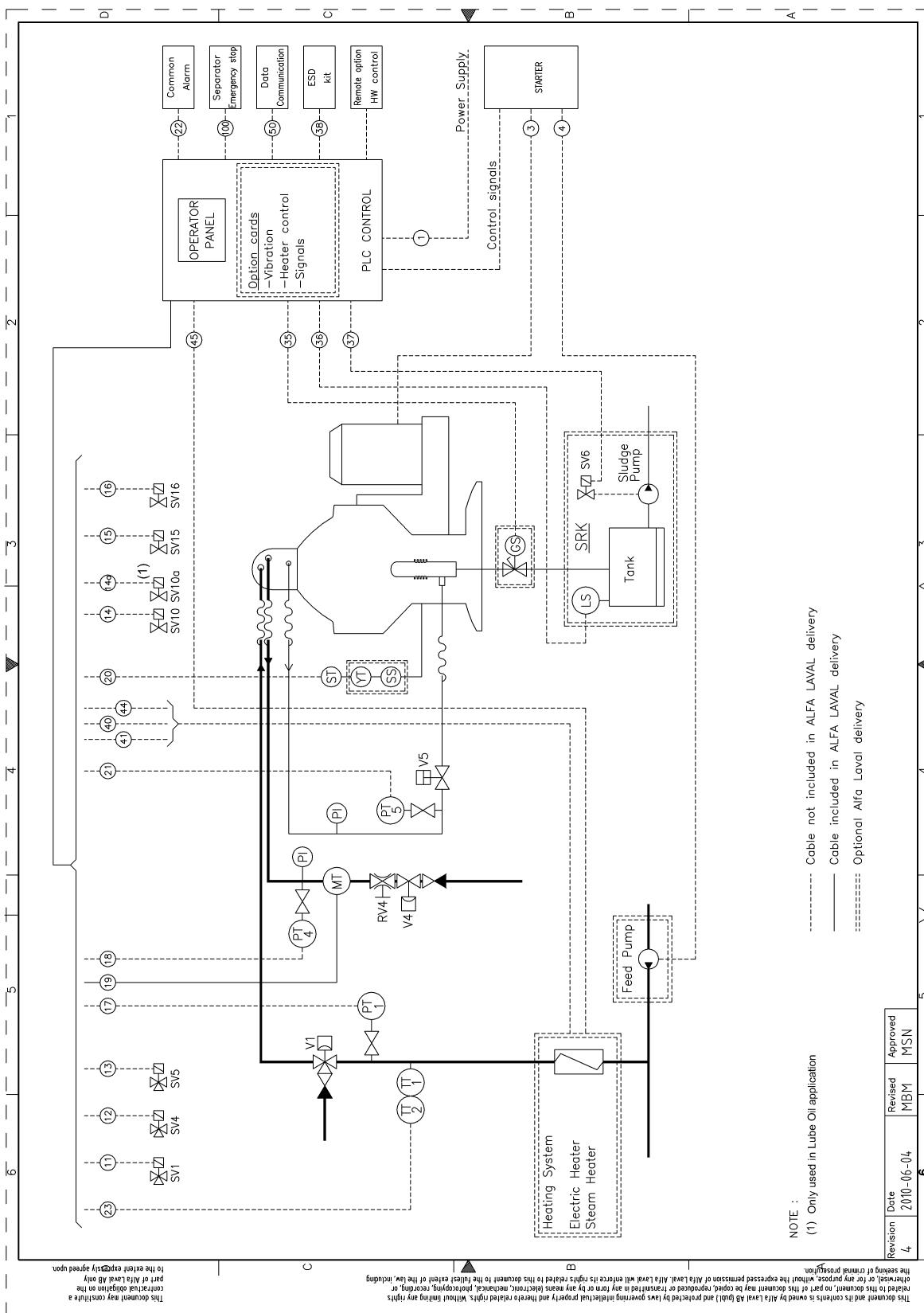


X025007A

3 *Electrical Drawings*

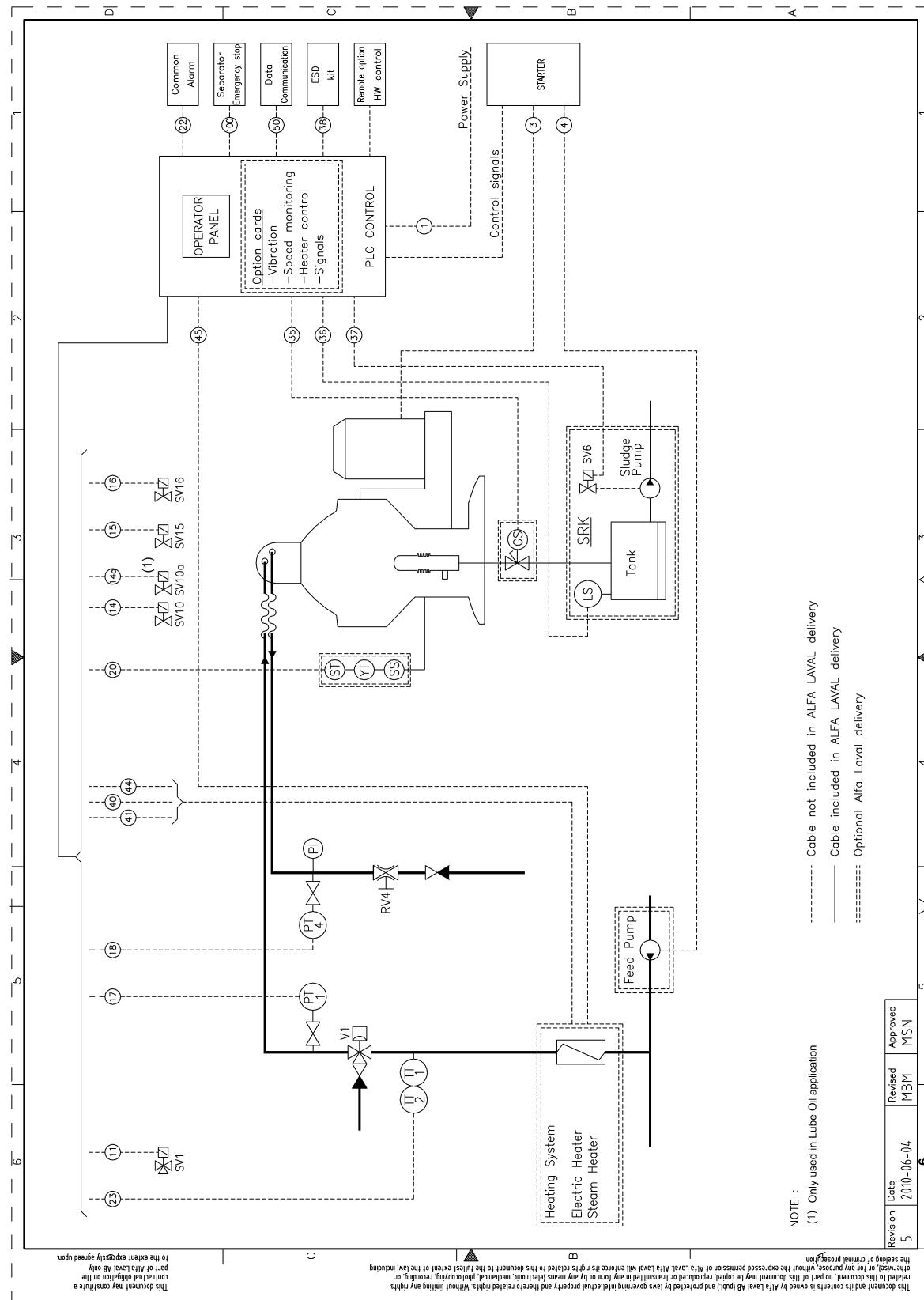
3.1 Electrical System Layout S 831 – S 947

Alfa Laval ref. 580907 Rev. 4



3.2 Electrical System Layout P 635/636

Alfa Laval ref. 580908 Rev. 5



3.3 Control and Starter Electrical Diagrams

3.3.1 Starter cable list

Alfa Laval ref. 580881 Rev. 7

| No. | Type | | Connection point A | Instruction | Connection point B | Remarks |
|----------------------------------------------------------|--------|----------|--------------------|-------------|---------------------|----------------------------|
| Basic design (currents according to order) | | | | | | |
| 1 | MPRXCX | 3x4 | Mains supply | | Starter | 1) Fuse 20 A |
| 1 | MPRXCX | 3x10 | Mains supply | | Starter | 1) Fuse 35A |
| 1 | MPRXCX | 3x16 | Mains supply | | Starter | 1) Fuse 50 A |
| 1 | MPRXCX | 3x25 | Mains supply | | Starter | 1) Fuse 63 A |
| 1 | MPRXCX | 3x35 | Mains supply | | Starter | 1) Fuse 80 A |
| 2 | MPRXCX | 2x2m5 | Supply | | Starter | 1) Fuse 16 A |
| 3 | MPRXCX | 3x1,5 | Starter | Marked 3A | Separator motor | 4,0 – 6,3 A |
| 3 | MPRXCX | 3x2,5 | Starter | Marked 3B | Separator motor | 6,3 – 16 A |
| 3 | MPRXCX | 3x4 | Starter | Marked 3C | Separator motor | 16 – 20 A |
| 3 | MPRXCX | 3x6 | Starter | Marked 3D | Separator motor | 20 – 25 A |
| 3 | MPRXCX | 3x10 | Starter | Marked 3E | Separator motor | 25 – 32 A |
| 3 | MPRXCX | 3x16 | Starter | Marked 3F | Separator motor | 32 – 45 A |
| 3 | MPRXCX | 3x25 | Starter | Marked 3G | Separator motor | 45 – 63 A |
| Optional or customer's own feed pump (as ordered) | | | | | | |
| 4 | MPRXCX | 3x25 | Starter | | Feed pump | 2) |
| Optional sludge handling (as ordered) | | | | | | |
| 35 | RFE-HF | 1x4x0,75 | Starter | | GS, Valve switch | |
| 36 | RFE-HF | 1x2x0,75 | Starter | | LS, Sludge level | |
| 37 | RFE-HF | 1x2x0,75 | Starter | | SV6, Solenoid valve | For pneumatic sludge pump |
| 73 | RFE-HF | 2x0,75 | Starter | | Heatpac on tank | Included in heater element |
| Optional space heating (as ordered) | | | | | | |
| 71 | MPRXCX | 2x1,5 | Starter | | Separator pump | |
| 73 | MPRXCX | 2x1,5 | Starter | | Feed pump | 2) |
| Optional heat tracing (as ordered) | | | | | | |
| 74 | MPRXCX | 2x1,5 | Starter | | Thermostat | |
| 75 | | 3x1,5 | Starter | | Heating cable | |

- 1) Cable not included in Alfa Laval delivery.
 2) Cable not included in Alfa Laval delivery
 except when feed pump ordered as part of a
 Module including Pumping and Heating Unit.

| No. | Type | | Connection point A | Instruc-tion | Connection point B | Remarks |
|----------------------------------------------------|--------|----------|--------------------|--------------|--------------------------------------|-----------------------------------------------------|
| Signal cables (currents according to order) | | | | | | |
| 11 | RFE-HF | 1x2x0,75 | EPC 60 | | SV1 | |
| 12 | RFE-HF | 1x2x0,75 | EPC 60 | | SV4 | |
| 13 | RFE-HF | 1x2x0,75 | EPC 60 | | SV5 | S-type only |
| 14 | RFE-HF | 1x2x0,75 | EPC 60 | | SV10 | |
| 14A | RFE-HF | 1x2x0,75 | EPC 60 | | SV10A | Lube oil only |
| 15 | RFE-HF | 1x2x0,75 | EPC 60 | | SV15 | |
| 16 | RFE-HF | 1x2x0,75 | EPC 60 | | SV16 | |
| 17 | RFE-HF | 1x2x0,75 | EPC 60 | | PT1 | ¹⁾ |
| 18 | RFE-HF | 1x2x0,75 | EPC 60 | | PT4 | |
| 19 | RFE-HF | 1x4x0,75 | EPC 60 | | MT | S-type only |
| 20 | RFE-HF | 4x2x0,75 | EPC 60 | | ST, (YT, SS) | Not for P605, P615, S805, S815 |
| 21 | RFE-HF | 1x2x0,75 | EPC 60 | | PT5 | S-type only |
| 22 | RFE-HF | 1x2x0,75 | EPC 60 | | Common alarm | ²⁾ |
| 23 | RFE-HF | 4x2x0,75 | EPC 60 | | TT1/TT2 | ³⁾ |
| Options (as ordered) | | | | | | |
| 25 | RFE-HF | 1x4x0,75 | EPC 60 | | SS | ²⁾ Only for P605, P615, S805, S815 |
| 30 | RFE-HF | 1x4x0,75 | EPC 60 | | YS | ²⁾ Only for P605, P615, S805, S815 |
| 38 | MPRXCX | 4x1,5 | EPC 60 | | Syst. Emergency | ^{2) 4)} |
| 100 | MPRXCX | 4x1,5 | EPC 60 | | Sep. Emergency stop | ^{2) 4)} |
| Optional Electric Heater (as ordered) | | | | | | |
| 40 | RFE-HF | 4x2x0,75 | Starter | | Power unit | |
| 45 | RFE-HF | 1x2x0,75 | Starter | | Power unit | |
| Optional heat tracing (as ordered) | | | | | | |
| 41 | RFE-HF | 1x4x0,75 | EPC 60 | | Steam reg. valve | |
| 44 | RFE-HF | 1x2x0,75 | EPC 60 | | Shut-off valve | |
| 50 | RJ45 | | EPC 60 CPU | | Client remote data communica-tion | ²⁾ |

- 1) Cable only included in the Alfa Laval delivery when PT1 is delivered mounted on Module.
- 2) Cable not included in Alfa Laval delivery
- 3)Cable only included in the Alfa Laval delivery when Electric Heater is delivered mounted on Module.
- 4) This cable cannot be longer than 25 m to avoid voltage drop.

Other equivalent and approved cables may be used.

Cable areas are calculated with correction factor 0.7.

Cables used are Shipboard Cables, designed according to IEC 60092-3.

Flame retardant according to IEC 60332-1-2 and IEC 60332-3-22.

Halogen-free according to IEC 60754 series.

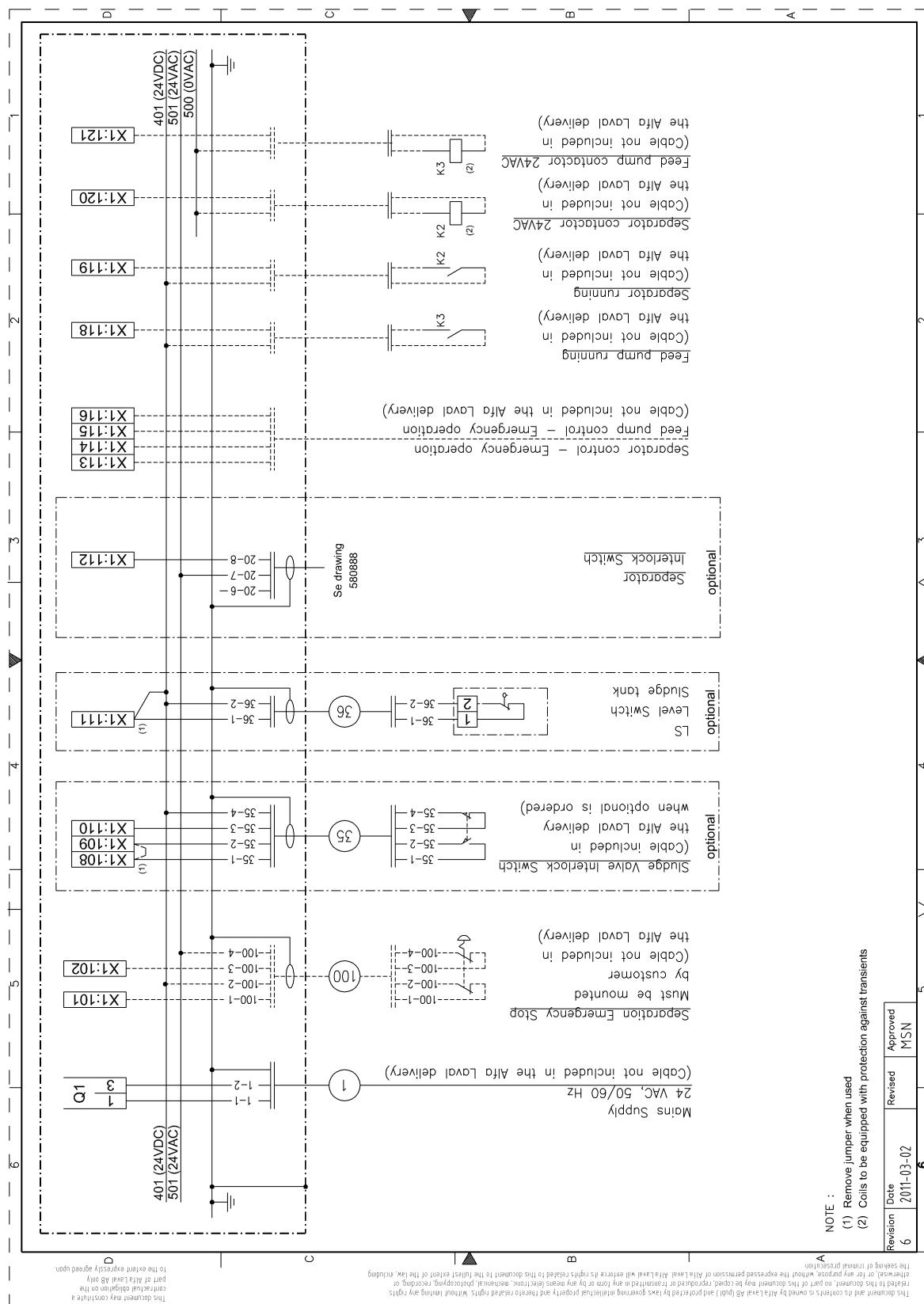
Smoke emission according to IEC 61034 series.

All power cables should be Signal Shielded Cables with the shield properly connected to earth as shown in the electrical drawings.

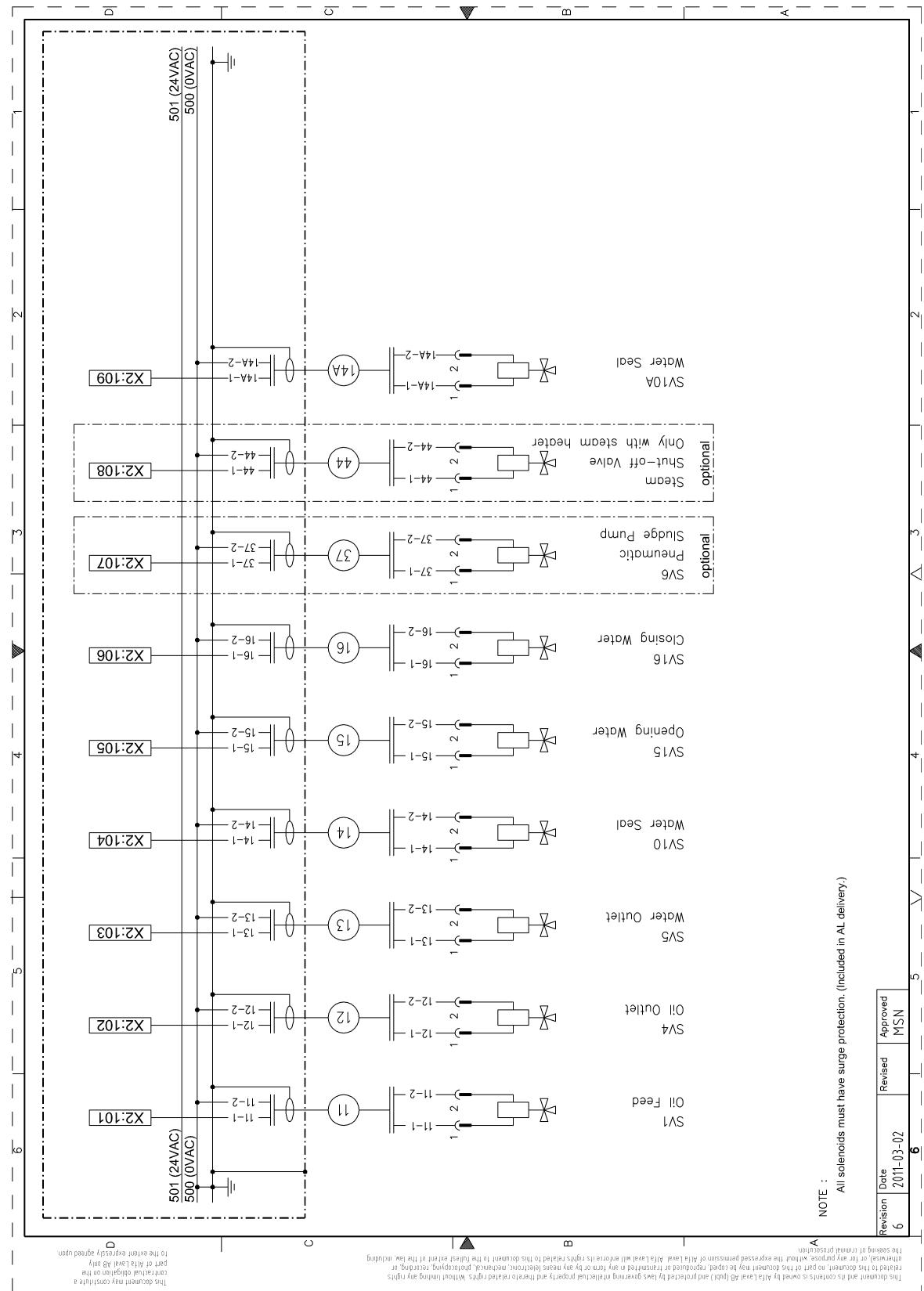
For armoured power cables, the armour must be connected to earth, as shown in the electrical drawings, and must give sufficient EMI protection. Copper wire armouring is normally used.

3.3.2 Separator Interconnection Diagram

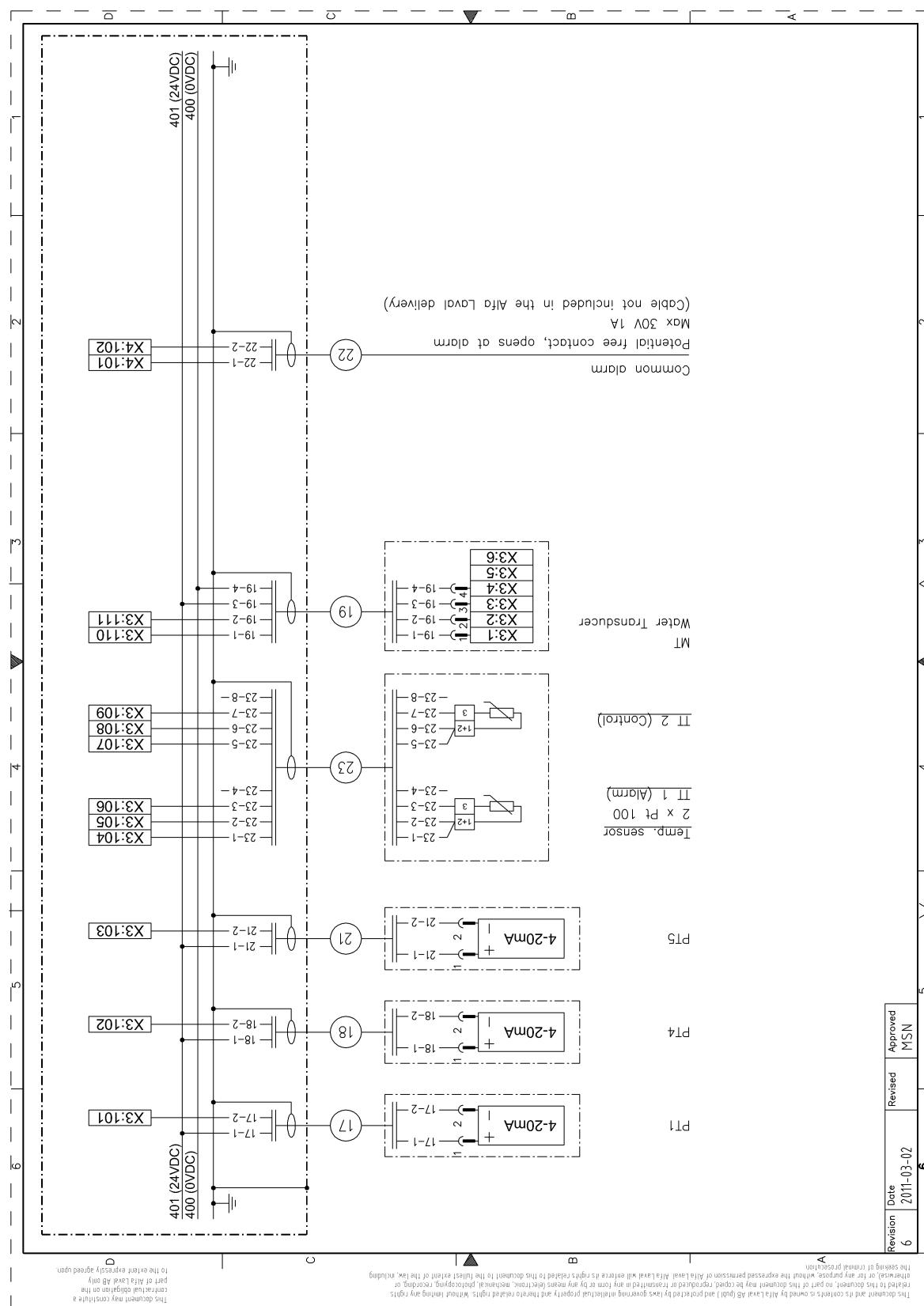
Alfa Laval ref. 580906 Rev. 6



Alfa Laval ref. 580906 Rev. 6

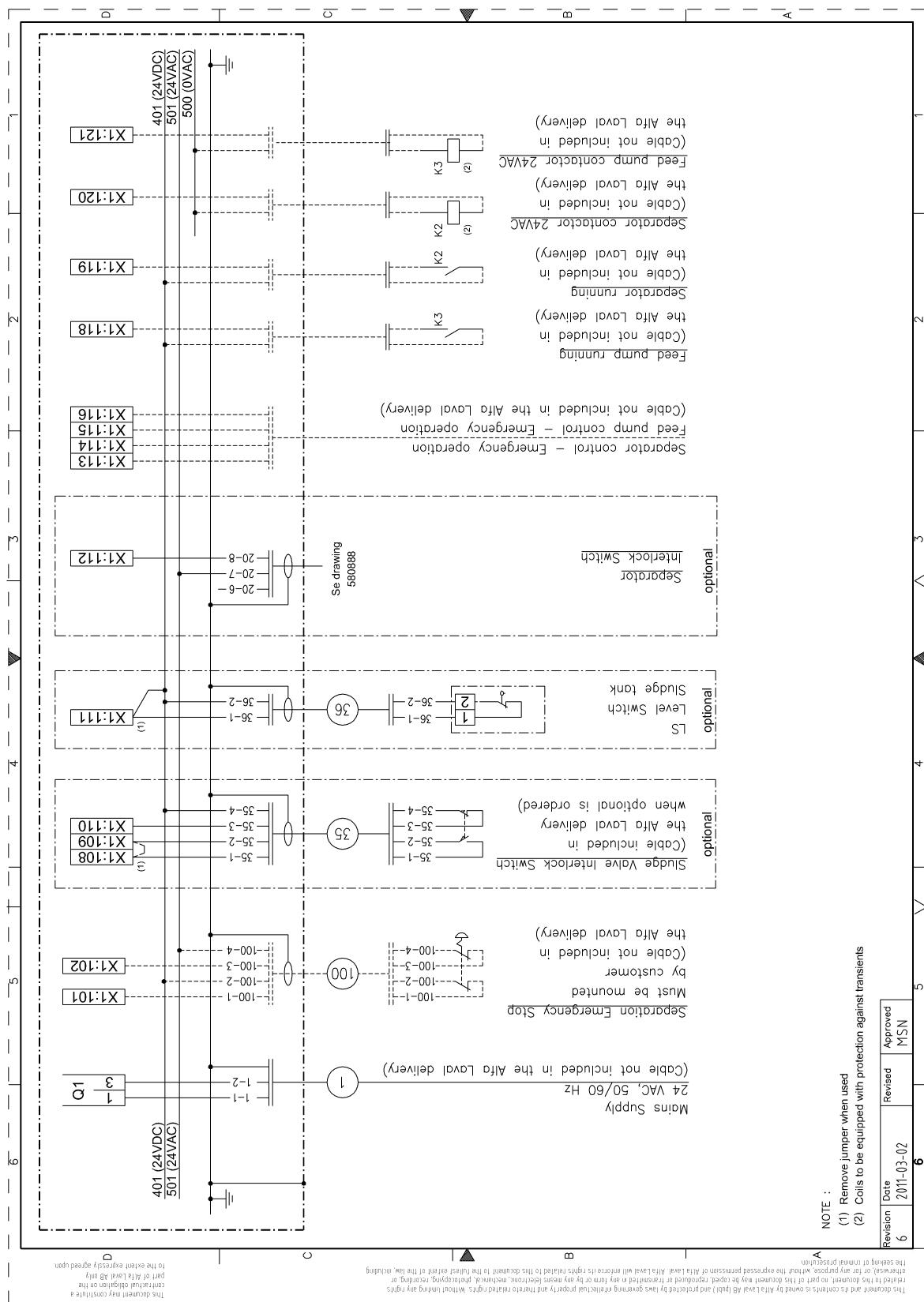


Alfa Laval ref. 580906 Rev. 6

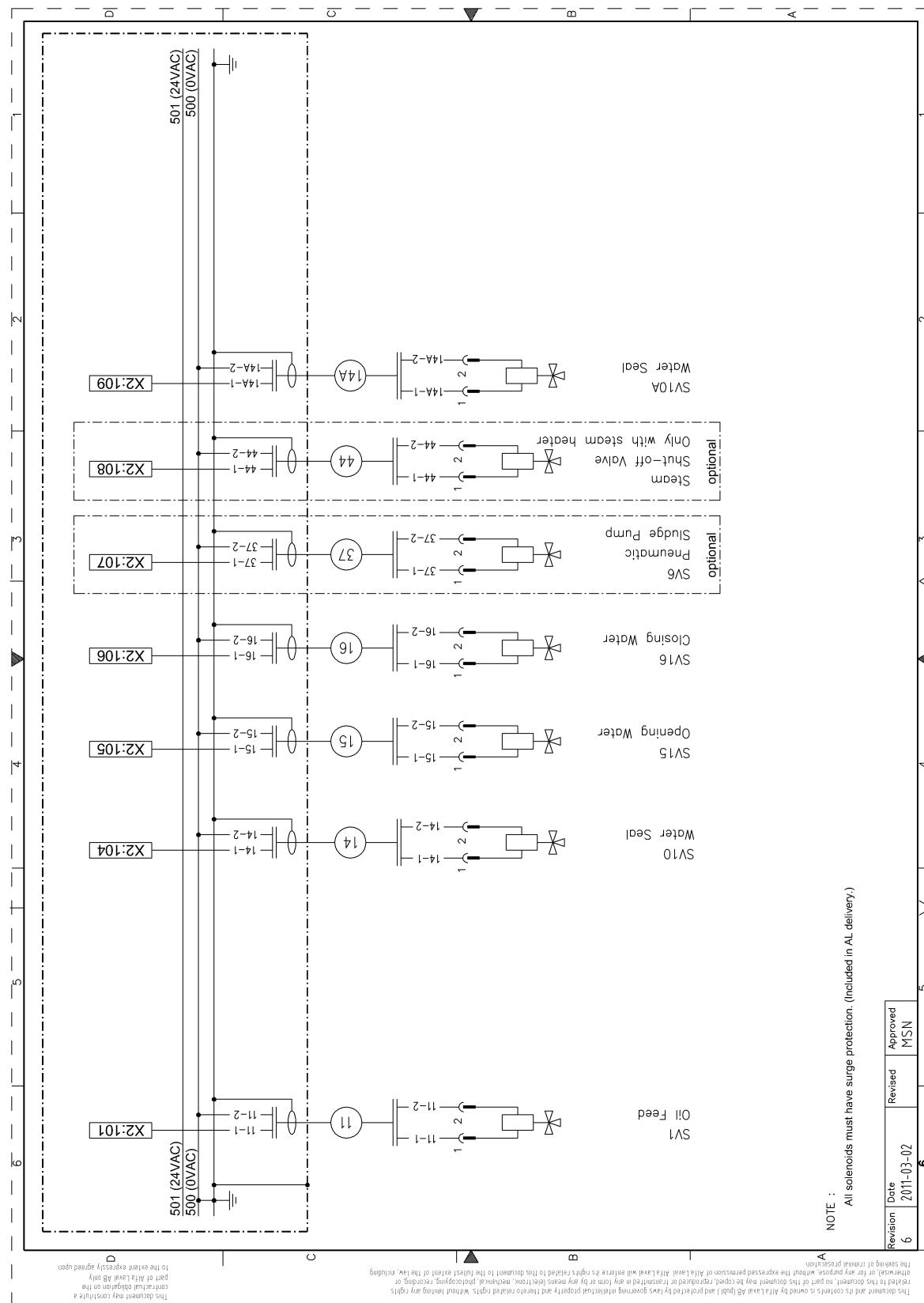


3.3.3 Separator Interconnection Diagram

Alfa Laval ref. 581069 Rev. 6



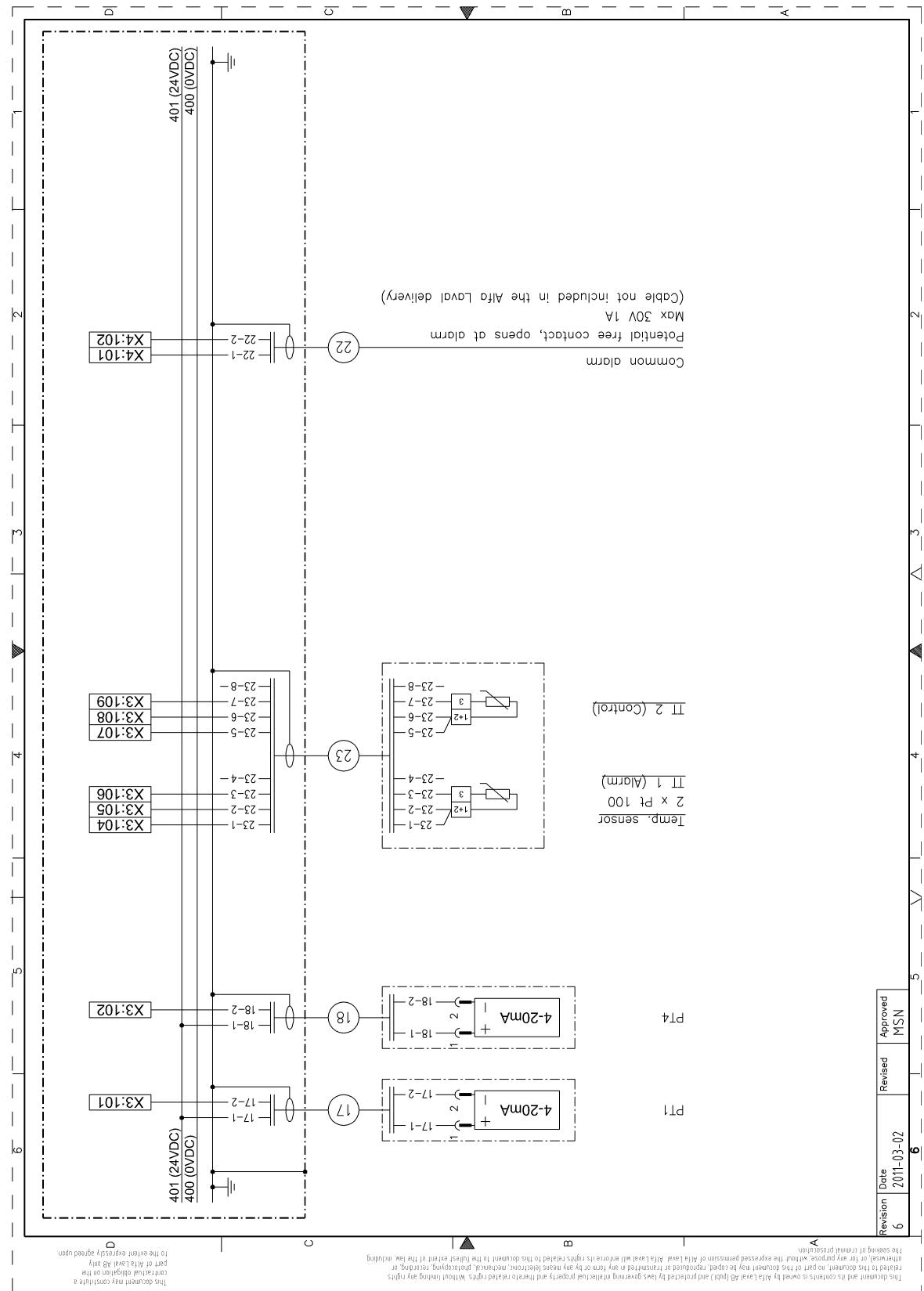
Alfa Laval ref. 581069 Rev. 6



NOTE :
All solenoids must have surge protection. (Included in AL delivery)

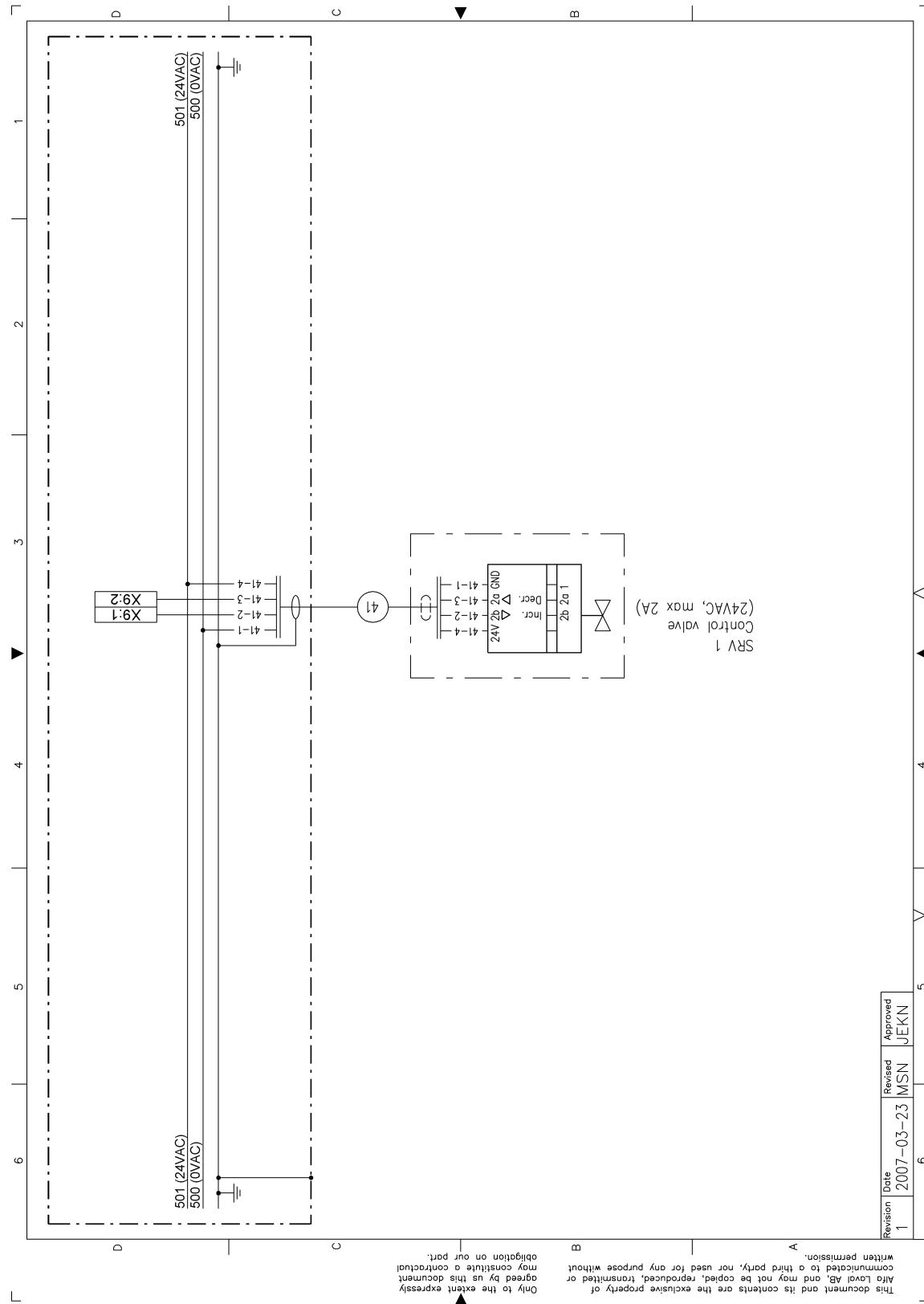
| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 6 | 2011-03-02 | | MSN |

Alfa Laval ref. 581069 Rev. 6



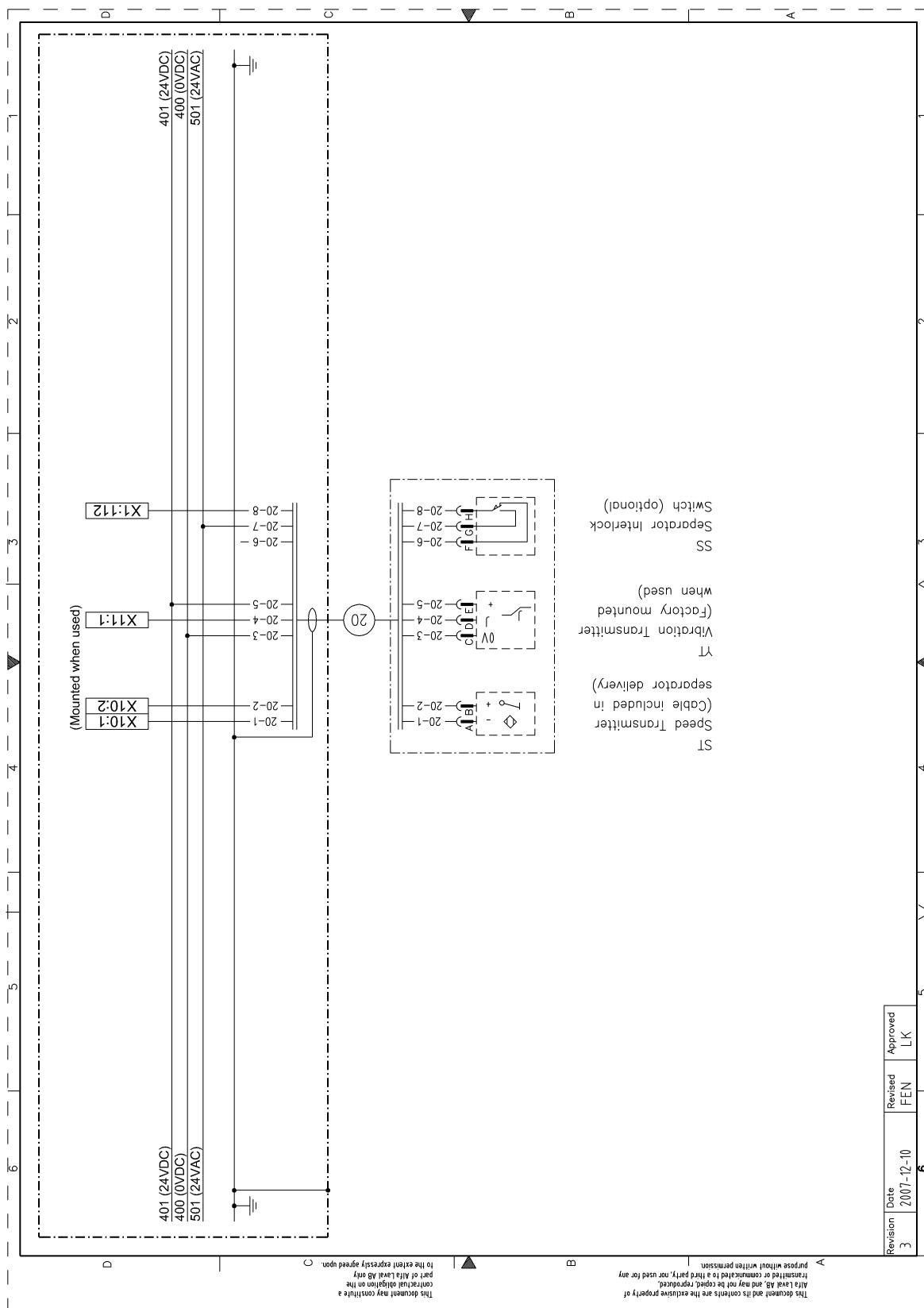
3.3.4 Steam Regulating Valve (optional) Interconnection Diagram

Alfa Laval ref. 580886 Rev. 1



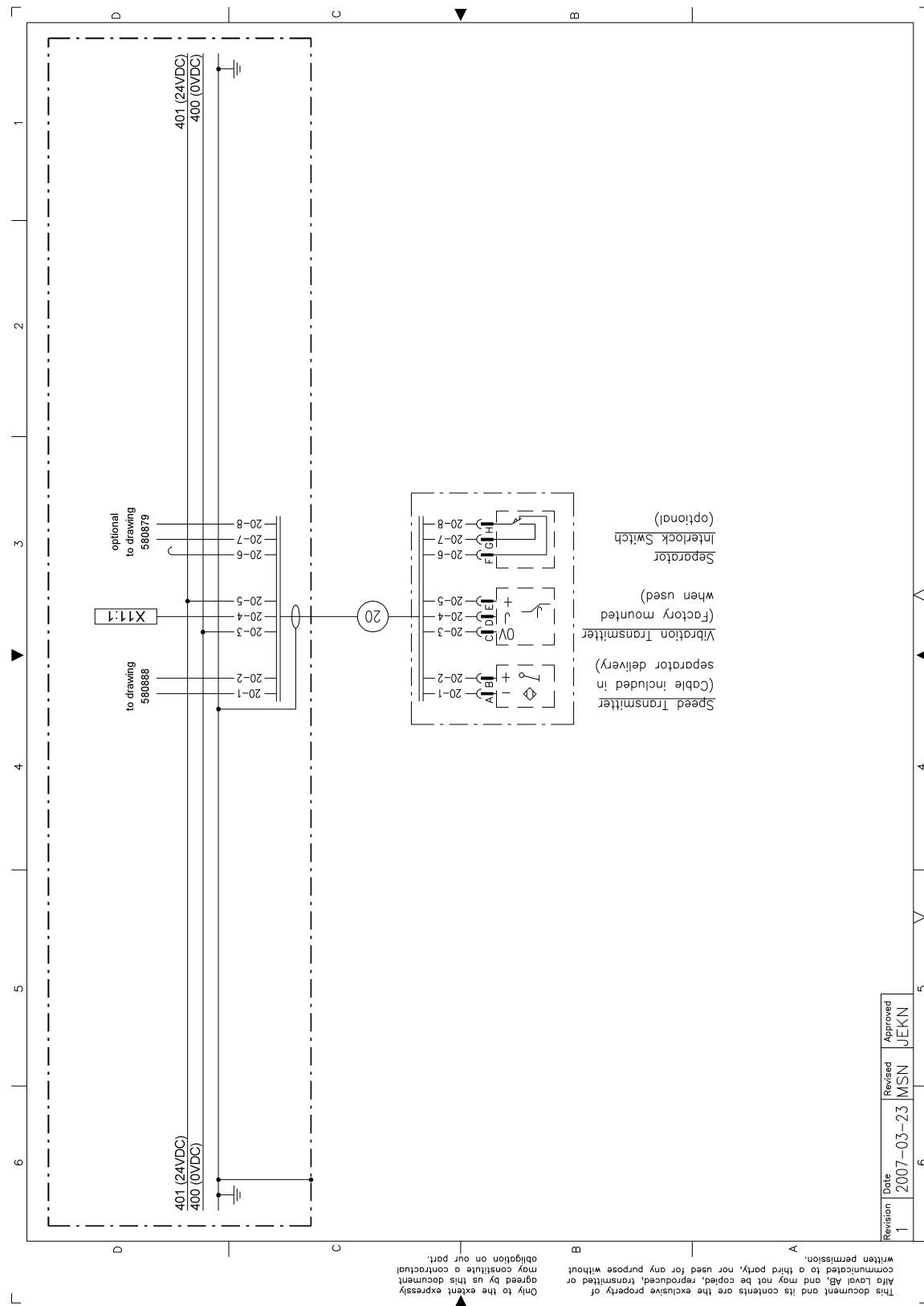
3.3.5 Speed Transmitter (optional) Interconnection Diagram

Alfa Laval ref. 580888 Rev. 3



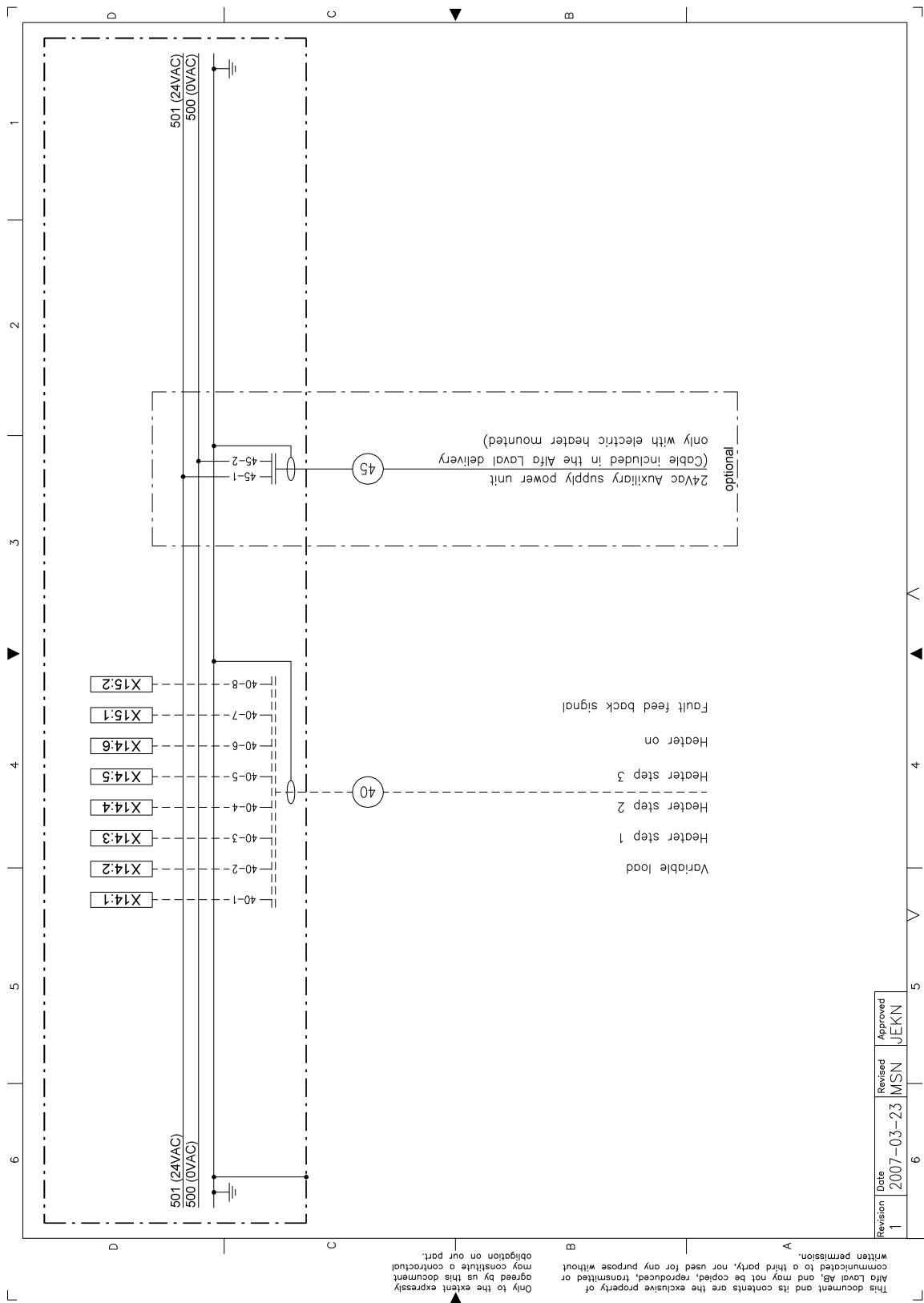
3.3.6 Vibration Transmitter (optional) Interconnection Diagram

Alfa Laval ref. 580890 Rev. 1



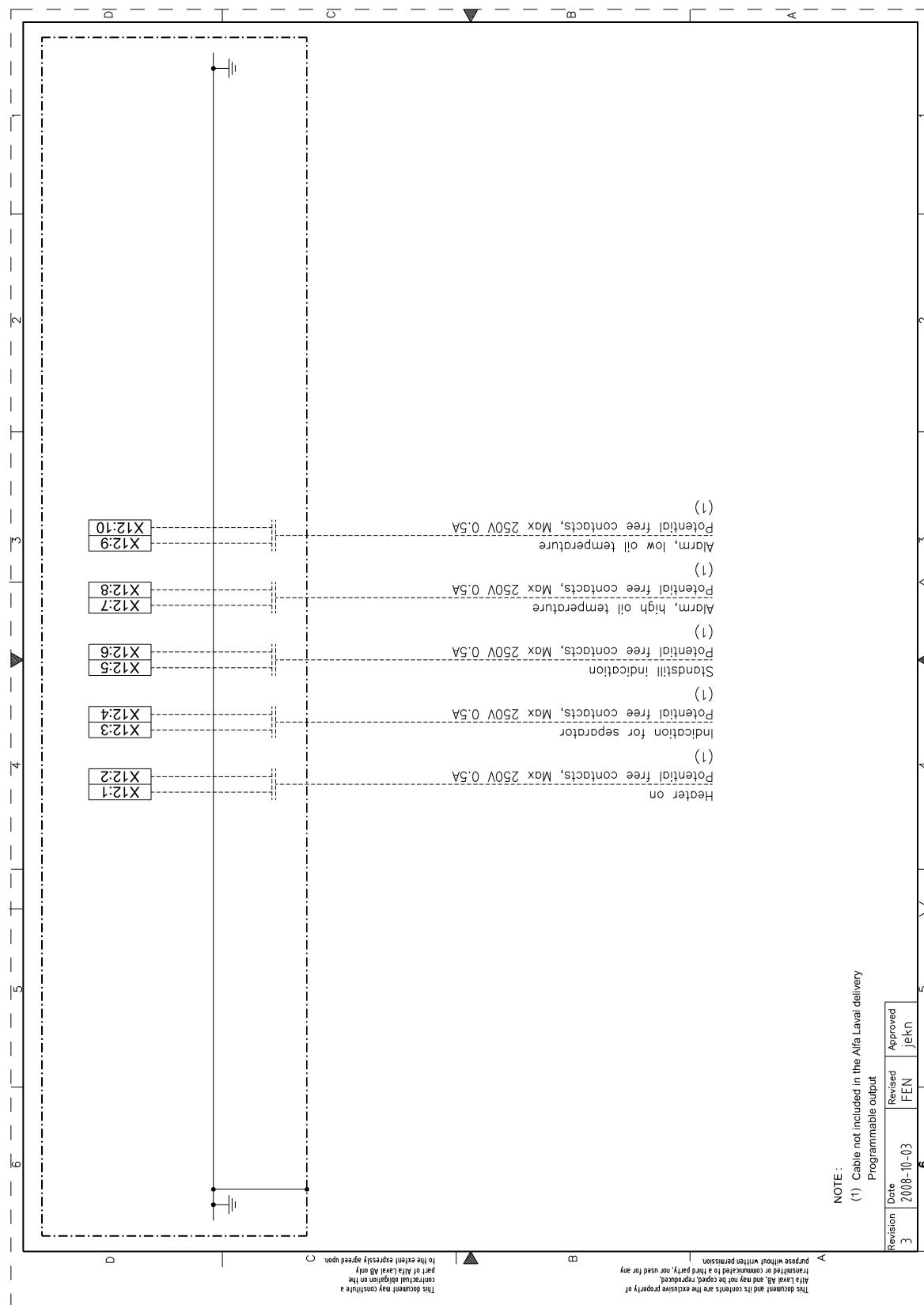
3.3.7 Electric Heater (optional) Interconnection Diagram

Alfa Laval ref. 580896 Rev. 1

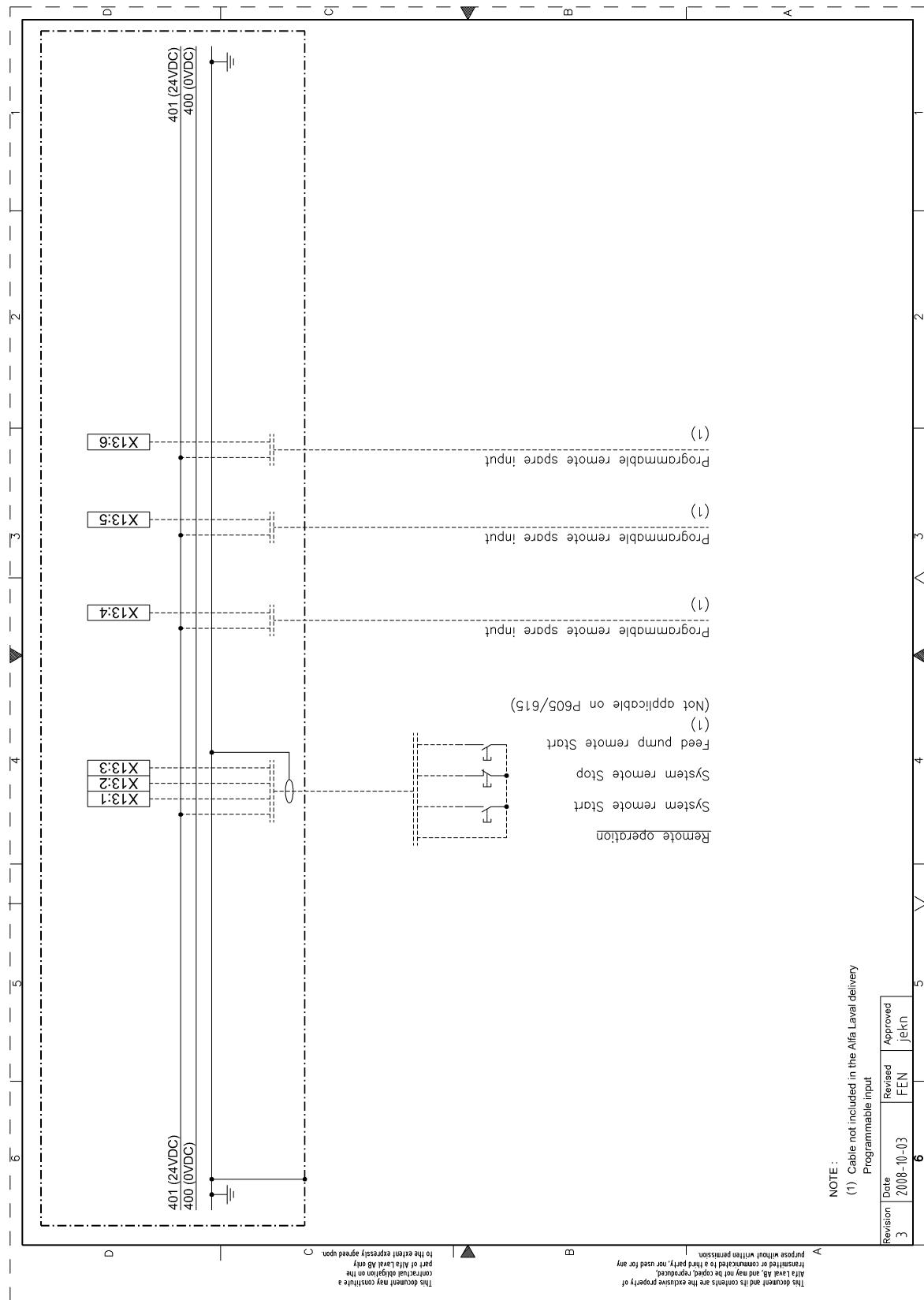


3.3.8 I/O (optional) Interconnection Diagram

Alfa Laval ref. 580894 Rev. 3

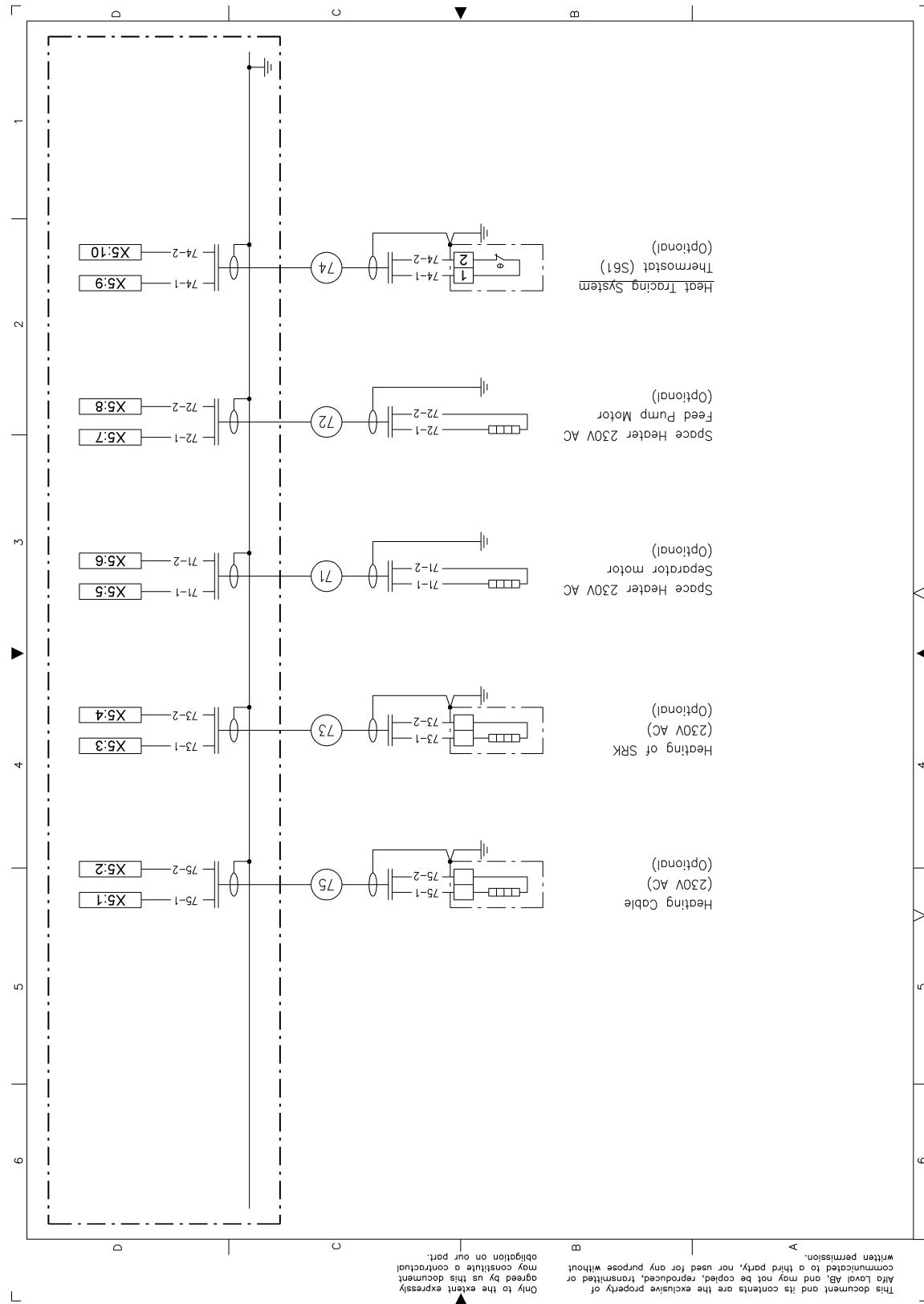


Alfa Laval ref. 580894 Rev. 3



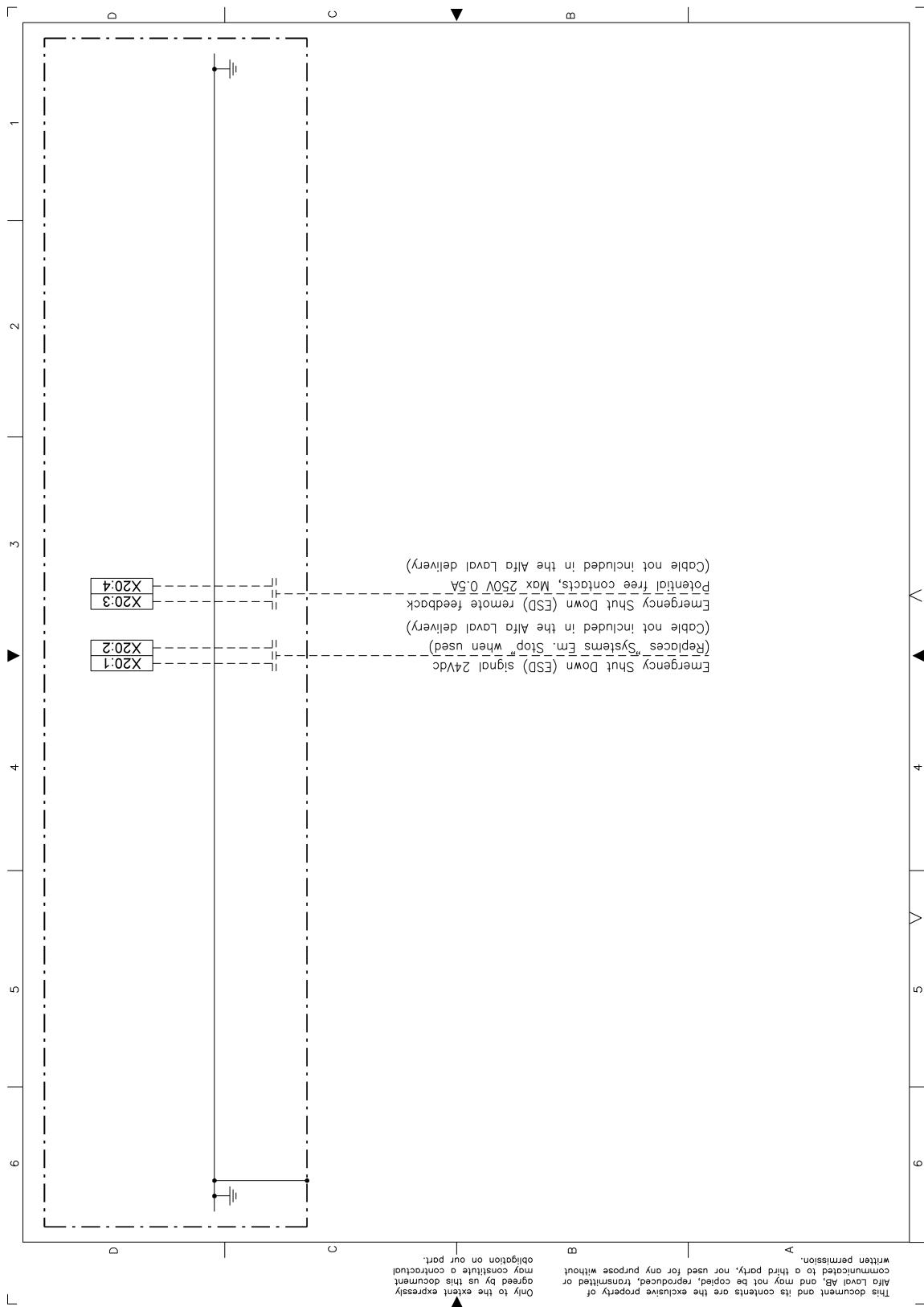
3.3.9 Heat Tracing (optional) Interconnection Diagram

Alfa Laval ref. 580884 Rev. 0



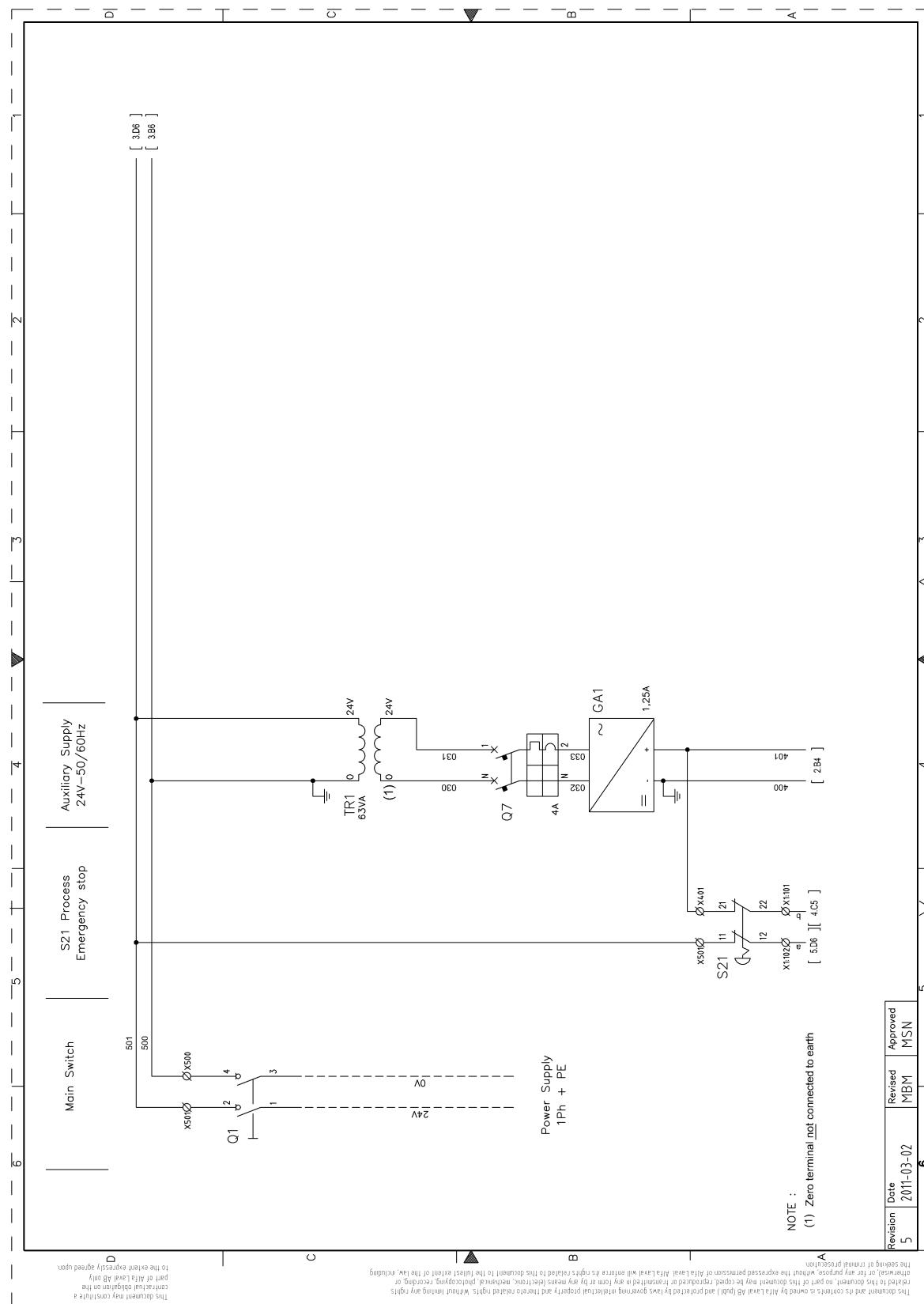
3.3.10 Emergency Shutdown Interconnection Diagram

Alfa Laval ref. 580898 Rev. 0

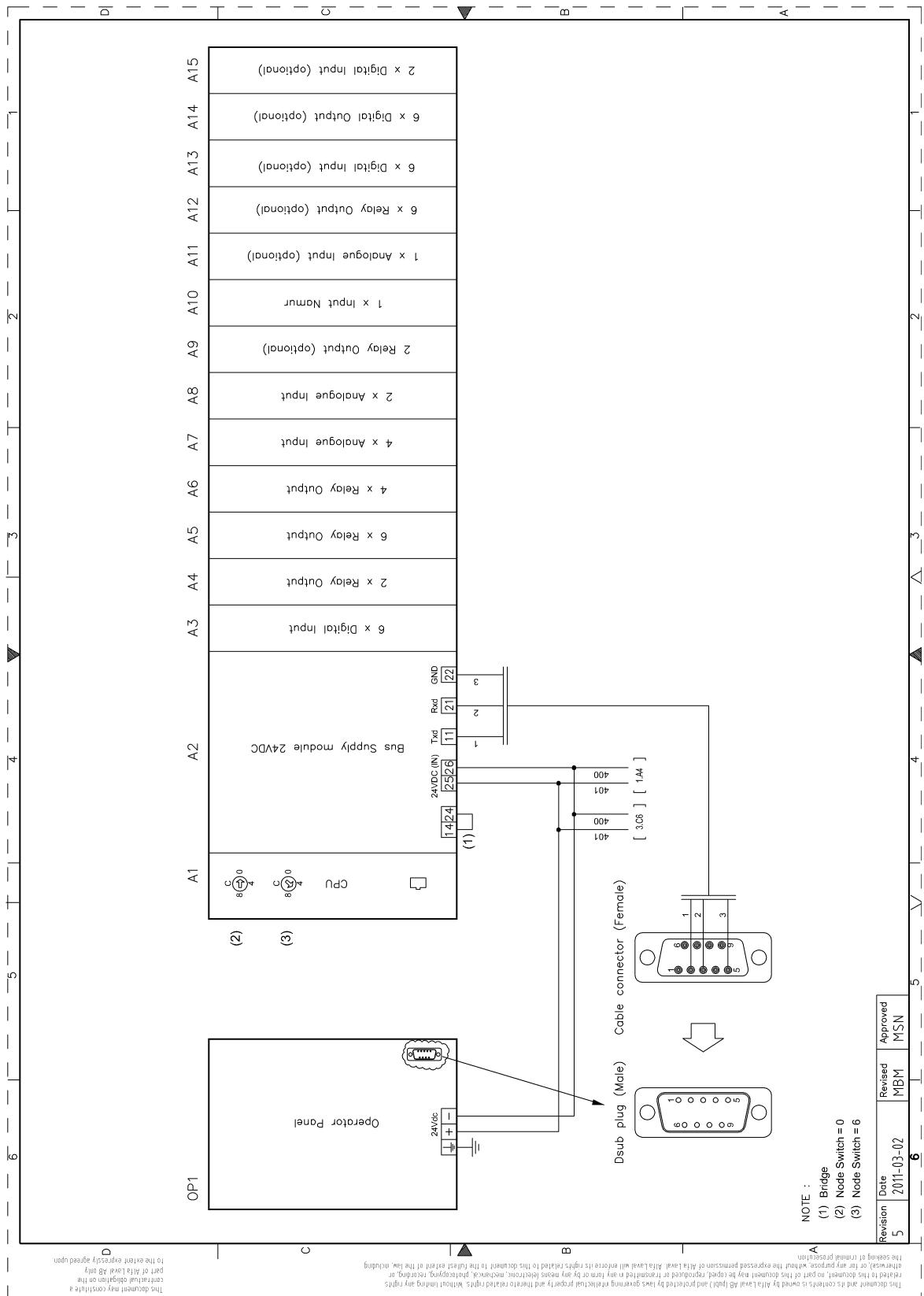


3.3.11 Circuit Diagram

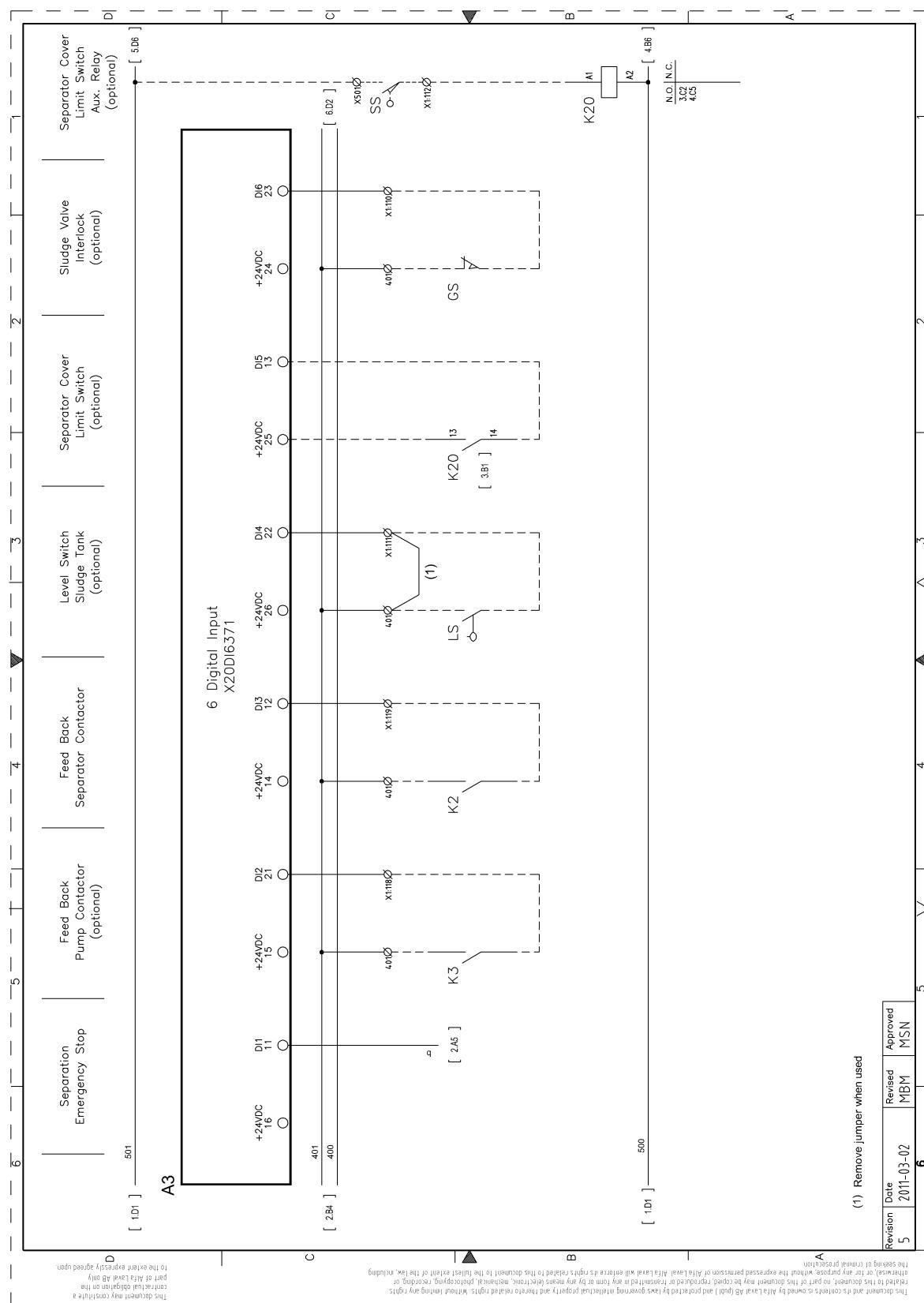
Alfa Laval ref. 580905 Rev. 5



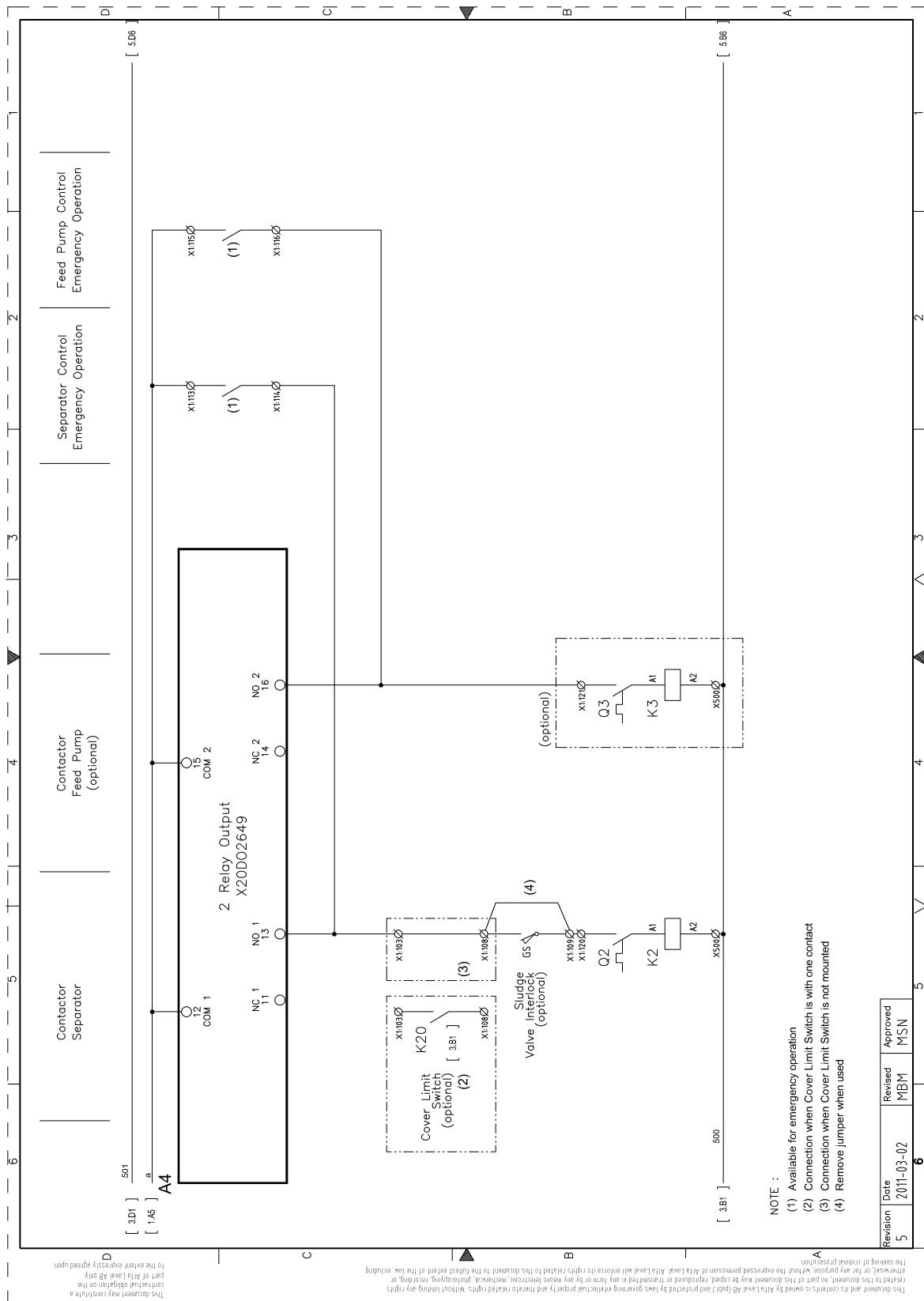
Alfa Laval ref. 580905 Rev. 5



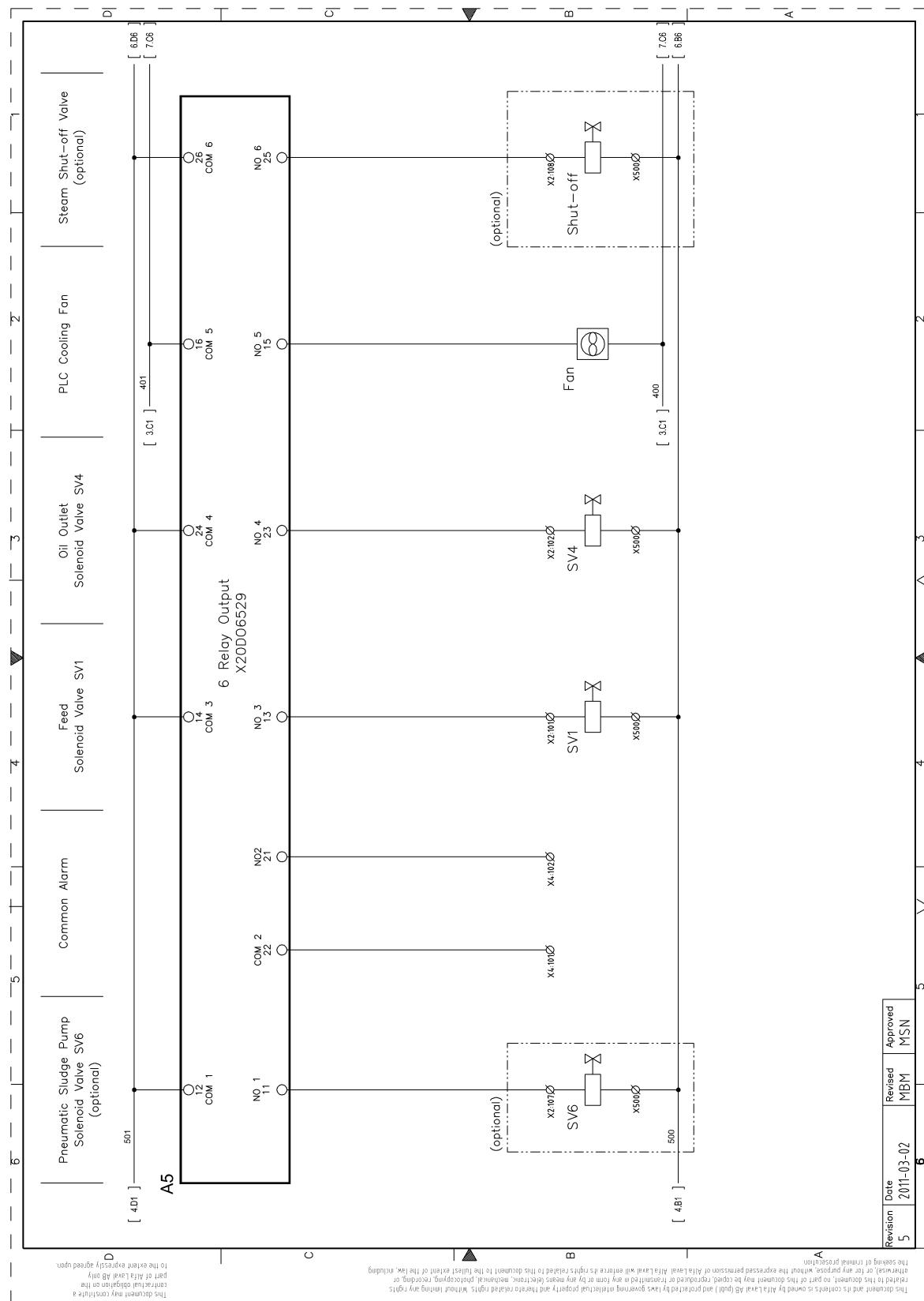
Alfa Laval ref. 580905 Rev. 5



Alfa Laval ref. 580905 Rev. 5



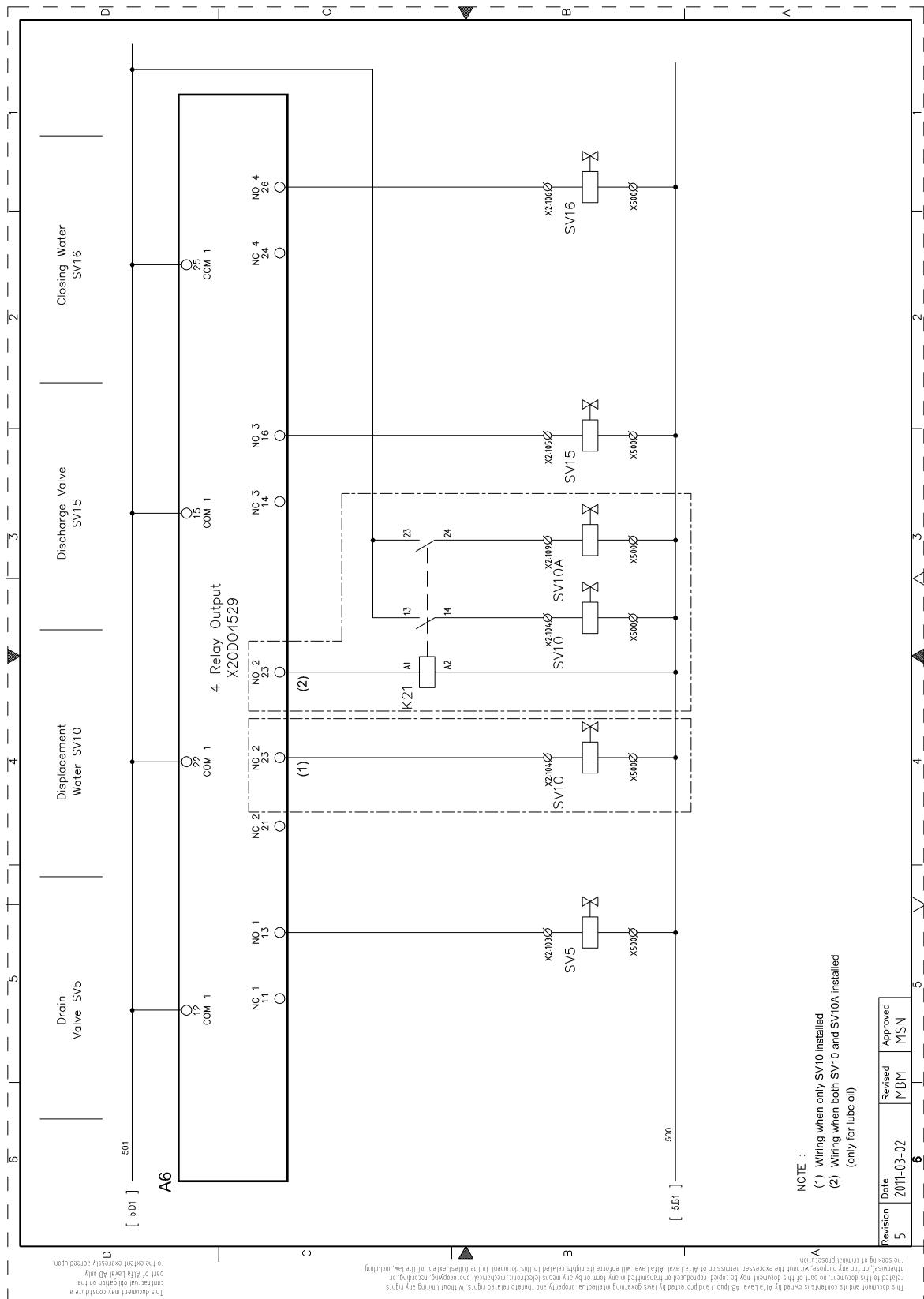
Alfa Laval ref. 580905 Rev. 5



580905_04

| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 5 | 2011-03-02 | MBM | MSN |

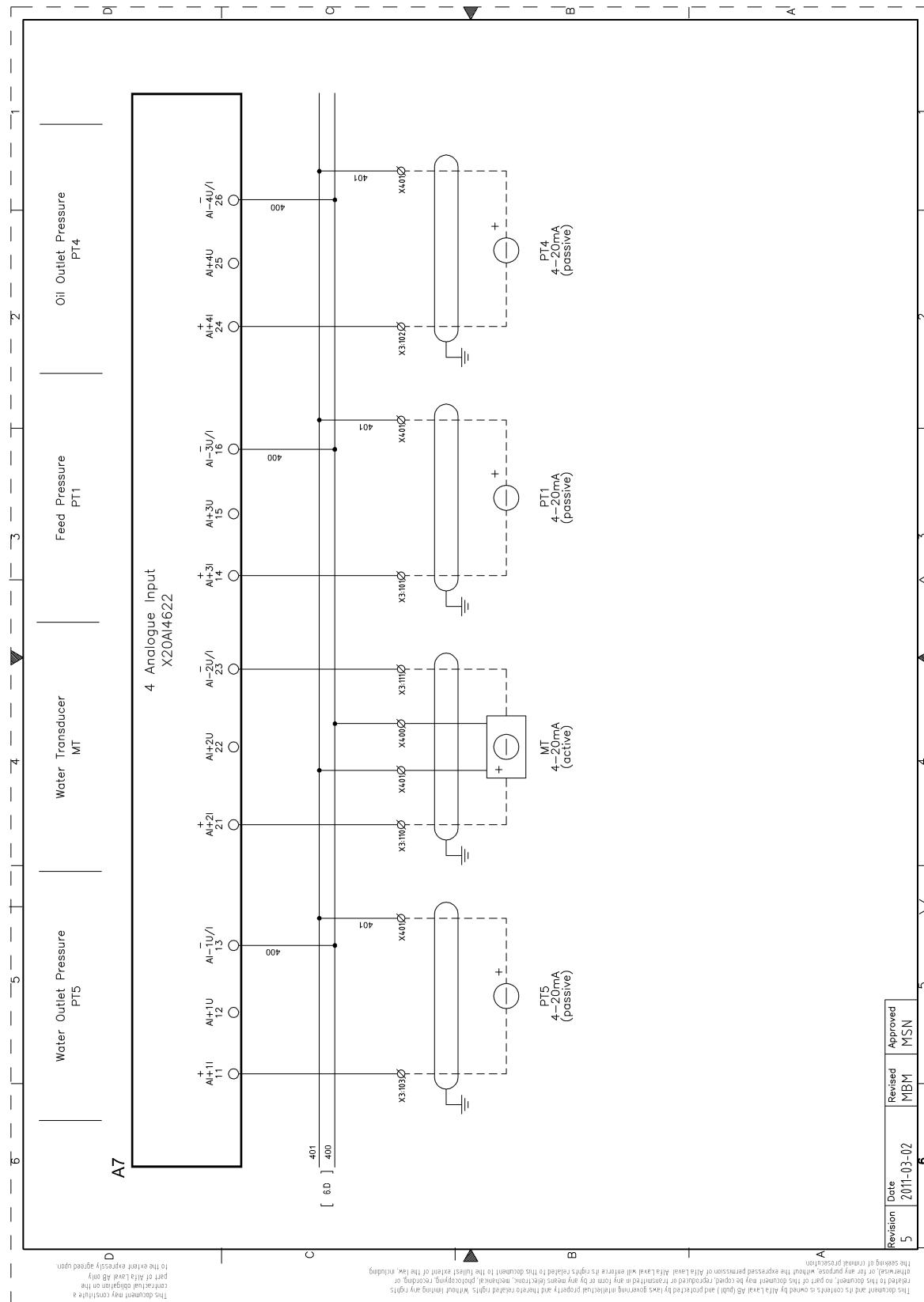
Alfa Laval ref. 580905 Rev. 5



This document and its contents is owned by Alfa Laval AB (publ) and/or its local manufacturing, distribution, project and sales entities and their respective affiliates. Reproduction, transmission, disclosure or other unauthorized use of the information contained herein without the express written permission of Alfa Laval AB (publ) will infringe its rights and expose it to the full extent of the law, including criminal liability and/or civil damages. This document is for internal purposes only. It is not intended to be part of Alfa Laval AB (publ)'s standard terms and conditions of sale, which prevail over any conflict with the contents of this document.

NOTE :
(1) Wiring when only SV10 installed
(2) Wiring when both SV10 and SV10A installed
(only for tube oil)

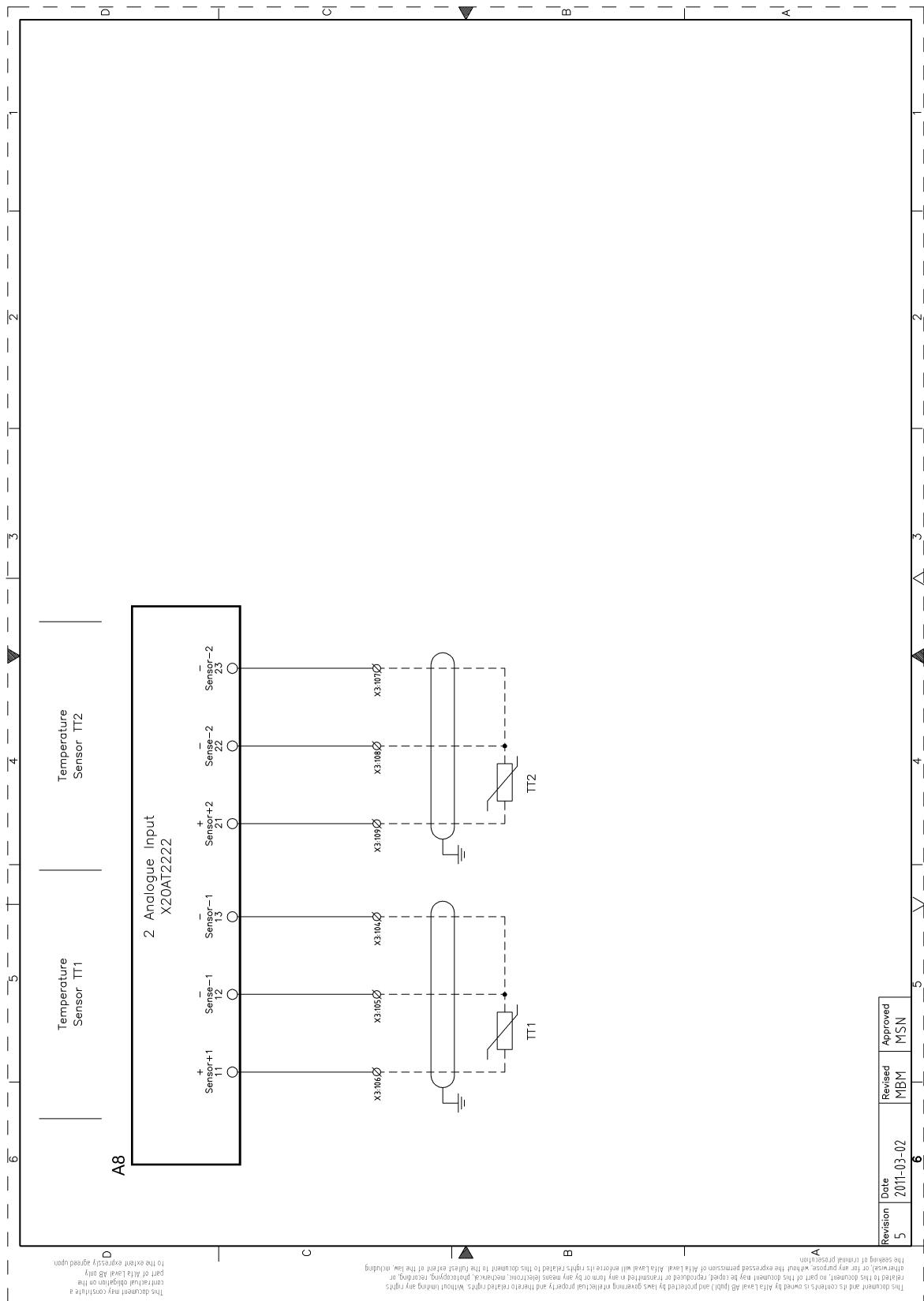
Alfa Laval ref. 580905 Rev. 5



580905_06

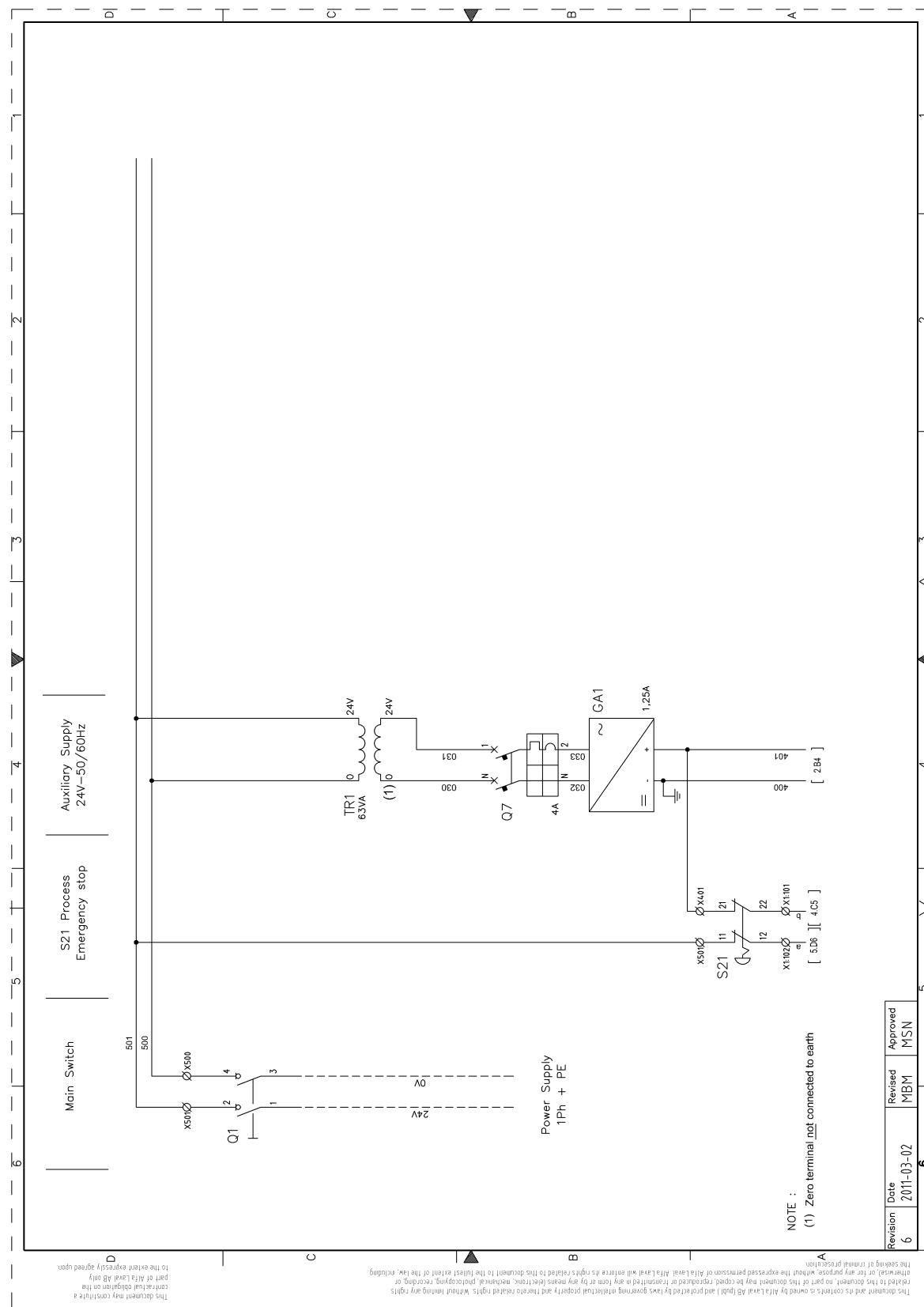
| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 5 | 2011-03-02 | MBM | MSN |

Alfa Laval ref. 580905 Rev. 5

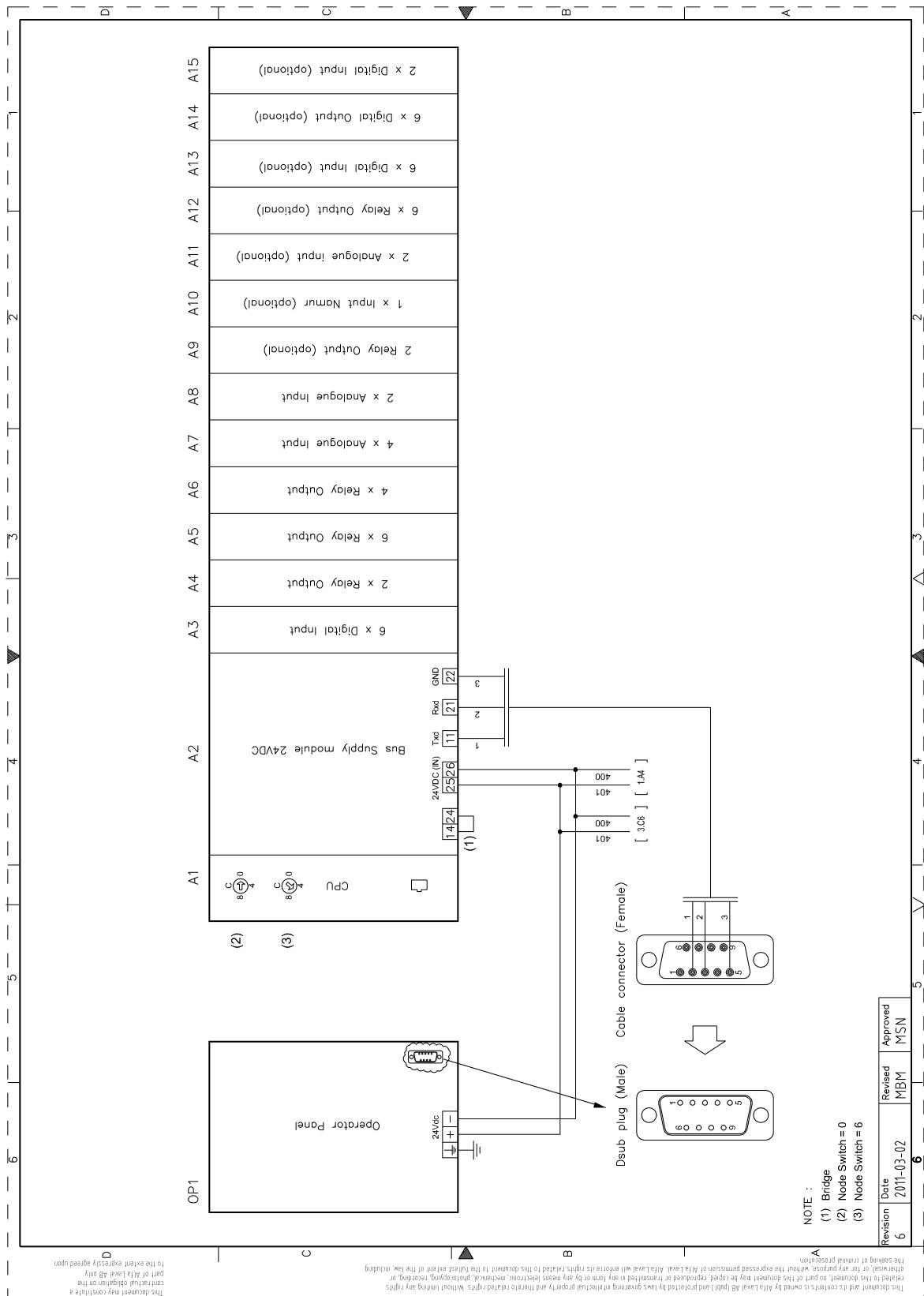


3.3.12 Circuit Diagram

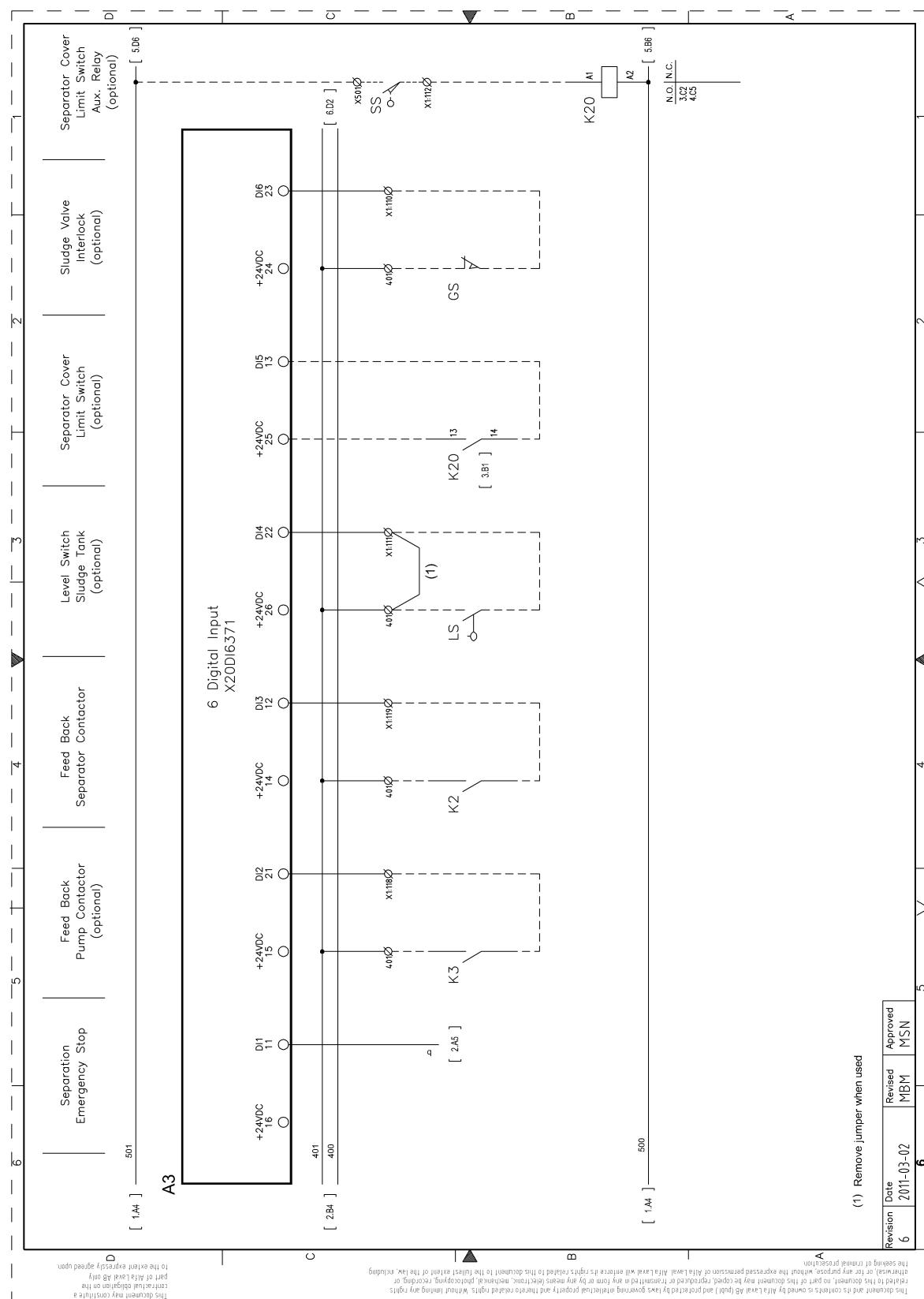
Alfa Laval ref. 581068 Rev. 6



Alfa Laval ref. 581068 Rev. 6

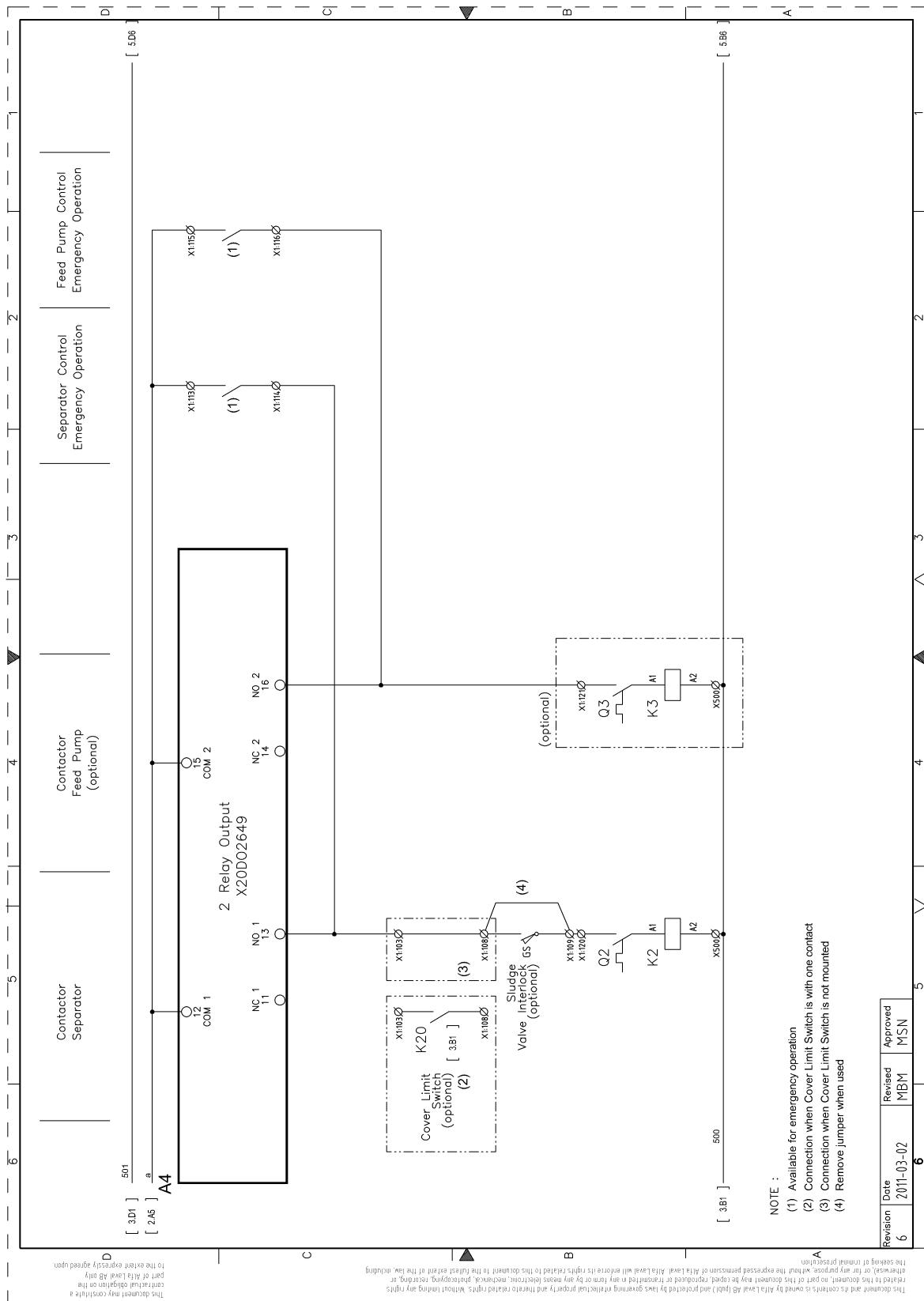


Alfa Laval ref. 581068 Rev. 6

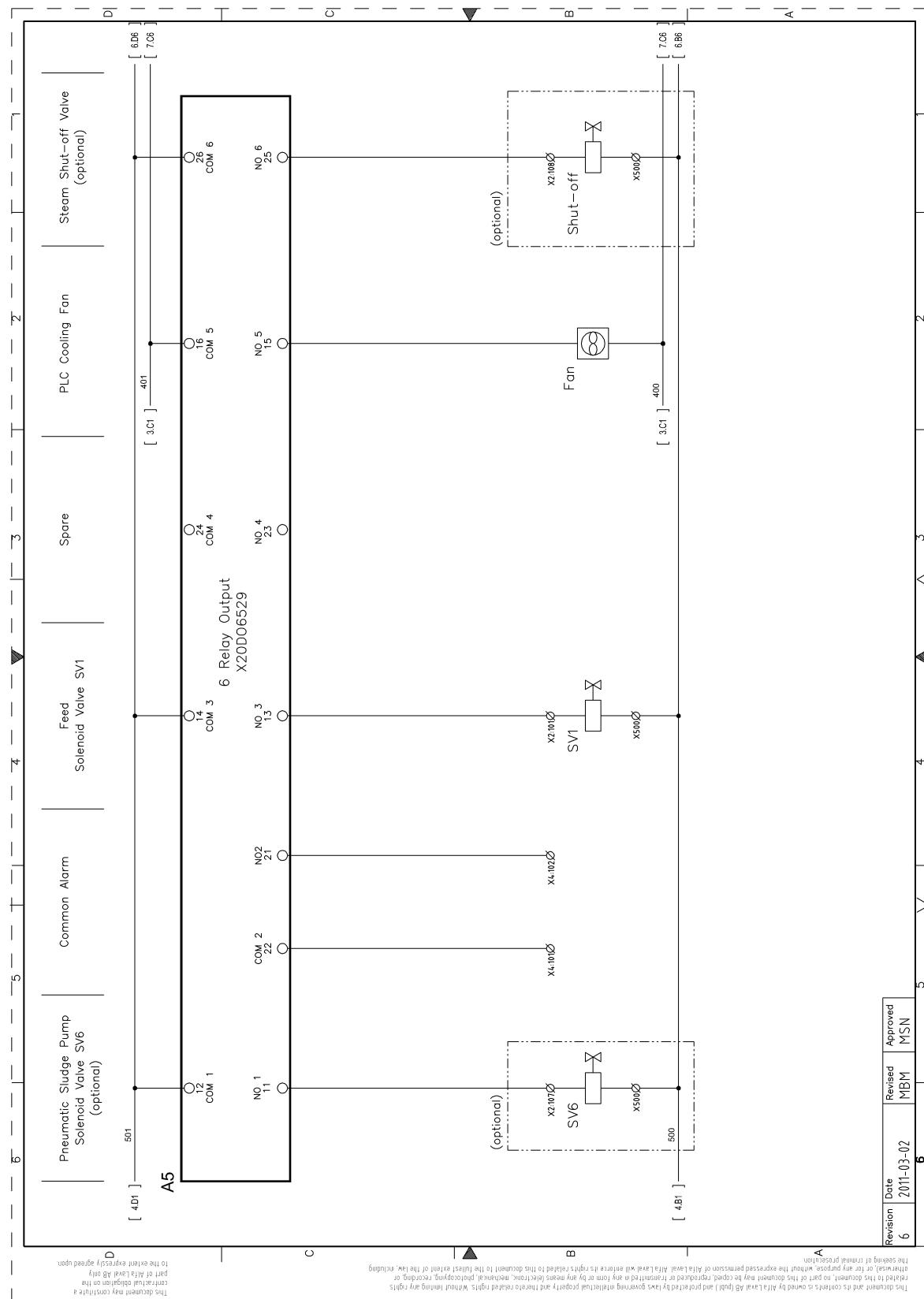


| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 6 | 2011-03-02 | MBM | MSN |

Alfa Laval ref. 581068 Rev. 6



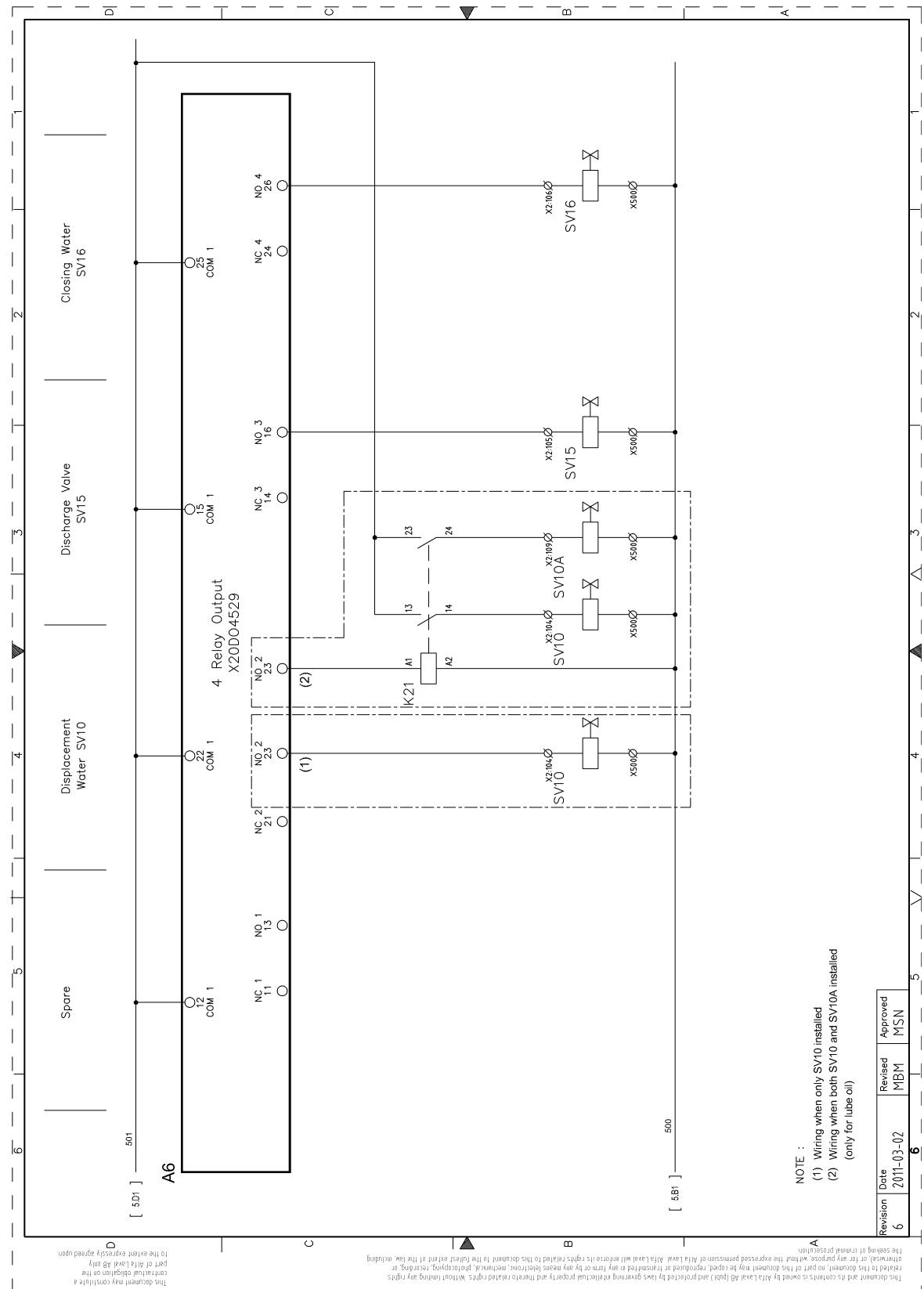
Alfa Laval ref. 581068 Rev. 6



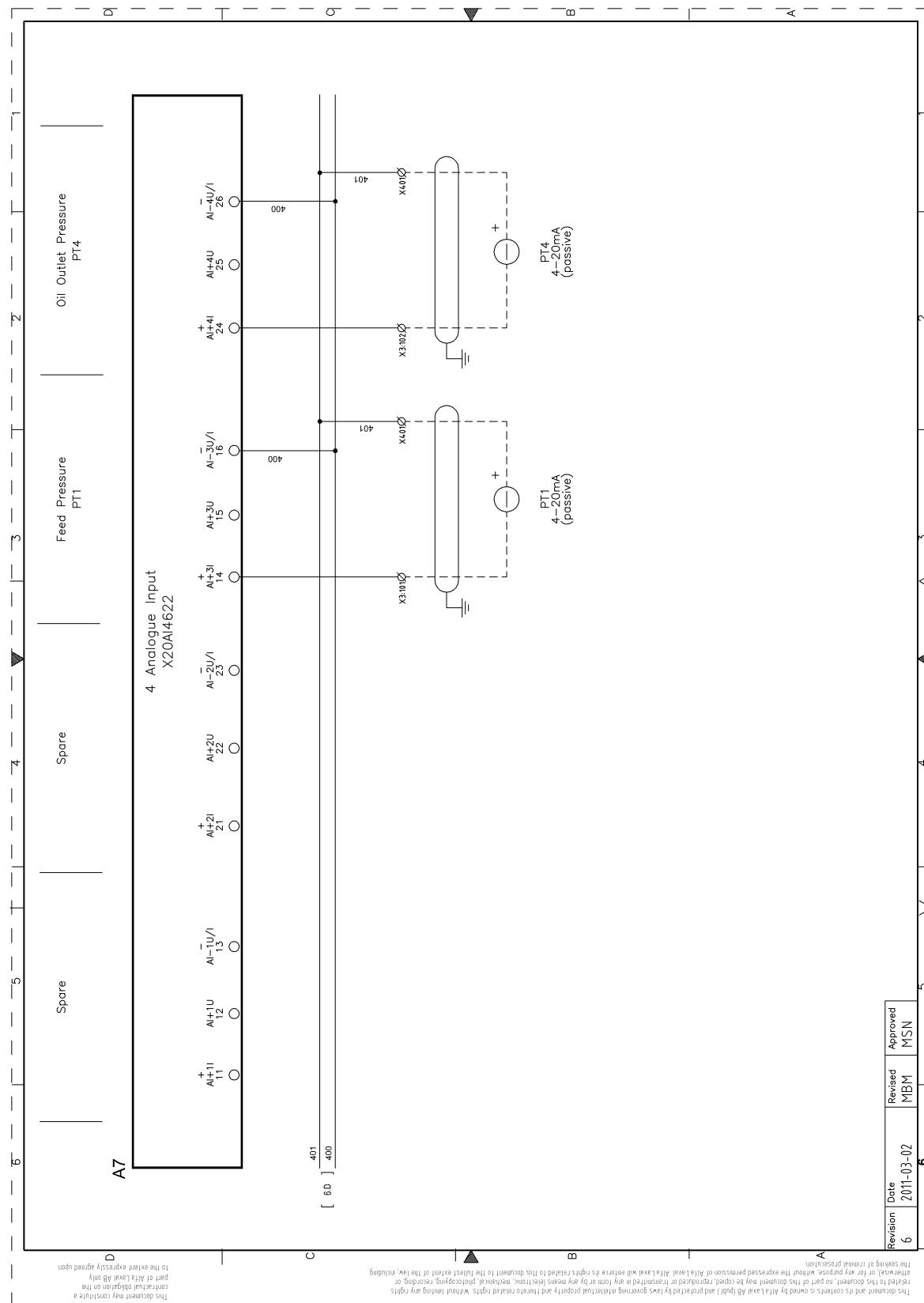
3.3 Control and Starter Electrical Diagrams

3 Electrical Drawings

Alfa Laval ref. 581068 Rev. 6



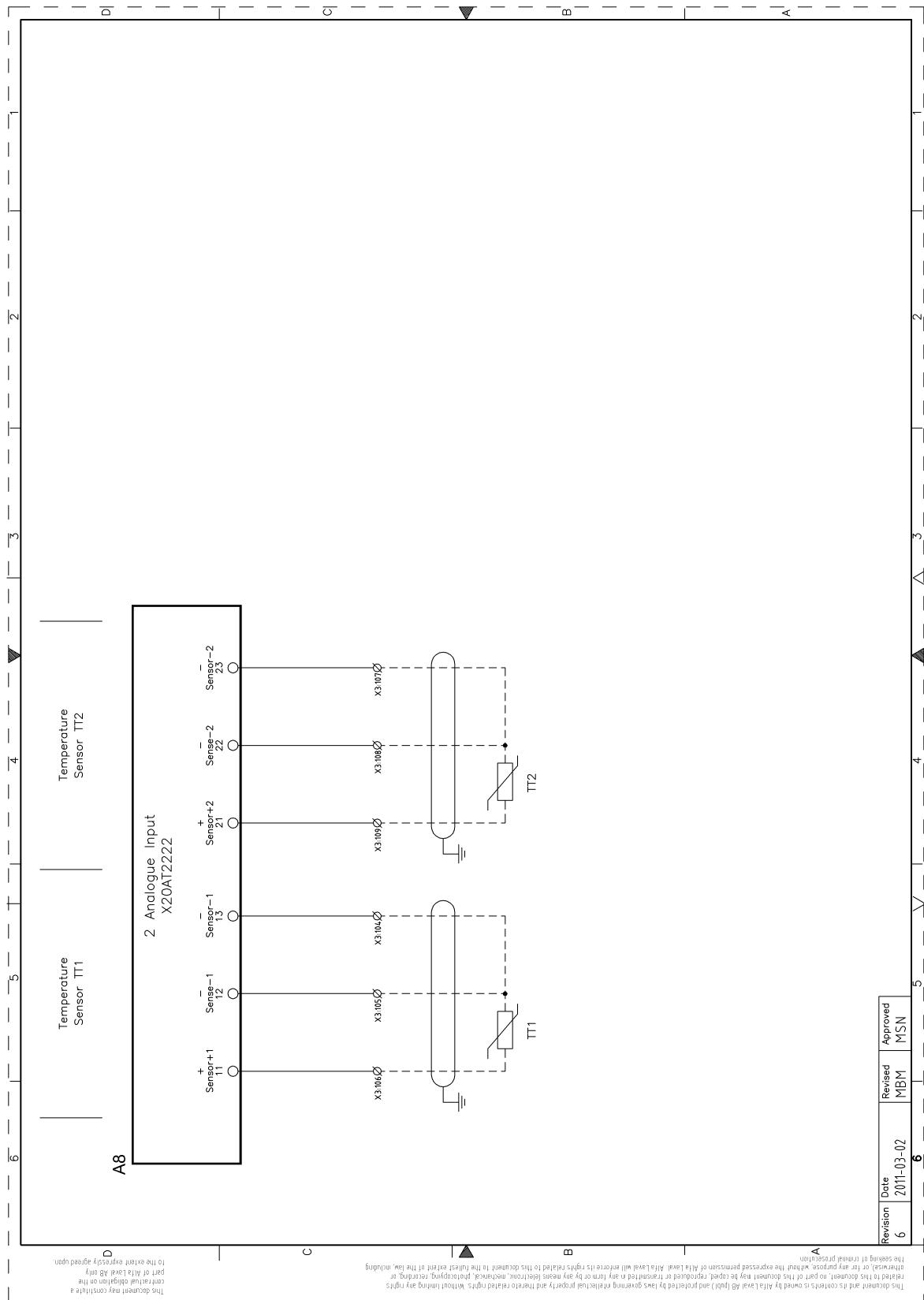
Alfa Laval ref. 581068 Rev. 6



581068_06

| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 6 | 2011-03-02 | MBM | MSN |

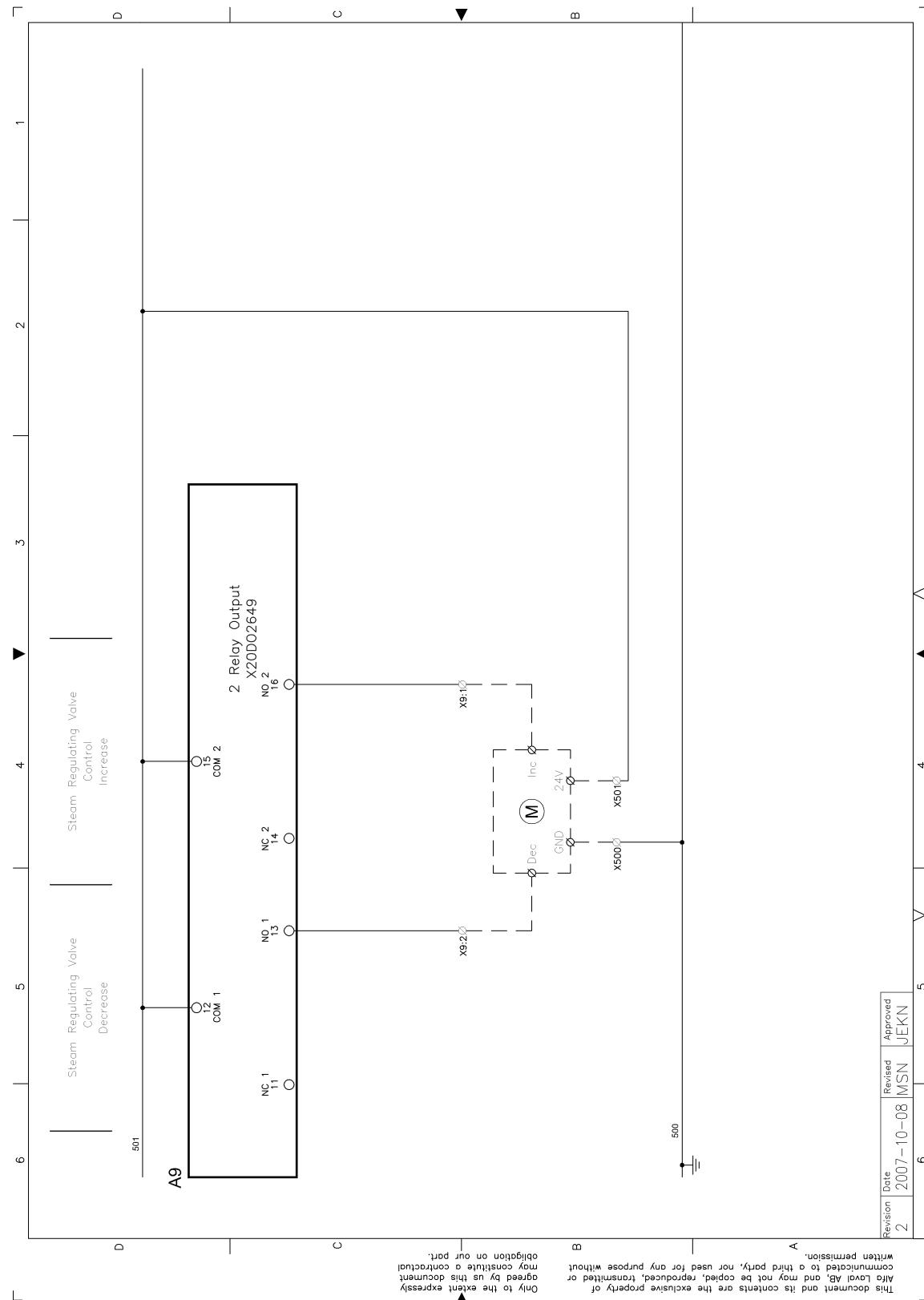
Alfa Laval ref. 581068 Rev. 6



| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 6 | 2011-03-02 | MBM | MSN |

3.3.13 Steam Regulating Valve (optional) Circuit Diagram

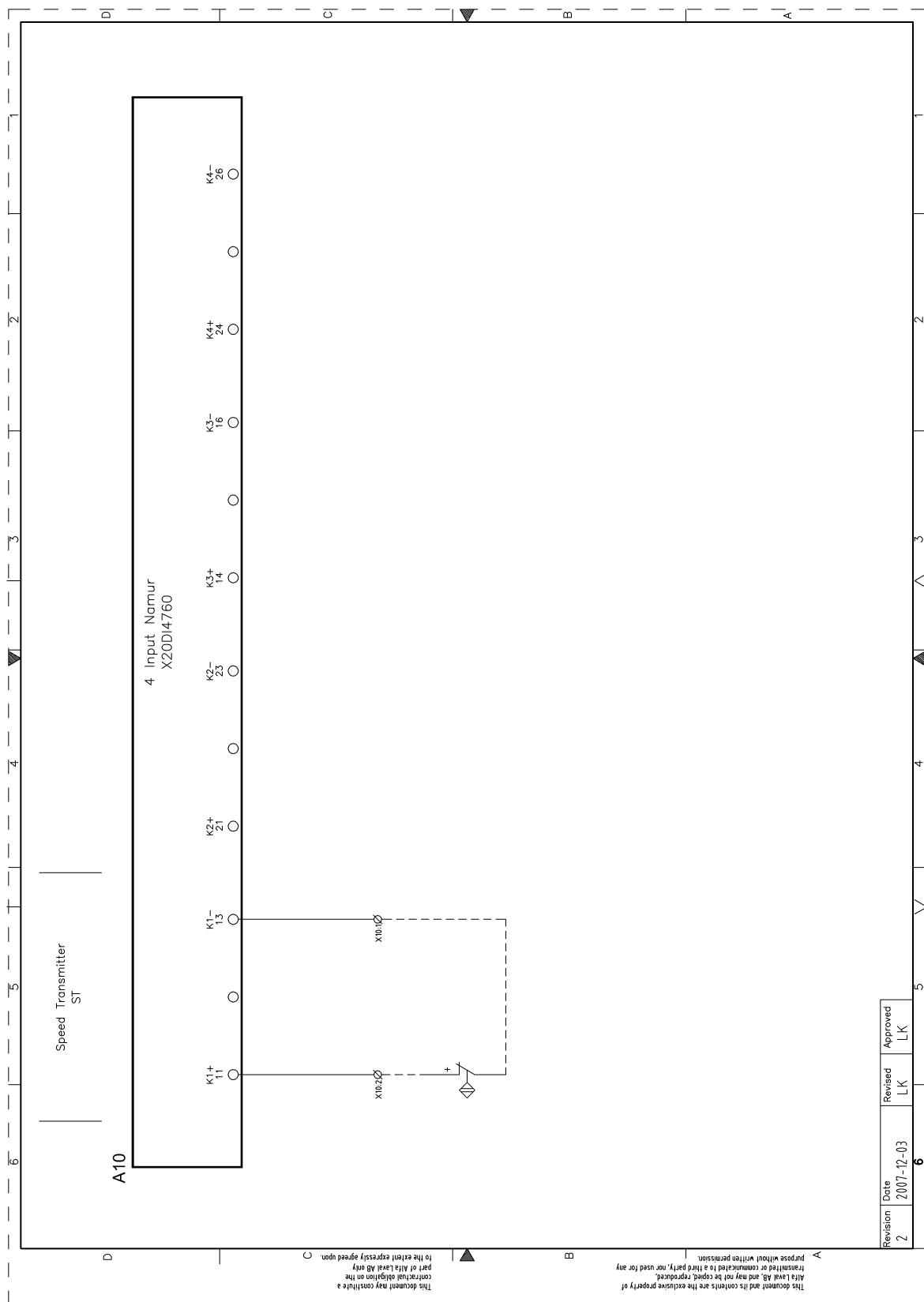
Alfa Laval ref. 580885 Rev. 2



This document and its contents are the exclusive property of Alfa Laval AB, and may not be copied, reproduced, transmitted or communicated to a third party, nor used for any purpose without written permission. Only to the extent expressly permitted or agreed by us in this document may constituents of a contractual obligation on our part, may constitute a contractual obligation to a third party, nor used for any purpose without written permission.

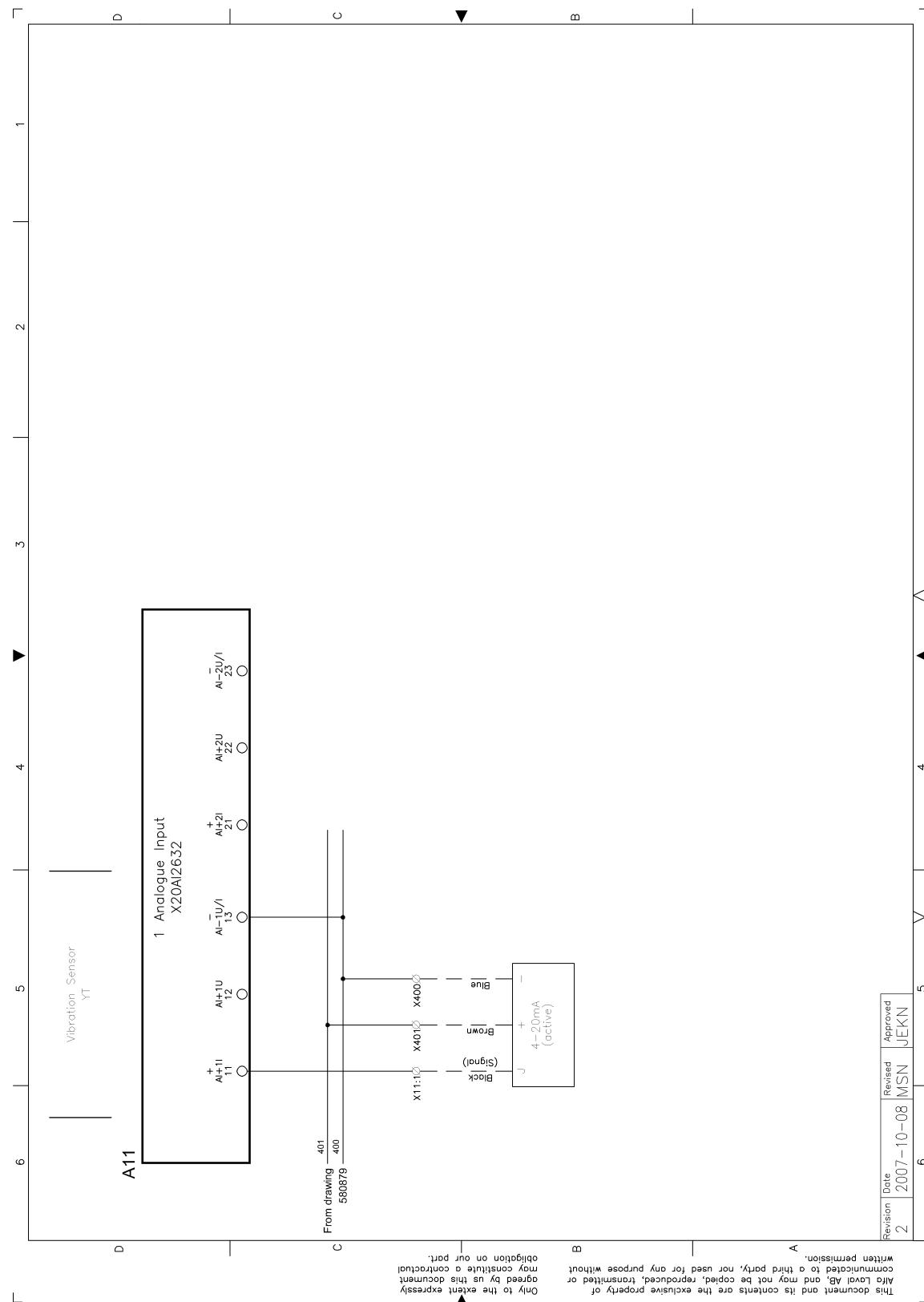
3.3.14 Speed Transmitter (optional) Circuit Diagram

Alfa Laval ref. 580887 Rev. 2



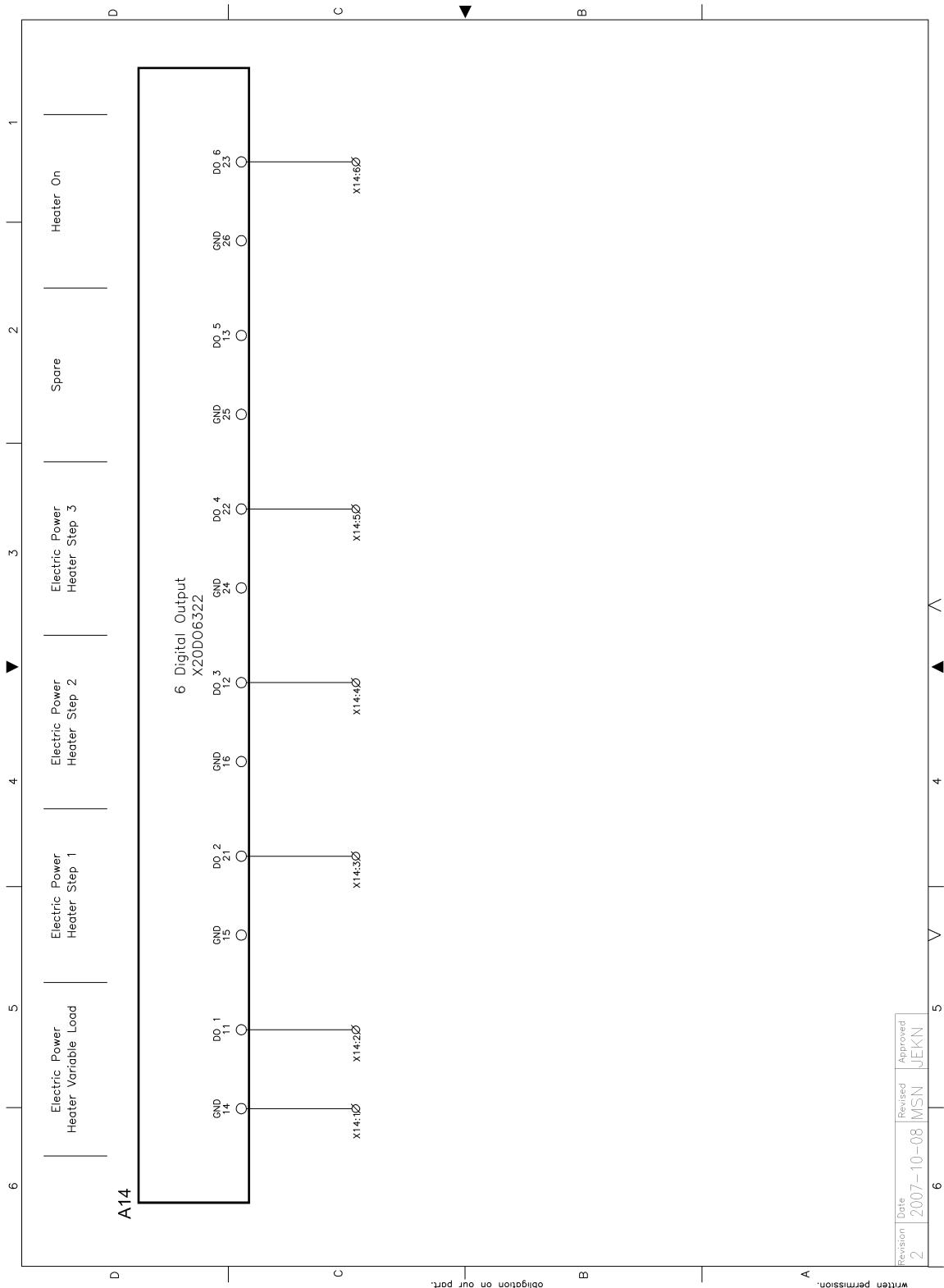
3.3.15 Vibration Transmitter (optional) Circuit Diagram

Alfa Laval ref. 580889 Rev. 2



3.3.16 Electric Heater (optional) Circuit Diagram

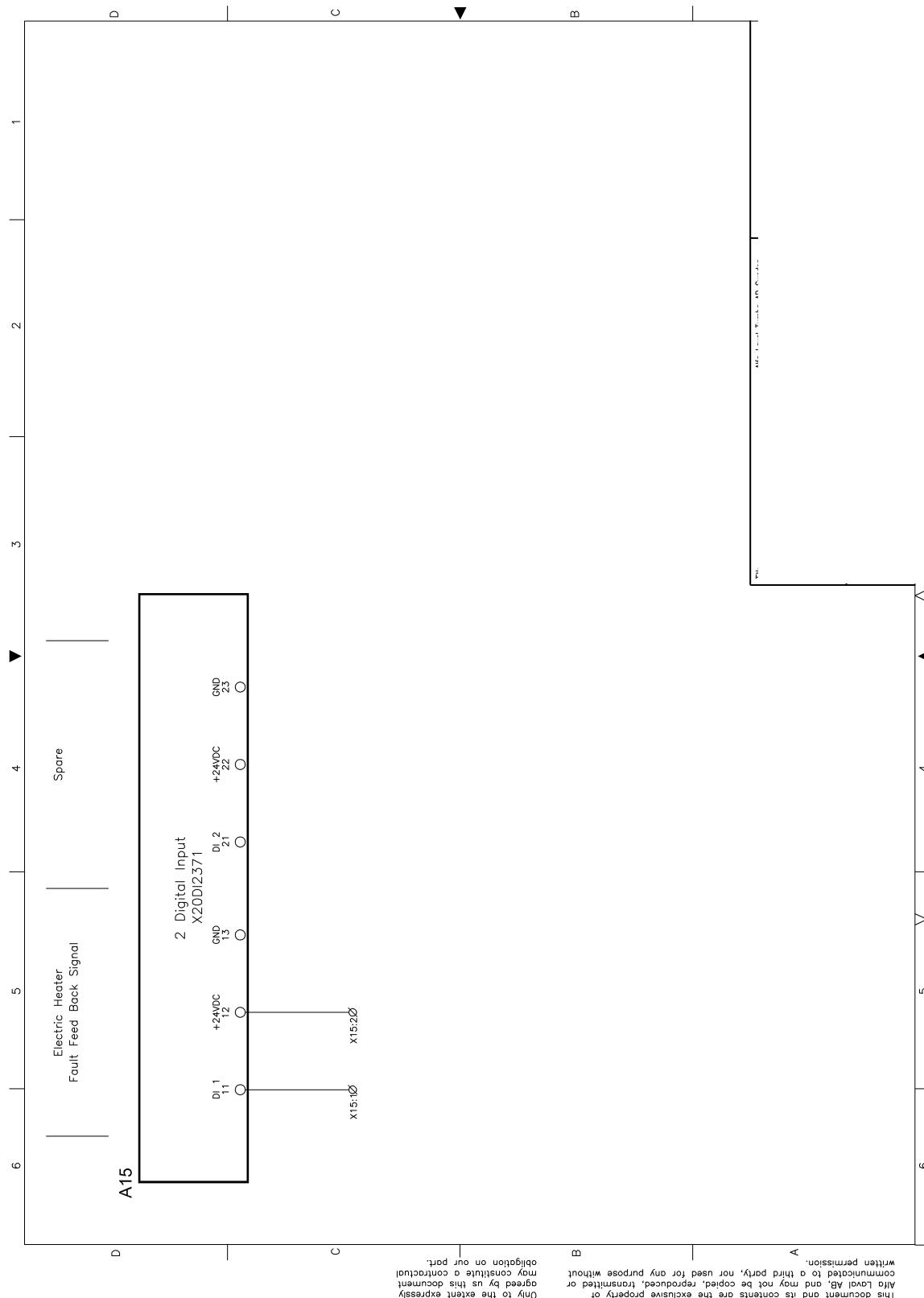
Alfa Laval ref. 580895 Rev. 2



This document and its contents are the exclusive property of Atta Local and may not be copied, reproduced, transmitted or otherwise communicated to a third party, nor used for any purpose without written permission.

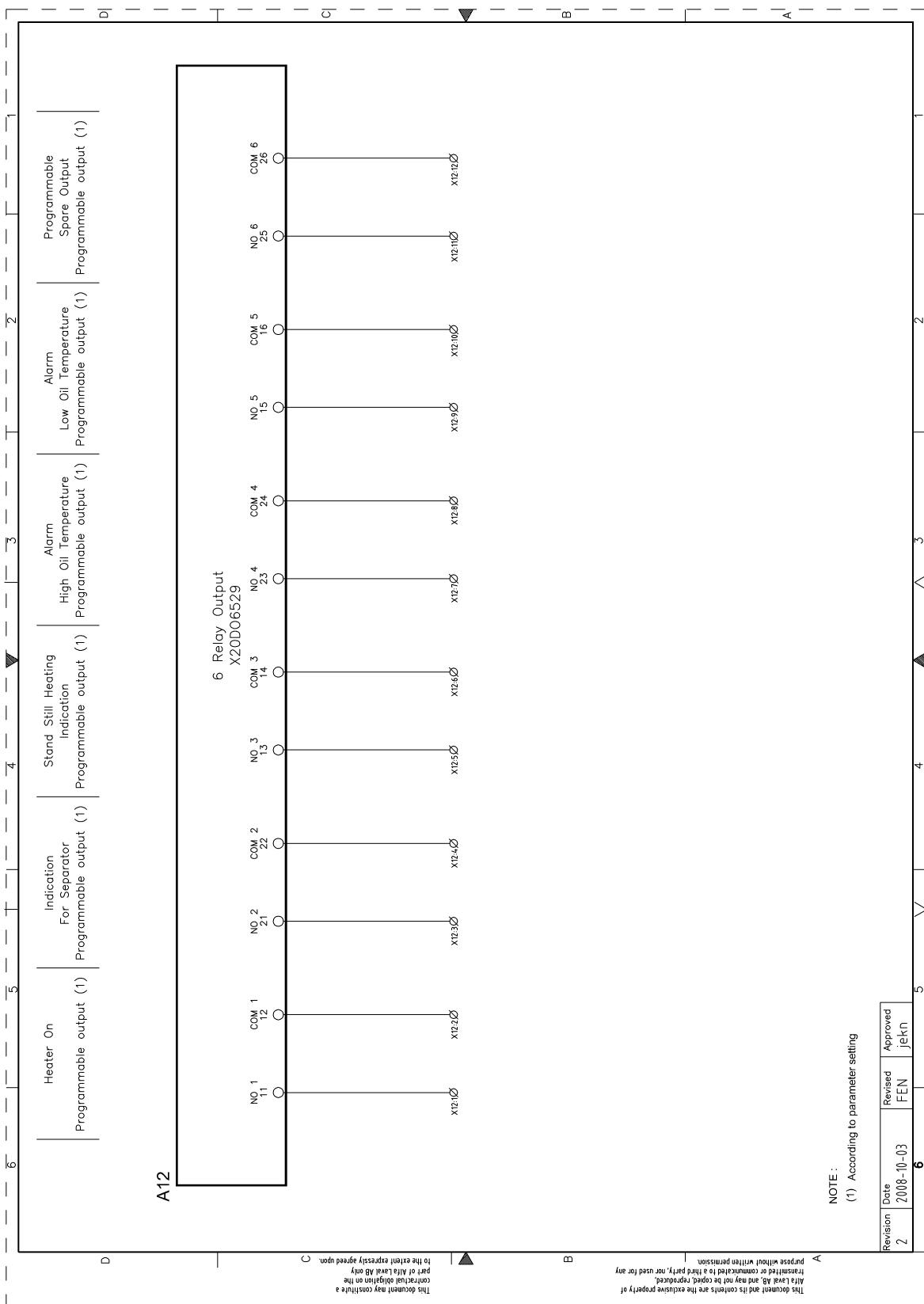
580895#2_00

Alfa Laval ref. 580895 Rev. 2

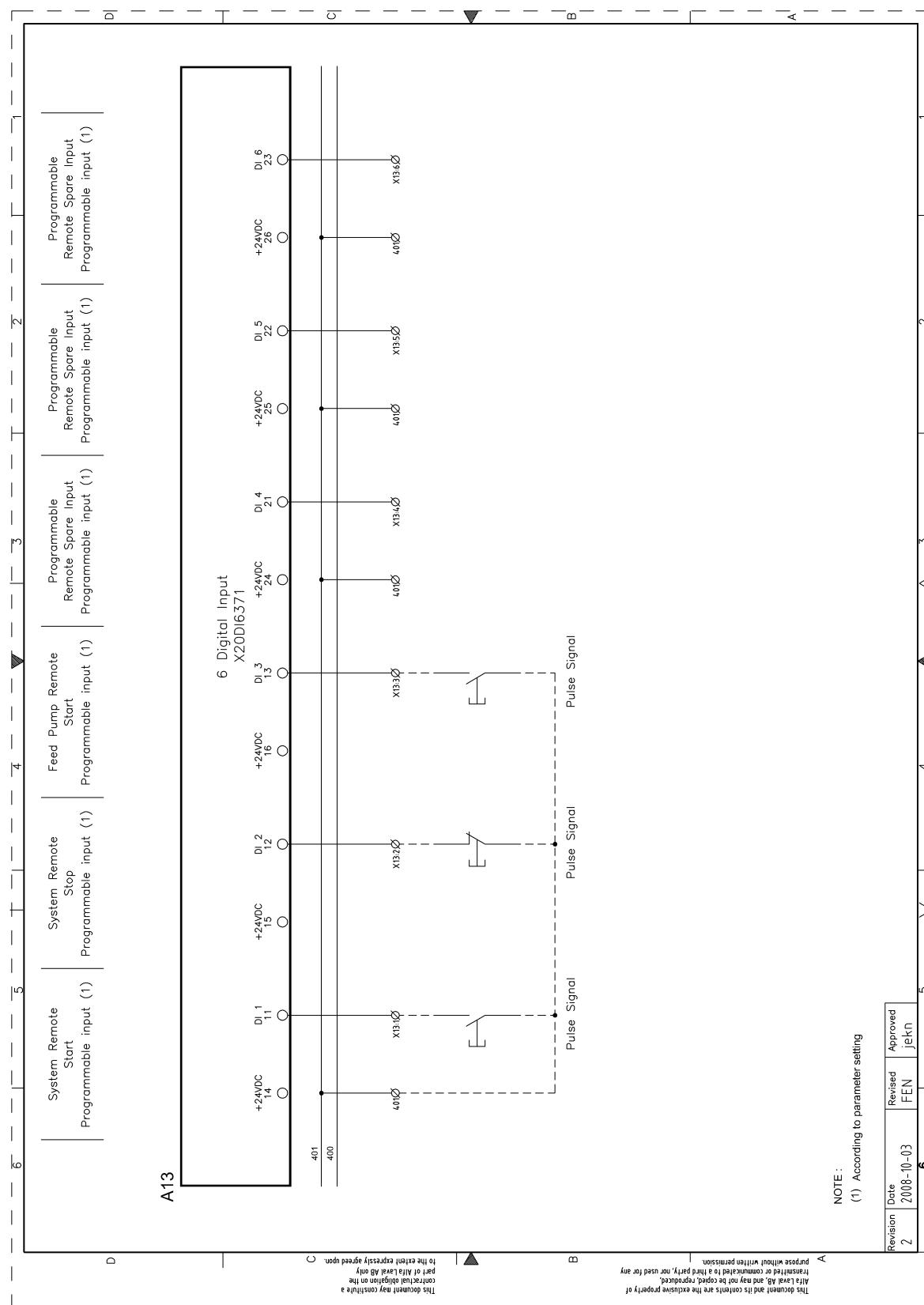


3.3.17 I/O (optional) Circuit Diagram

Alfa Laval ref. 580893 Rev. 2

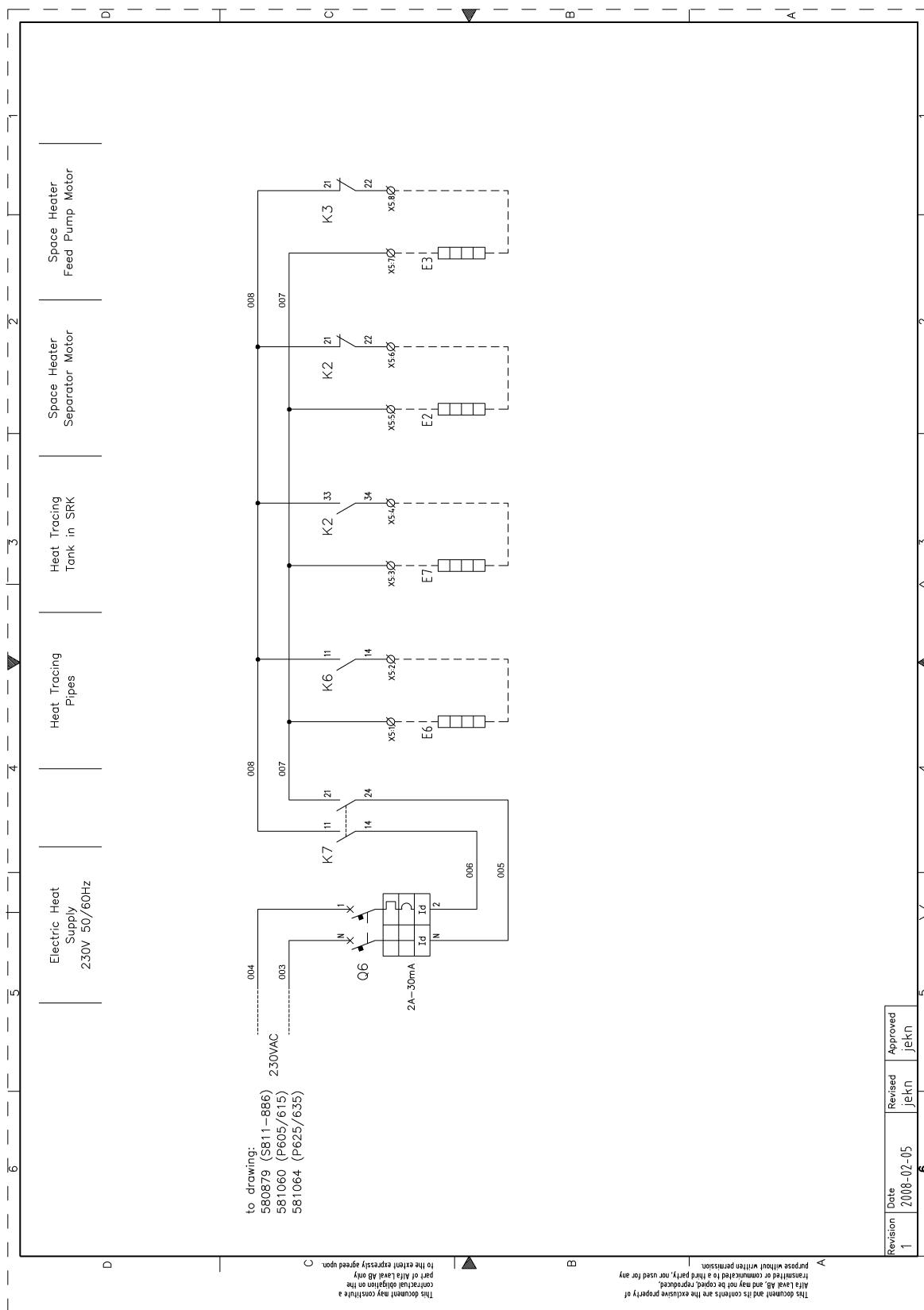


Alfa Laval ref. 580893 Rev. 2



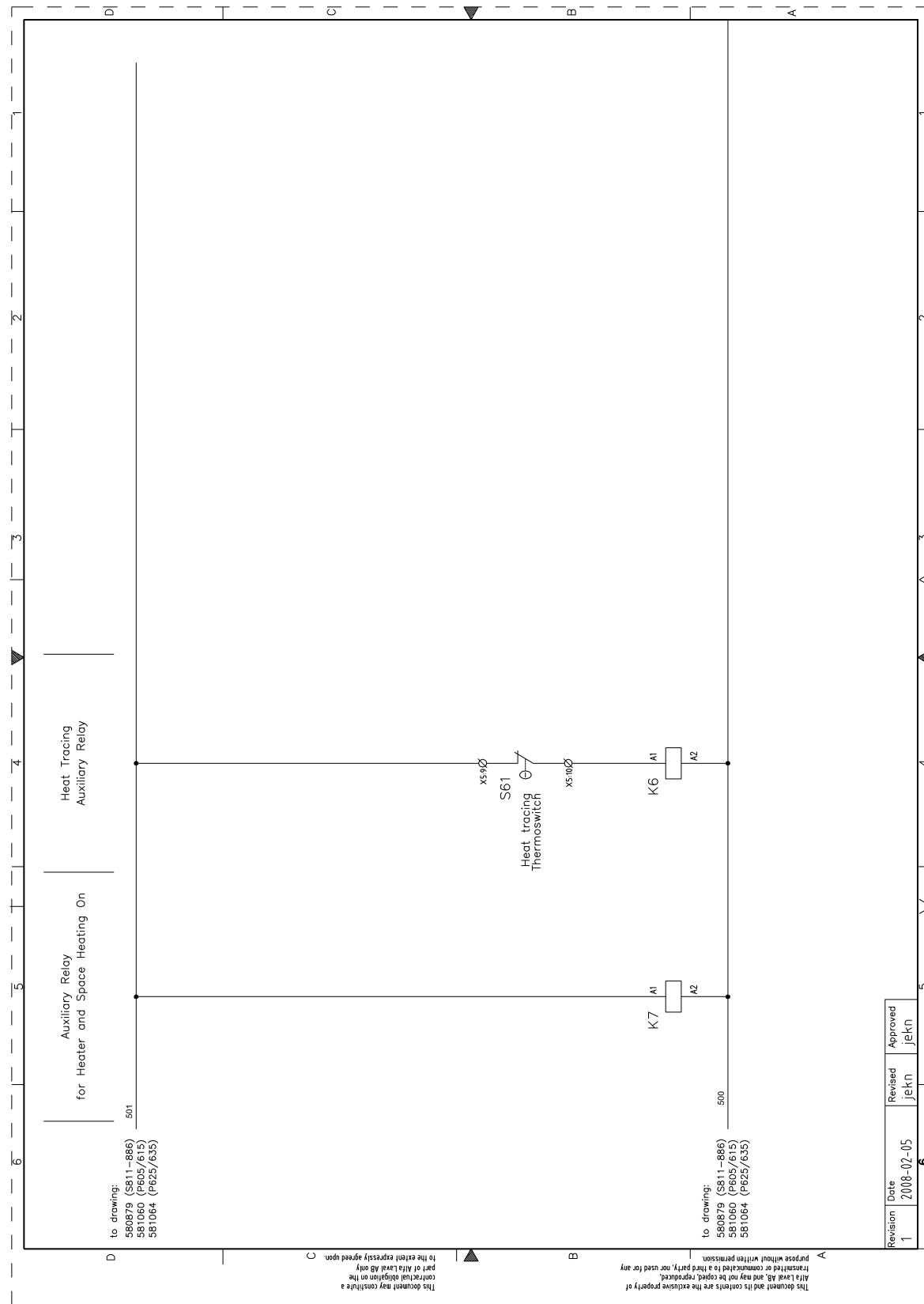
3.3.18 Heat Tracing (optional) Circuit Diagram

Alfa Laval ref. 580883 Rev. 1



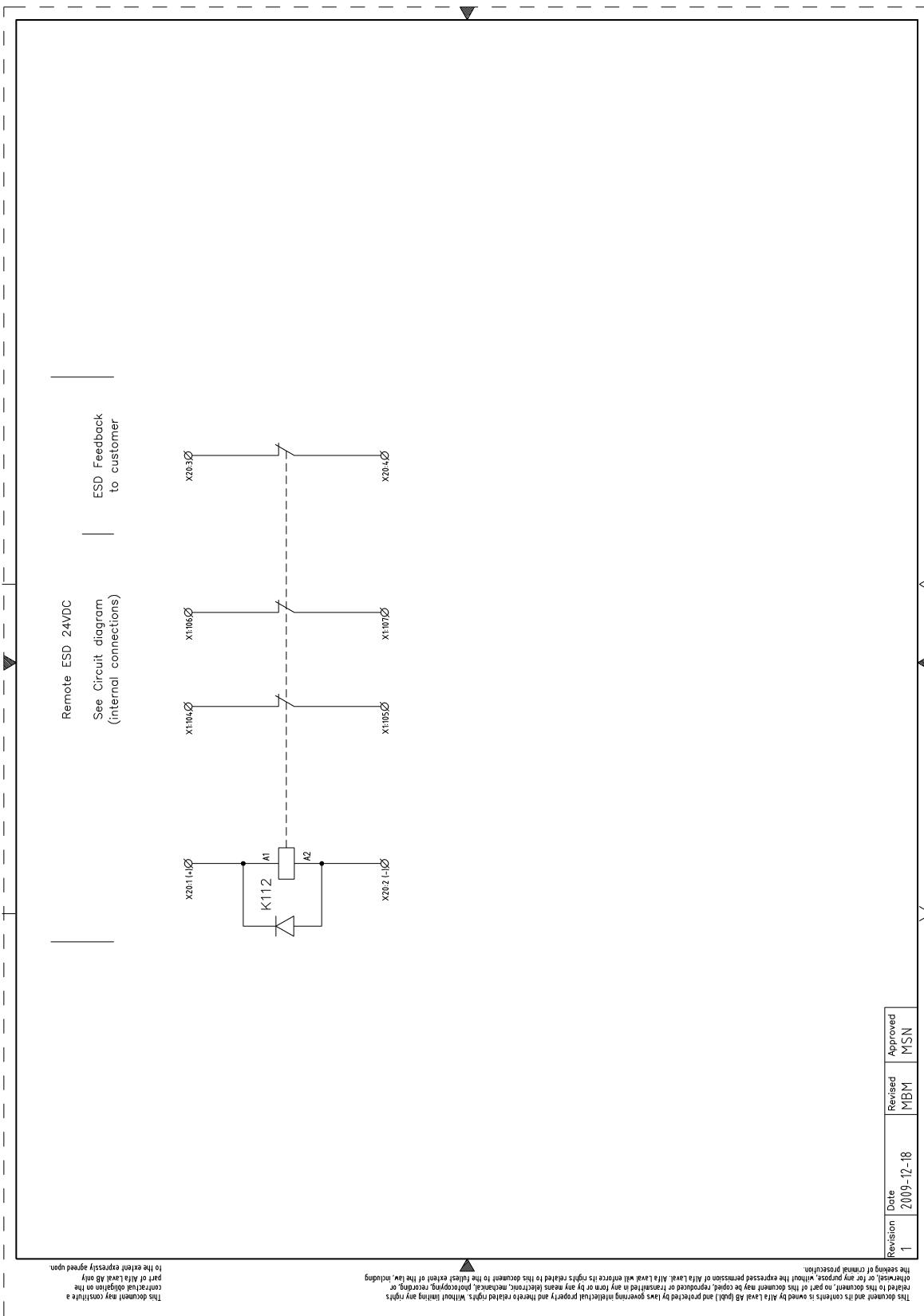
| Revision | Date | Revised | Approved |
|----------|------------|---------|----------|
| 1 | 2008-02-05 | Jekn | Jekn |

Alfa Laval ref. 580883 Rev. 1



3.3.19 Emergency Shutdown Circuit Diagram

Alfa Laval ref. 580897 Rev. 1



4 Specifications

- Only qualified personnel are allowed to work with lifting of the module.
- Use only the lifting lugs as shown in the illustrations.
- Slings or wires used for lifting the Module must be adjusted so that the beam is located above the centre of gravity.
- Slings or wires used for lifting the Double Module must be of the same length to avoid instability.
- Slings/wires must be dimensioned locally depending on equipment used.
- For information on how to lift the separator, see the Separator Manual booklet.



Crush hazard

When lifting the Module, use only the lifting eyes specifically for this purpose. Always use a lifting beam.

4.1 Cables

Cable Identification

All cables are marked to simplify identification and fault finding.

Specifications

The following specifications apply to cables connected to and from Alfa Laval equipment. Follow the instructions given in the cable list. Examples of cable types that can be used:

- Steel armoured cable.



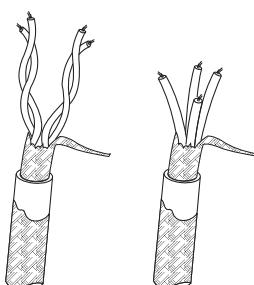
G032224A

- Copper armoured cable with a separate earth core.



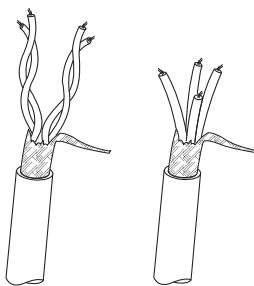
G032244A

- Steel armoured and shielded signal cable; pair twisted or parallel.



G032214A

- Shielded signal cable; pair twisted or parallel.



G032234A

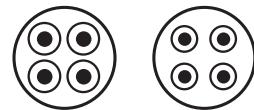
4.2 Cable Routing

Recommendations

Power cables carry the power supply to motors, heaters, etc.
Any distance between signal and power cables reduces electrical noise transfer.

Examples of recommended routing of various cable types.

- Power cables and signal cables routed on a cable rack should be separated.
- Sattbus cables should be routed away from power cables.



G032273A

Left: Power Cables / Right: Signal cable

If the space is limited, cables can be routed in tubes.

4.3 Oil, Water, Steam, and Condensate Piping

For piping to and from Alfa Laval equipment, see the specifications below.

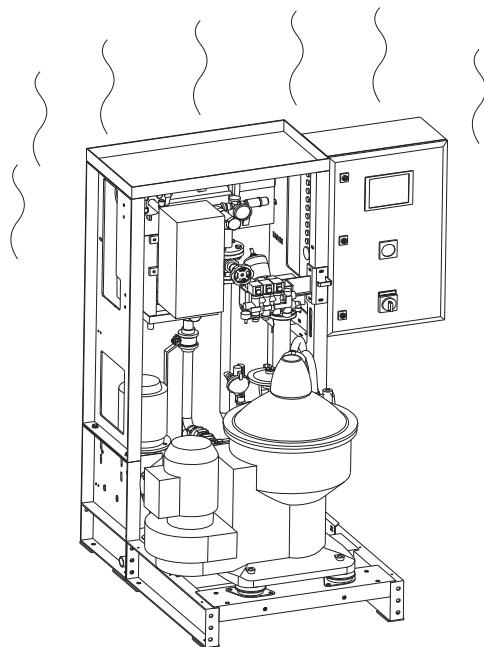
Specifications

- The correct pipe size must be used in the oil system.
- The number of bends in the oil pipes must be minimized.
- The suction height must be as low as possible.
- The oil feed pump must be of positive displacement type.
- The pump must be positioned close to the oil tank.
- The heater must be installed close to the separation module to maintain correct feed oil temperature.
- The recirculation line should be connected either directly to the settling tank (HFO) or to the oil outlet line from the separator (LO).
- The oil outlet line from the separator must be connected to the system tank for lube oil, or the service tank for fuel oil.

4.4 Ambient Temperature Limitation

Specification

Leading classification societies state in their regulations for engine room equipment that the maximum ambient temperature permissible is +55 °C. To meet this regulation, it is essential that electrical and electronic components have good ventilation, and temperature control.



X024675A

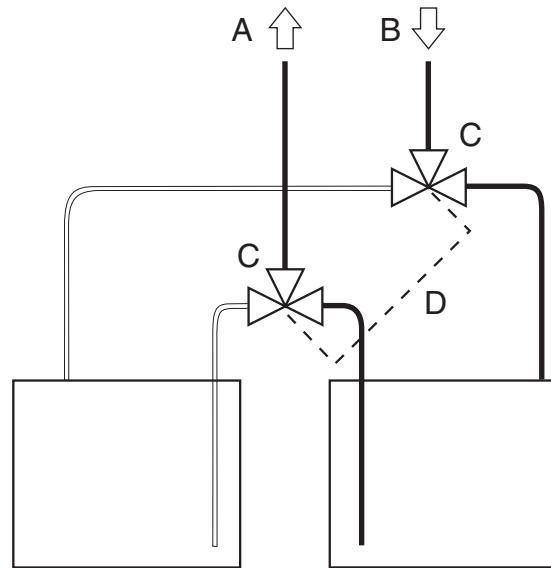
4.5 Heat Tracing and Insulation of Fuel Oil, Sludge, and Steam Pipes

Alfa Laval can, on request, supply modules which are heat traced and insulated, as optional equipment.

4.6 More than one Oil Tank

Recommendation

When one separator serves more than one oil tank, both the suction and the outlet lines should be fitted with change-over valves. To avoid oil transfer from one tank to another, these valves must be interlinked.



P000062B

- A. Unprocessed oil
- B. Clean oil
- C. Change over valve
- D. Interlink

4.7 Sludge Removal Kit (Optional Equipment)

If you have a Sludge Removal Kit, this must be connected to a ventilation pipe.

NOTE

The sludge removal pump must be set to the correct speed – circa 60 strokes/min, otherwise the lifetime of the diaphragm, valve balls, and air motor will be severely shortened.

WARNING

Health Risk

Oil mist and vaporized oil constituents from hot oily sludge may be dangerous to health and must not be inhaled.

A pipe or hose must be drawn from the flange to the nearest oil tank ventilation pipe.

The pipe/hose must have the same diameter as the flange opening.

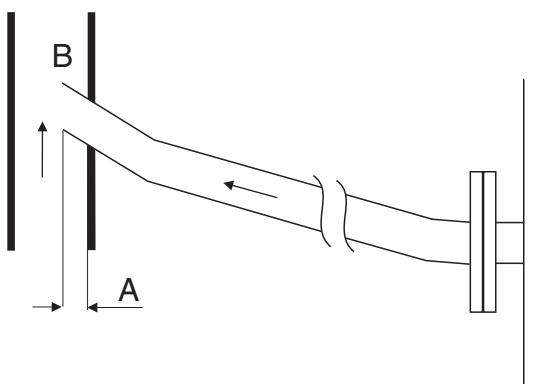
The pipe/hose must be as straight as possible, with a steady upward incline.

The connection to the oil tank ventilation pipe must point upwards as shown.

NOTE

For HFO separation, it is not recommended to make the connection to the separator room ventilation system.

For LO separation, connection to the separator room ventilation system should be made **only** if the separator room ventilation is adequate. Use the optional connection hose (part no. 568023-80, -81, or -82) for this purpose. This hose is designed to entrap oil drops in the vent hose, and lead the oil back to the Sludge Removal Kit tank.



P000063B

A. ~5 mm

B. Oil tank ventilation pipe

NOTE

Impurities gather in the Sludge Removal Kit tank.

Regularly check the tank and level switch.

See instructions below.

Proceed as follows:

- From the Control Panel, run the sludge pump manually for a few seconds.
- Undo the four screws connecting the sludge pump to the sludge tank and remove the sludge pump.
- If necessary, clean the level switch and the inside of the tank using diesel oil.
- Check the seals and gaskets, and change if necessary.
- Loosen the hose clip and check the inside of the ventilation hose. Clean if necessary.

To avoid breakdown of the Sludge Removal system, the sludge pump must be regularly overhauled as follows using spare parts kit specified in the spare parts catalogue.

- Replace the diaphragms and the O-rings with those delivered in the spare parts kit.
- Perform a 4000 hour Inspection Service.

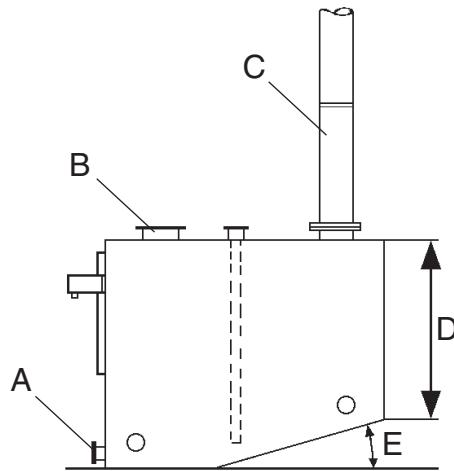
For Service and Overhaul intervals, see [1.3 System Data on page 8](#).

4.8 Sludge Tank

It is not necessary to have a sludge tank together with a Separation Module with sludge removal kit (for lube oil). If a sludge tank is required, follow the recommendations below:

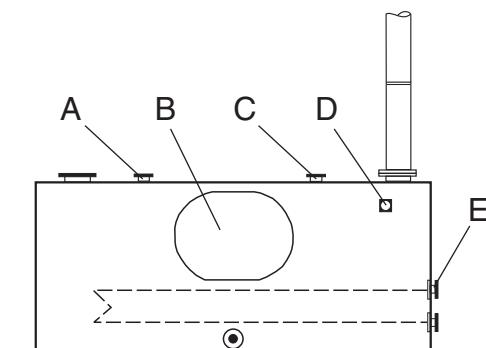
Recommendations

- Sludge tank volume per Separation Module should cover approximately up to 2 days storage at a discharge interval of 2 hours (for discharge volumes see technical data).
- A manhole should be installed for inspection and cleaning.
- The tank should be fitted with a sounding pipe.
- The tank floor, or most of it, should have a slope (B) of minimum 15°.
- The sludge outlet pump connection should be positioned in the lowest part of the tank.
- A high level alarm switch, connected to the sludge pump, should be installed.
- A heating coil should be used to keep the sludge warm and fluid while being pumped out.
- Tank ventilation must follow the classification rules for evacuation of gases.
- There should be a ventilation pipe to fresh air.
- The ventilation pipe should be straight. If this is not possible, any bends must be gradual.
- The ventilation pipe must not extend below the tank top.
- A sludge tank with partition walls must have ventilation pipes in all compartments, or cutouts in the upper edge, to allow vapours to travel through the tank.



G004273B

- A. Sludge outlet pump connection
- B. Sludge pipe connection
- C. Ventilation pipe
- D. Min. height 400 mm
- E. Min. slope 15°



G004270B

- A. Bowl casing drain connection
- B. Manhole
- C. Water drain connection
- D. High level alarm switch
- E. Heating coil

In retrofit applications, where an Alfa Laval Separation Module will share a common separator sludge tank with existing separators, it is recommended to install a Sludge Removal Kit.

The number of ventilation pipes, and their minimum dimension, depend on the size and number of separators connected to the same tank. See table below.

| Type | 1 module | 2/3 modules | 4 modules |
|------------|-------------|-------------|--------------|
| P636, P636 | 1 x Ø 60 mm | 1 x Ø 90 mm | 1 x Ø 100 mm |

| Type | 1 module | 2/3 modules | 4 modules |
|-----------|-------------|-------------|--------------|
| S831-S947 | 1 x Ø 60 mm | 1 x Ø 90mm | 1 x Ø 115 mm |

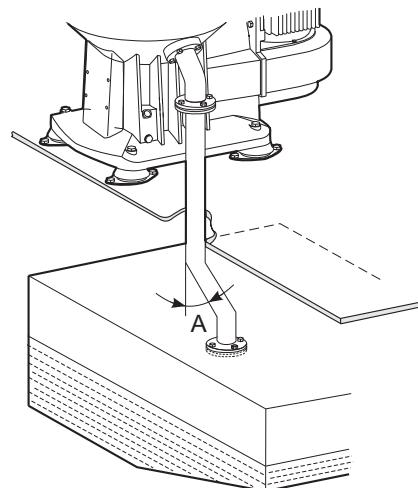
The Module generates almost no air during operation. At any discharge, the maximum volume of air produced is the same as the bowl volume (see technical data).

4.9 Sludge Piping

Specification

- The sludge pipe from the separator to the sludge tank should be vertical.

If a vertical pipe is not possible, the deviation (A) from the vertical line must not exceed 30°.

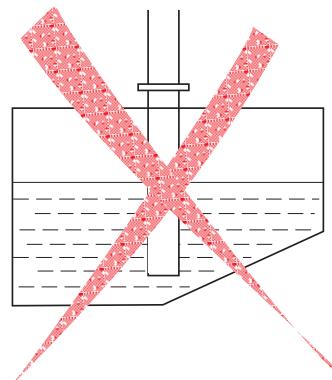


G004401A

- The sludge pipe must not extend below the tank top.

NOTE

An extended sludge pipe will obstruct ventilation and create back pressure that could cause separator problems.



G004316A

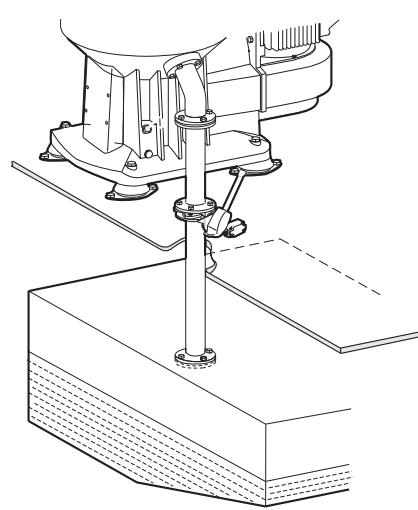
Recommendation

In cases where sludge tank ventilation is not adequate, and more than one separator is connected to the same sludge tank, we recommend that a butterfly valve is installed in each sludge pipe.

NOTE

If a butterfly valve is not used, the bowl and the operating system may be affected by corrosive fumes and sludge from the sludge tank.

- If a butterfly valve is used, it should be equipped with an interlocking switch (connected to the separator starter) to prevent the separator from being started when the valve is not fully open.



G004411A

5 Commissioning and Initial Start

5.1 Completion Check List

It is essential *before* starting up the separation system that all modules are in good operating condition and that all pipelines and control equipment are properly connected to assure correct operation.

Use this check list as a guide for completing the system installation:



Breakdown hazard

Check that the power frequency is in agreement with the machine plate. If incorrect, resulting overspeed may cause breakdown.

1. Check that transport seals are removed from all pipes.
2. Use flushing filters to prevent pipe work debris from being pumped into the separation module.

NOTE

The flushing filters must be removed after initial flushing.

3. Check that all separators are in proper working condition. Follow the manufacturer's instructions.
4. Make sure that separators are lubricated in accordance with instructions.

NOTE

Make sure that the spindle bearings are prelubricated



g08687t1

Drop some frame oil onto the bearings

5. Separators are delivered without oil in the oil sump. For information on oil filling and oil type, see the *Separator Manual booklet*.

NOTE

Too much, or too little oil may result in damage to separator bearings.

Neglecting an oil change may result in damage to separator bearings.

6. Power on.
7. Check that the separator rotation direction corresponds with the arrow on the frame by doing a quick start/stop (1–2 seconds.) and looking at the motor fan rotation.



If power cables have been installed incorrectly, the separator will rotate in reverse, and vital rotating parts can unscrew.

8. Check the pump function and direction.
9. If a Sludge Removal Kit is used, check that the sludge pump speed is set to circa 60 strokes/min. If necessary, adjust the throttling valve (positioned after solenoid valve SV 6).

5.2 Initial Start-up

NOTE

After every start the separator must always be run continuously for a minimum of 1 hour to ensure proper lubrication.

Use this check list for initial system start up:

1. Check that there is oil in the feed oil tank.
2. Check water and air supply. See [1.3 System Data](#).
3. Check power supplies to the control unit and that the voltage is in accordance with data in [1.3 System Data](#).

4. Check all parameter settings in the control unit.
See *Installation Parameters* in the *Parameter List* booklet.
5. Check the separator.

NOTE

Always lubricate the bearings before start-up.

NOTE

The Separation module is supplied with standard configuration parameters. You may have to make some changes to suit your installation.

6. Start the separation system as described in the *Operating Instructions* booklet.
7. Start up step by step, checking that the machine and module function properly.
8. Establish system pressures. The delivery height pressure is the pressure in the oil pipe work down stream from the separation module, due to the pipe bends and the height (head) to the cleaned oil tank. If the cleaned oil tank is below the separation module the delivery height pressure may be very low. The oil paring disc pressure will have to be greater than the delivery height pressure for any oil to flow.

Proceed as follows:

- Ensure the valves in the oil system are in the correct positions.
- The oil should be at separation temperature.

For S-type separators:

- The paring tube should be able to move freely.
- Ensure that V5 is closed.
- Fully open the back pressure regulating valve RV4.
- The shut off valve V4 should be open.
- Open SV15 for 3 seconds to prime the operating slide.
- Open SV16 for 15 seconds to close the bowl.
- Open SV10 for 1 minute to put water into the bowl.
- Feed oil to the separator at the normal flow rate by opening SV1.

- Note the pressure in the oil outlet PT4, both on the pressure gauge and in the EPC 60 display. This pressure is P min.
- Gradually close the back pressure regulating valve RV4. The pressure on PT4 will increase. The water pressure (PT5) decreases slightly as the paring tube moves inwards. The water pressure will suddenly drop when oil passes from the oil paring chamber to the water paring chamber. Note the pressure of PT4 both on the pressure gauge and in the EPC 60 display. This pressure is P max.
- Open RV4.
- Stop the oil feed to the separator and note the pressure in the oil outlet. This is the delivery height pressure P del.
- Stop the heater.
- Stop the separator.
- Stop the feed pump when the heater has cooled.

For P-type separators:

- Fully open the back pressure regulating valve RV4.
- Open SV15 for 5 seconds to prime the operating slide.
- Open SV16 for 15 seconds to close the bowl.
- Open SV10 for 5 seconds to put water into the bowl.
- Feed oil to the separator at the normal flow rate by opening SV1.
- Note the pressure in the oil outlet PT4, both on the pressure gauge and in the EPC 60 display. This pressure is P min.
- Gradually close the back pressure regulating valve RV4. The pressure on PT4 will increase. The oil pressure will suddenly drop when oil passes over to the water outlet. Note the pressure of PT4 both on the pressure gauge and in the EPC 60 display. This pressure is P max.
- Open RV4.
- Stop the oil feed to the separator and note the pressure in the oil outlet. This is the delivery height pressure P del.
- Stop the heater.
- Stop the separator.
- Stop the feed pump when the heater has cooled.

5.2.1 Calculating Operating Pressure

- Calculate the normal back pressure level during operation as follows:

$$\frac{P_{\min} + P_{\max}}{2} = P_{\text{normal}}$$

- Calculate the value for low pressure alarm setting (Pr 11) as follows:

$$\frac{P_{\min} + P_{\text{normal}}}{2} = P_{\text{low press.}}$$

- Calculate the value for high pressure alarm setting (Pr 10) as follows:

$$\frac{P_{\text{normal}} + P_{\max}}{2} = P_{\text{high press.}}$$

Adjust the back pressure to P_{normal}

Set P154 to give alarm at pressure *decreasing* below the $P_{\text{low press.}}$ value.

Set P153 to give alarm at pressure *increasing* above the $P_{\text{high press.}}$ value.

6 Shut-down and Storage

Storage before Installation

If the separation system is stored before installation, the following safeguards must be taken:

| Storage period | 1 < 6 months | ≥6 months | See |
|--------------------------------------|------------------------|------------------|-----------------------|
| Action before storage | | | |
| Protect from dust, dirt, water, etc. | X | X | This chapter |
| Protect with anti-rust oil | X | X | This chapter |
| Action before installation | | | |
| Inspection service | | X | <i>Service manual</i> |
| Overhaul service | | X | <i>Service manual</i> |

6.1 Shut-down after Use

If the separation system is going to be shut down for a period of time, the following safeguards must be taken:

| Shut-down period | 1 < 6 months (stand-by) | 6 – 18 months | > 18 months | See |
|--------------------------------------|---------------------------------------|----------------------|-----------------------|-------------------------------------------------------|
| Action before storage | | | | |
| Remove bowl | X | X | X | <i>Dismantling and Assembly in the Service Manual</i> |
| Protect from dust, dirt, water, etc. | X | X | X | This chapter |
| Protect with anti-rust oil | X | X | X | This chapter |
| Inspection service | | X | X | <i>Service manual</i> |
| Overhaul service | | | X | <i>Service manual</i> |

6.2 Protection and Storage

All system equipment, both the separator and the ancillary equipment, must be stored indoors at 5 – 55°C, if not delivered in water-resistant box for outdoor storage.

If there is a risk for condensation of water, the equipment must be protected by ventilation and heating above dew point.

The following protection products are recommended:

- Anti-rust oil with long lasting effective treatment for external surfaces. The oil should prevent corrosion attacks and give a waxy surface.
- Anti-rust oil (Dinitrol 40 or equivalent) thin and lubricating for inside protection. It gives a lubricating transparent oil film.
- Solvent, e.g. white spirit, to remove the anti-rust oil after the shut-down.
- Moist remover to be packed together with separator equipment.
- If the storage time exceeds 12 months, the equipment must be inspected every 6 months and, if necessary, the protection be renewed.

Modules

- Clean unpainted steel parts with solvent and treat external surfaces with anti-rust oil (type 112).
- If necessary, clean other equipment on the module with solvent.
- Treat the equipment with anti-rust oil by following the description above accordingly.
- Bolts, nuts and other external steel components should be treated with anti-rust oil (type 112).

Rubber Parts

- Gaskets, O-rings and other rubber parts should not be stored for more than two years. After this time, they should be replaced.

Separator

Dismantle the separator bowl and take out the O-rings. Clean the bowl with oil and reassemble without the O-rings. Place in a plastic bag with silica dessicant bags and seal the plastic bag.

Grease the spindle.

Valves, Pipes and Similar Equipment

- Components such as valves need to be cleaned with solvent and treated with anti-rust oil (type 112).
- Water pipes should be drained and treated with anti-rust oil (type 112).
- Articles made of rubber or plastics (e.g. seals) must *not* be treated with anti-rust oil.

Electric Heater

- Fill the heater with a non-corrosive lubricating oil.
- Place a number of bags of silica gel inside the connection box to absorb humidity. Steam Heater •Drain the condensed water from the steam valve and the steam trap.
- Drain all condensed water from the heater.
- Fill the oil part of the heater with a non-corrosive lubricating oil.

Pump

- Clean the pump housing outside from oil and grease with solvent.
- Protect the pump by filling it with non-corrosive lubricating oil.
- Apply anti-rust oil on the pump housing outside.
- Fill the pump screws with lubricating oil to prevent rust.

6.3 Reassembly and Start up

- Clean away the anti-rust oil with white spirit.
- Remove the silica gel bags from all modules.
- Pre-lubricate the separator spindle bearings
- If stored for 6 months or longer, perform an inspection service (including change of oil in the separator sump).
- Follow all relevant instructions in this booklet and in the Separator Manual.
- Before operating the heater:
 - Check by lifting the safety valve handle that it functions correctly.
 - Follow the start-up check list for the heater in the manufacturer's instructions.
 - For plate heat exchangers: check the bolt connections to ensure that all gaskets are tight.

NOTE

Always lubricate the bearings before start-up.

NOTE

After every start the separator must always be run continuously for a minimum of 1 hour to ensure proper lubrication.