1. Description

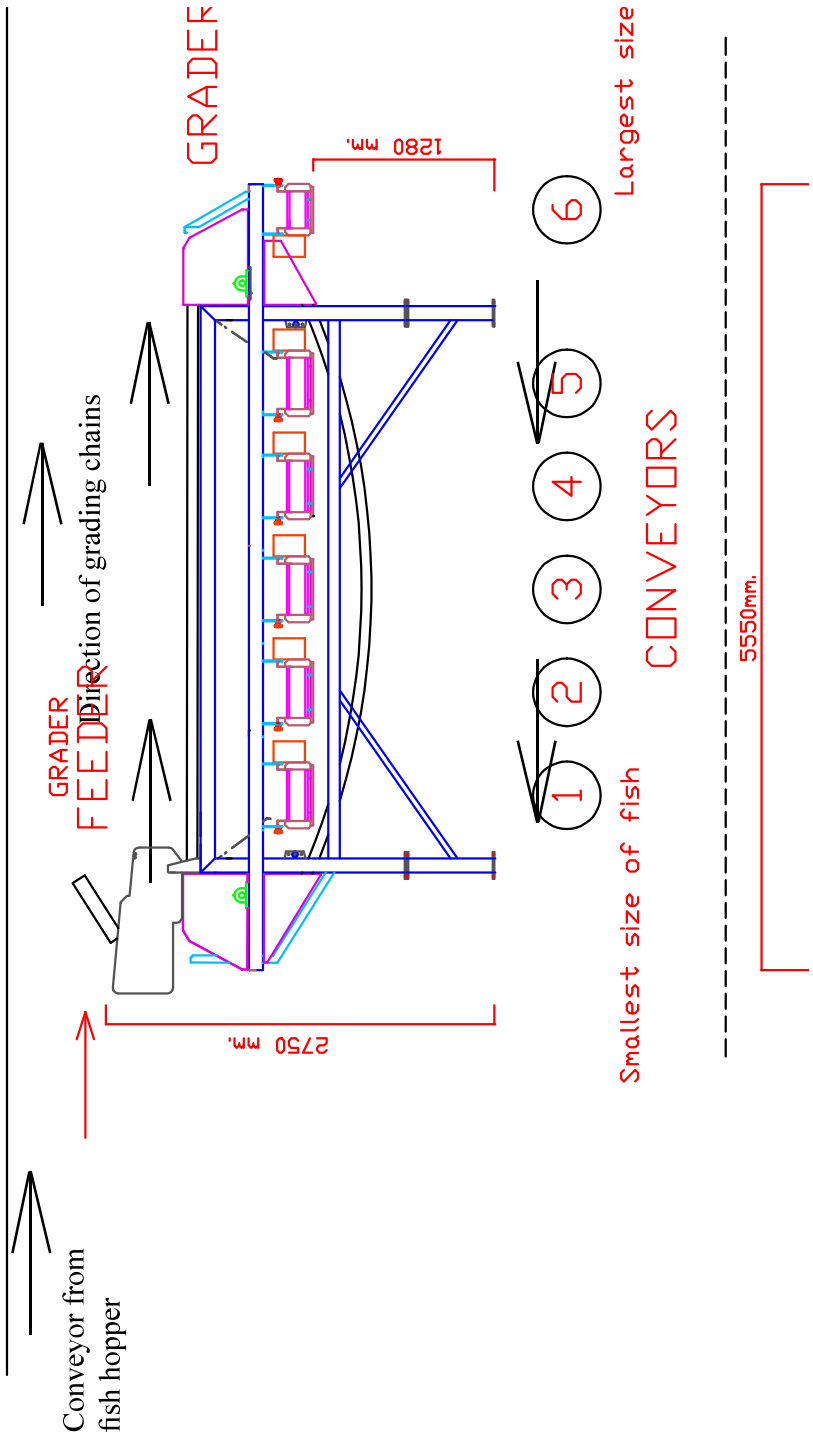


Fig. A. Side view of Style grading machine LR-5/24 with conveyors 1 to 6 inside machine.

1. Description

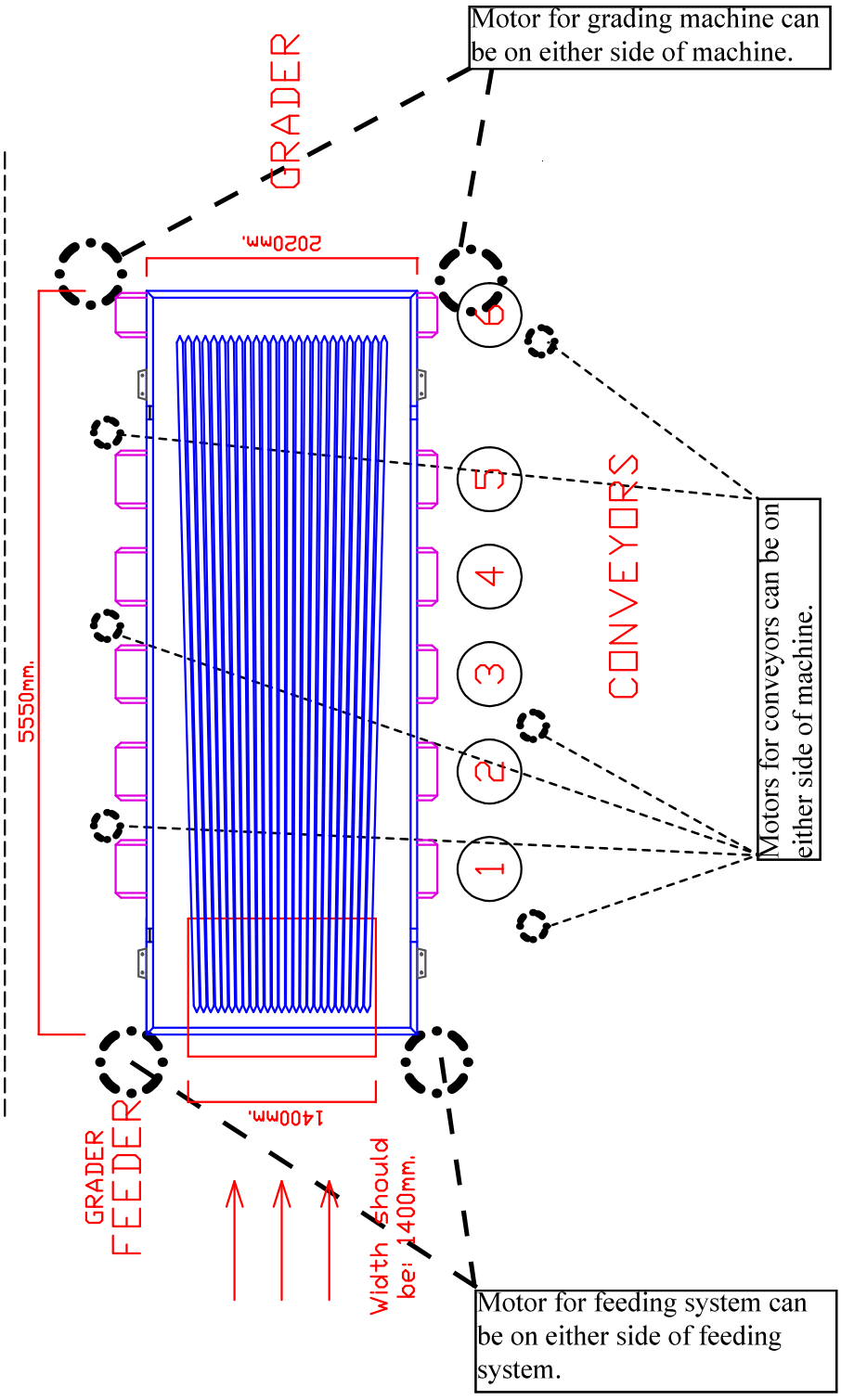


Fig. B. Top view of Style grading machine LR-5/24 with conveyors 1 to 6 inside machine.

1. Description

The Style grading machine is a fish grading machine that grades the fish by width. Fish are fed into the Style feeding system at the beginning of the machine from a fish hopper by the means of a conveyor from the fish hopper. It is here that the input tonnage is decided and the conveyor speed from the fish hopper is adjusted (see owners manual for hopper and hoppers conveyor) so the correct input tonnage is fed into the Style feeding system to the grading machine.

Then the speed of the conveyors for the Style feeding system are adjusted in the way that the fish that come off the conveyors into the grading machine are in a single row, one by one and fall into the grading machine between the grading chains that travel forward in the same direction in the channels. The speed of the grading chains are adjusted in the way that the chains travel with a little more speed then the fish that fall into the machine to separate them even better so there will always be only one and one fish in the grading channels of the machine at a given time and spot. The grading channels are pre adjusted with adjusting bars and there are three adjusting bars in the machine. The first adjusting bar that is in the beginning of the machine where the fish fall into the machine has a fixed width so that the width in the grading channel is for example 8mm. The second adjusting bar that is in the middle of the machine has a larger width for example 12mm. and the third adjusting bar that is by the end of the grading channels has the largest width adjustment for example 18mm. See fig.1.2.3.a page 13.

When fish fall down from the feeding system into the grading machine and in between the grading chains that travel forward in the grading channels at a given speed away from the feeding system and adjusting bars that decide the width of the grading channels are installed in the machine in the way that they are narrow in the beginning and width increases to the end then the smallest fish fall down between these channels in the beginning of the machine and the larger fish fall down at the end of the grading machine. See fig. 1.2.2.f page 9 and fig. A page 2.

The fish fall down onto conveyors #1 to #6 that are underneath the grading channels and to be able to adjust the sizes of the fish more accurately that fall down between the conveyors there are adjusting pans between the conveyors that can be adjusted forward or backward on the sides. By moving the bar that hold these pans in the machine backward closer to the feeding system then the fish that were falling down there at a given spot where the top of the pan is will be moved to the next conveyor towards the other end of the machine. This works visa / versa if the bar for the adjusting pans is turned in the other direction. See fig. C page 4 and fig. 1.2.4 page 17.

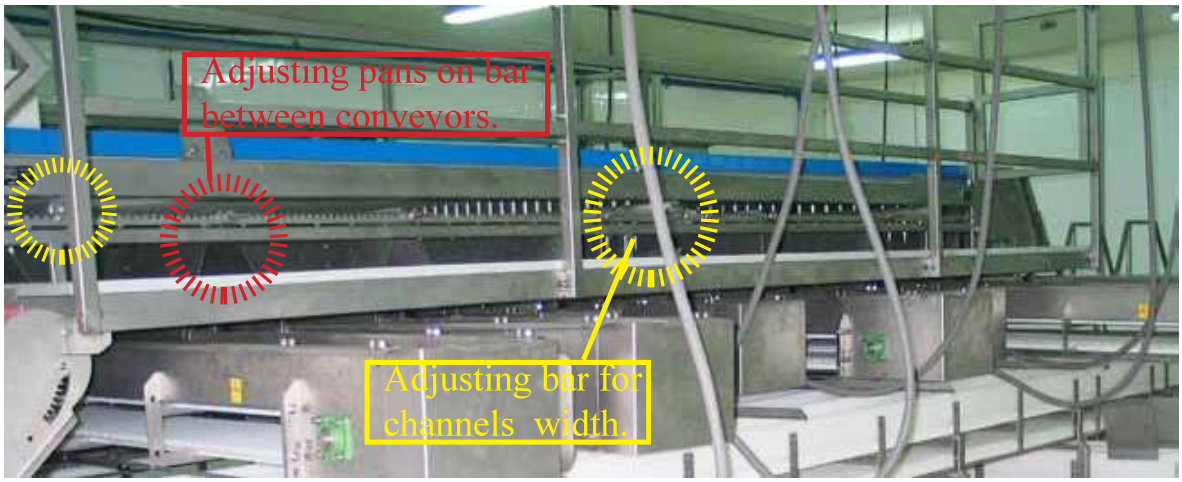


Fig. C. Side view of Style grading machine showing adjusting pans and adjusting bars.

1.1 Style feeding system, grading machine and conveyor specification.

- Overall length of grading machine		5.650 mm.		
- Overall width of grading machine		2.020 mm.		
- Overall height of grading machine		2.470 mm.		
- Height under conveyors # 1 to #6		1.045 mm.		
- Length of conveyors #1 to #6		3.000 mm.		
- Conveyor belt width of conveyors # 1 to #5		354 mm.		
- Conveyor belt width of conveyor # 6		254 mm.		
- Drive speed of feeding system		Adjustable from 1 to 10.		
- Drive speed of grading machine		Adjustable from 1 to 10.		
- Motor size on feeding system,	1430.rpm.	0,55kW	3x400V.	50Hz.
- Motor size for cooling fan for motor/feeding system	2710.rpm.	0,06kW	3x400V.	50Hz.
- Motor size on grading machine (5.5 kW additional)	1440.rpm.	4,00kW	3x400V.	50Hz.
- Motor size for cooling fan for motor/grading machine	2750.rpm.	0,09kW	3x400V.	50Hz.
- Motor size for conveyors # 1 to # 6		0,37kW	3x400V.	50Hz.
- Water consumption, 20mm. pipe. 2-8 bar pressure.		300 liters / hour.		
- Gearbox for feeding system with 25 mm. hollow st.steel.shaft.		I:10.		
- Gearbox for grading machine with 40 mm. hollow st.steel.shaft.		I:20.		
- Gearbox for Style conveyors with 25mm. hollow st.steel.shaft.		I:25.		

1.2 Component function.

1.2.1 Control panel.

The control panel is located in a fairly dry environment preferably away from areas where water is used as this can be dangerous for people and damage the equipment. If the cabinet is installed close to the grading machine then it must be protected in a way that water never gets on the cabinet as this is dangerous with regards to electrical shocks and can cause death to people.

The following switches and controllers are located on the front side of the panel:

- Forward / Stop / Reverse - switches and Overload lights for conveyors #1 to #6
- On / Stop switch - Overload light and speed controller knob for feeding system
- On / Stop switch - Overload light and speed controller for Style grading machine
- Emergency Stop switch for conveyors #1 to #6, feeding system and Style grading machine

The following lights are located on the front side of the control panel:

- Green Forward lights, built in switches for conveyors # 1 to #6
- Red Stop lights, built in switches for conveyors #1 to #6
- Green Reverse lights, built in switches for conveyors #1 to #6
- Red Overload lights for conveyors #1 to #6
- Green On light, built in switch for Style grading machine
- Red Stop light, built in switch for Style grading machine
- Red Overload light for Style grading machine
- Green On light, built in switch for Style feeding system
- Red Stop light, built in switch for Style feeding system
- Red Overload light for Style feeding system

The following speed controllers are located on the front side of the control panel:

- Speed adjusting knob with readings from 1 to 10 (min. - max.) for Style grading machine
- Speed adjusting knob with readings from 1 to 10 (min. - max.) for Style feeding system

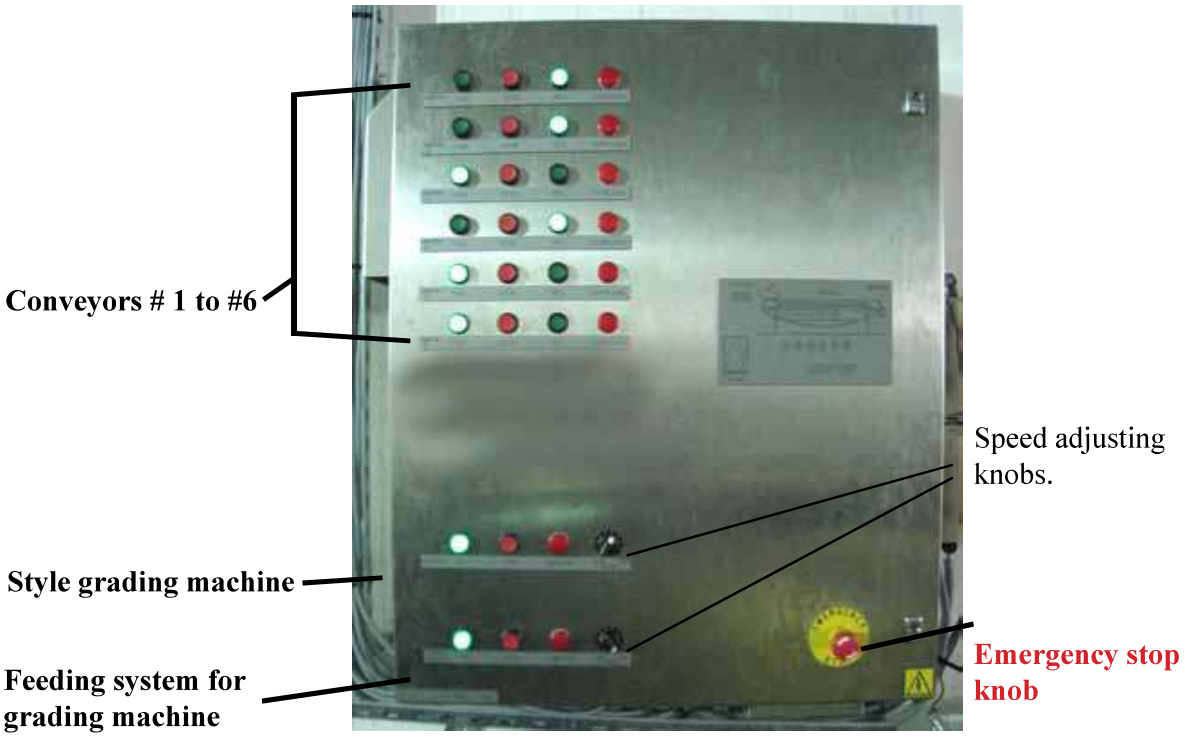


Fig. 1.2.1 Control panel

Parameter list for Vagon speed controller for Style grading machine.
Inputs in red done at Style for motor on Style grading machine.

3.2 Basic parameters (Control keypad: Menu P2 → P2.1)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.1.1	Min frequency	0,00	Par. 2.1.2	Hz	0,00	0	101	
P2.1.2	Max frequency	Par. 2.1.1	320,00	Hz	50,00	50	102	**NOTE**: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.1.3	Acceleration time 1	0,1	3000,0	s	1,0	5	103	
P2.1.4	Deceleration time 1	0,1	3000,0	s	1,0	7	104	
P2.1.5	Current limit	0,1 x I_L	1,5 x I_L	A	I_L "8,2 Amp. x 1,5" = 12,5	12,5	107	**NOTE**: Formulas apply approximately for frequency converters up to MF3. For greater sizes, consult the factory.
P2.1.6	Nominal voltage of the motor	180	690	V	NXL2:230v NXL5:400v	380	110	
P2.1.7	Nominal frequency of the motor	30,00	320,00	Hz	50,00	50	111	Check the rating plate of the motor
P2.1.8	Nominal speed of the motor	300	20 000	rpm	1440	1440	112	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.1.9	Nominal current of the motor	0,3 x I_L	1,5 x I_L	A	I_H	10,3	113	Check the rating plate of the motor "8,2 A x 1,25"
P2.1.10	Motor cosφ	0,30	1,00		0,85	0,84	120	Check the rating plate of the motor
P2.1.11	Start function	0	2		0	0	505	**0**=Ramp **1**=Flying start **2**=Conditional flying start
P2.1.12	Stop function	0	1		0	1	506	**0**=Coasting **1**=Ramp
P2.1.13	U/f optimisation	0	1		0	1	109	**0**=Not used **1**=Automatic torque boost
P2.1.14	I/O reference	0	5		0		117	**0**=AI1 **1**=AI2 **2**=Keypad reference **3**=Fieldbus reference (FBSpeedReference) **4**=Motor potentiometer **5**=AI1/AI2 selection
P2.1.15	AI2 signal range	1	4		2		390	Not used if AI2 Custom min <> 0% or AI2 custom max. <> 100% **1**=0—20 mA **2**=4—20 mA **3**=0V - 10V **4**=2V - 10V
P2.1.16	Analogue output function	0	12		1		307	**0**=Not used **1**=Output freq. (0—f_{max}) **2**=Freq. reference (0—f_{max}) **3**=Motor speed (0—Motor nominal speed) **4**=Output current (0—I_{nMotor}) **5**=Motor torque (0—T_{nMotor}) **6**=Motor power (0—P_{nMotor}) **7**=Mot. voltage (0—U_{nMotor}) **8**=DC-link volt (0—1000V) **9**=PI controller ref. value **10**=PI contr. act. value 1 **11**=PI contr. error value **12**=PI controller output

1.2.2 Style feeding system for grading machine.

Fish are fed into the Style feeding system at the beginning of the machine from a fish hopper by the means of a conveyor from the fish hopper. It is here that the input tonnage is decided and the conveyor speed from the fish hopper is adjusted (see owners manual for hopper and hoppers conveyor) so the correct input tonnage is fed into the Style feeding system to the grading machine.

Then the speed of the conveyors for the Style feeding system are adjusted in the way that the fish that come off the conveyors into the grading machine are in a single row, one by one and fall into the grading machine between the grading chains that travel forward in the same direction in the channels.

The feeding system consists of mainly two conveyor belts that travel at different speeds and are adjusted with one speed adjusting knob on the control panel with adjustments from 1 up to 10. The speed between the conveyors is prefixed with a timing belt and driven with one motor. The difference in the speed between the two belts is about double as the first conveyor belt that the fish fall onto from the conveyor from the hopper is going slower than the second conveyor belt in the feeding system. This is done to spread the fish apart and get them ready for the grading machine in a single row.

Parameter list for Vagon speed controller for Style feeding system.
Inputs in red done at Style for motor on Style feeding system.

PARAMETER LISTS VACON • 5

3.2 Basic parameters (Control keypad: Menu P2 → P2.1)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.1.1	Min frequency	0,00	Par. 2.1.2	Hz	0,00	0	101	
P2.1.2	Max frequency	Par. 2.1.1	320,00	Hz	50,00	50	102	NOTE: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.1.3	Acceleration time 1	0,1	3000,0	s	1,0	5	103	
P2.1.4	Deceleration time 1	0,1	3000,0	s	1,0	7	104	
P2.1.5	Current limit	0,1 x I_L	1,5 x I_L	A	I_L	2,4	107	NOTE: Formulas apply approximately for frequency converters up to MF3. For greater sizes, consult the factory.
					"1,6 Amp. x 1,5" = 2,4			
P2.1.6	Nominal voltage of the motor	180	690	V	NXL2:230v NXL5:400v	400	110	
P2.1.7	Nominal frequency of the motor	30,00	320,00	Hz	50,00	50	111	Check the rating plate of the motor
P2.1.8	Nominal speed of the motor	300	20 000	rpm	1440	1430	112	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.1.9	Nominal current of the motor	0,3 x I_L	1,5 x I_L	A	I_H	1,8	113	Check the rating plate of the motor "1,6 A x 1,25"
P2.1.10	Motor cosφ	0,30	1,00		0,85	0,76	120	Check the rating plate of the motor
P2.1.11	Start function	0	2		0	0	505	0=Ramp 1=Flying start 2=Conditional flying start
P2.1.12	Stop function	0	1		0	1	506	0=Coasting 1=Ramp
P2.1.13	U/f optimisation	0	1		0	1	109	0=Not used 1=Automatic torque boost

Fig. 1.2.2.a. Over all view of Style grading machine with feeding system and conveyor from hopper.

Fig. 1.2.2.b. Closer side-view of Style feeding system

Fig. 1.2.2.c. Front-view of Style feeding system

Fig. 1.2.2.d. Side-view of Style feeding system. Adjustable plates on top of feeding system

Fig. 1.2.2.e. Front-view of Style feeding system. Adjustable plates on top of conveyors.

CAUTION.

Never step inside or on top of feeding system and / or grading machine as this will damage the feeding system and grading machine and this is vary dangerous and can cause death to people.

Fig. 1.2.2.f. Front-view of Style feeding system and grading channels on top of grader.

Fig. 1.2.2.g. Front-view of Style feeding system. Adjustable plates on top of conveyors.

Fig. 1.2.2.h. Front-view of Style feeding system and grading channels on top of grader.

Fig. 1.2.2.i. Side-view of Style feeding system showing the motor and gear box.

Fig. 1.2.2.j. Style feeding system. Motor and gear box.

Note:

Adjust belt tension with medium pressure.

Fig. 1.2.2.k. Style feeding system. Motor and gear box.

Caution

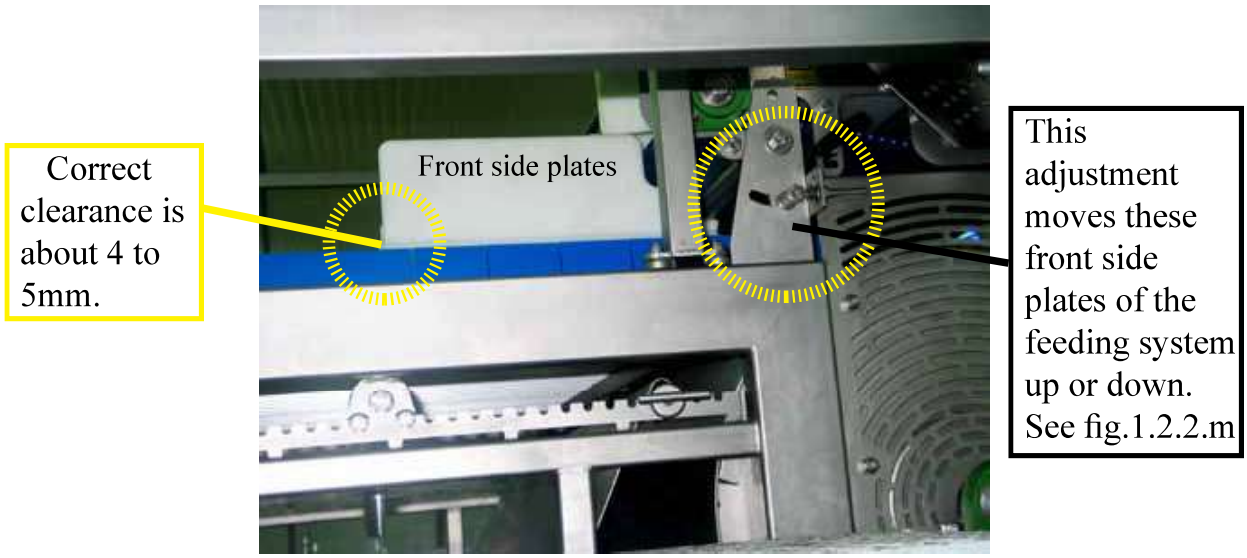


Fig. 1.2.2.l. Side-view of Style feeding system showing front plates on top of grading chains.

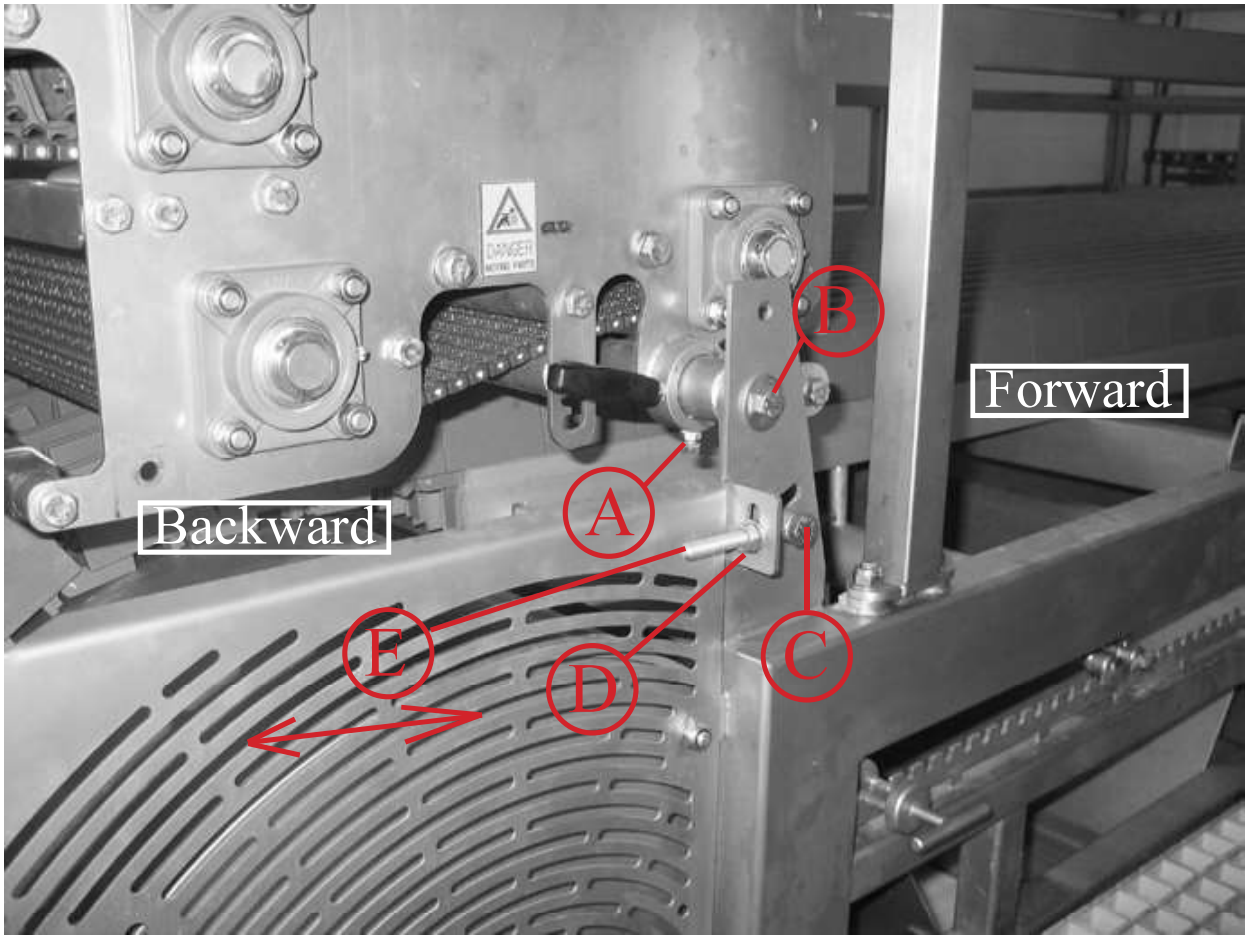


Fig. 1.2.2.m. Side-view of Style feeding system showing adjustments for side plates on top of grading chains.

ADJUSTMENT:

Loosen bolts and nuts; A, B, C and D and adjust bolt E by turning bolt D clockwise or counterclockwise so the correct clearance is obtained for the front of the front side plates of the feeding system. See fig. 1.2.2.l. here above. This is important to take pressure off of the grading chains.

1.2.3 Adjusting bars, grading channels and grading chains.

Adjusting bars are made of 70mm. round aluminium bars and are bored with high precision where aluminium pins are inserted into the bars and they are installed into the Style grading machine. The distance between the pins in the bars decides the distance between the grading channels as the channels fit on top of these pins and the grading chains travel on top of these grading channels forward from the feeding end of the machine. The space between the pins in the bars is narrow at the feeding end of the machine and the space gains gradually to the other end of the machine. This means that the space between the pins for the adjusting bar that is then installed in the machine at about the center when looking at the side of the machine is larger than the first one at the feeding end. The space
between the pins on the bar are then largest on the adjusting bar at the end of the machine.

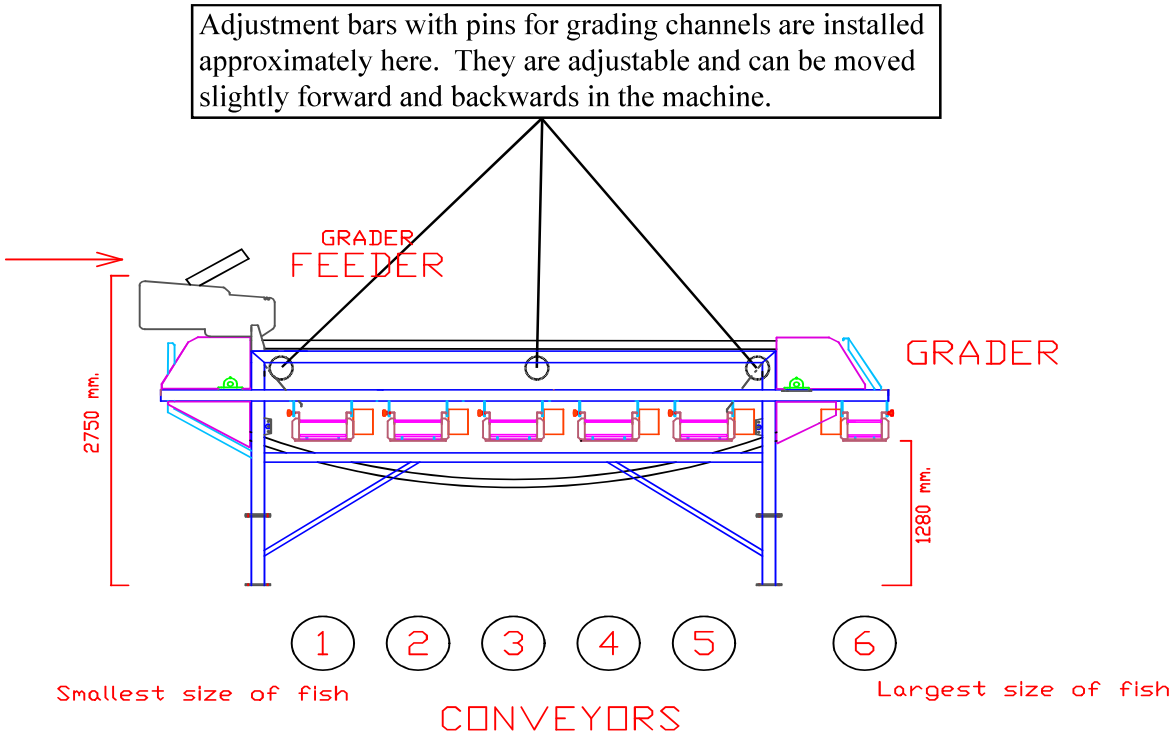


Fig. 1.2.3.a. Side-view of Style grading machine.

Fig. 1.2.3.b. Note: Grading chains, hook forward.

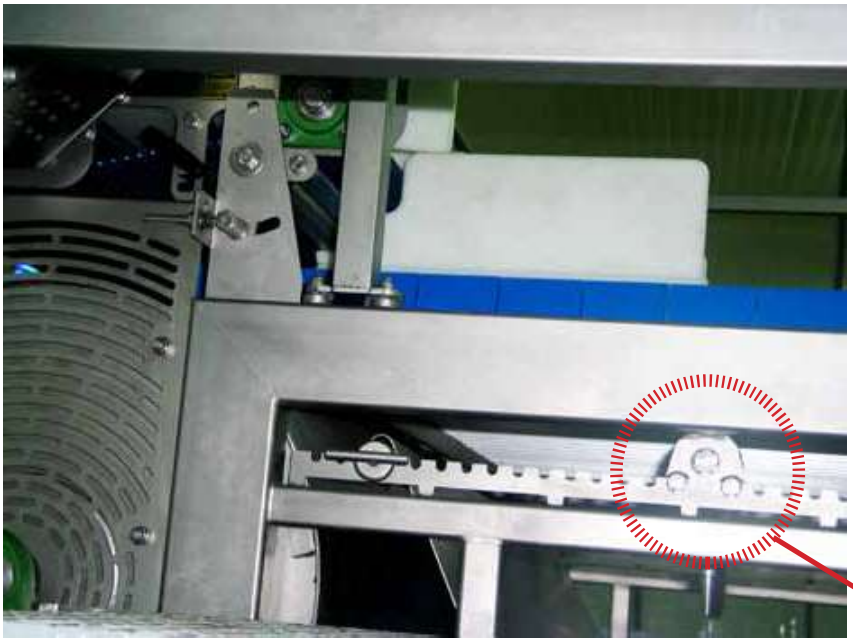


Fig. 1.2.3.c. Side-view of Style grading machine showing how the first adjusting bar is installed in the grading machine. A small plate is fastened to the ends of the bars that is then installed on top of the slotted flat bar and bolted in.

They must be installed perpendicular to the frame.

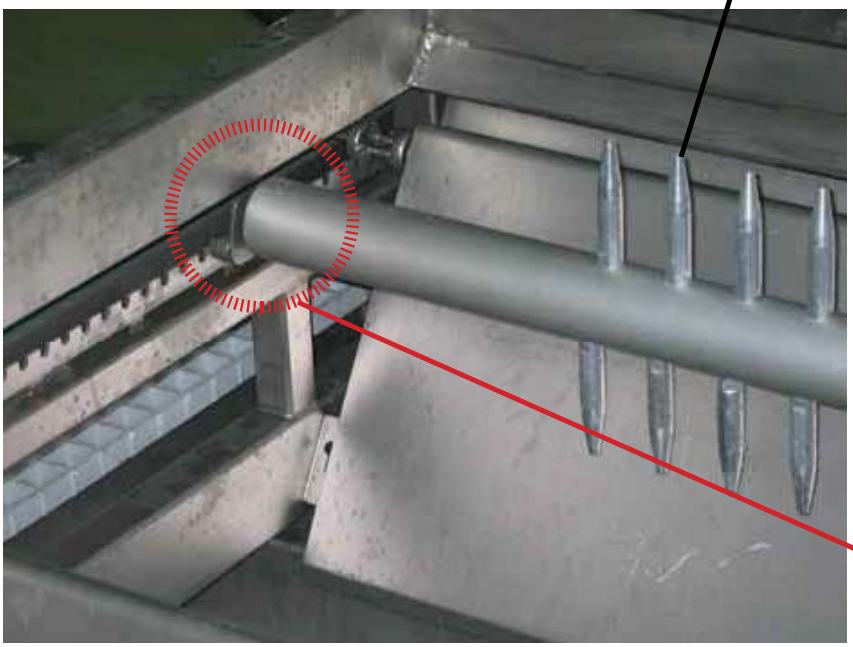


Fig. 1.2.3.d. Here we can see how the first adjusting bar is installed in the grading machine. A small plate is fastened to the ends of the bars that is then installed on top of the slotted flat bar and bolted in.

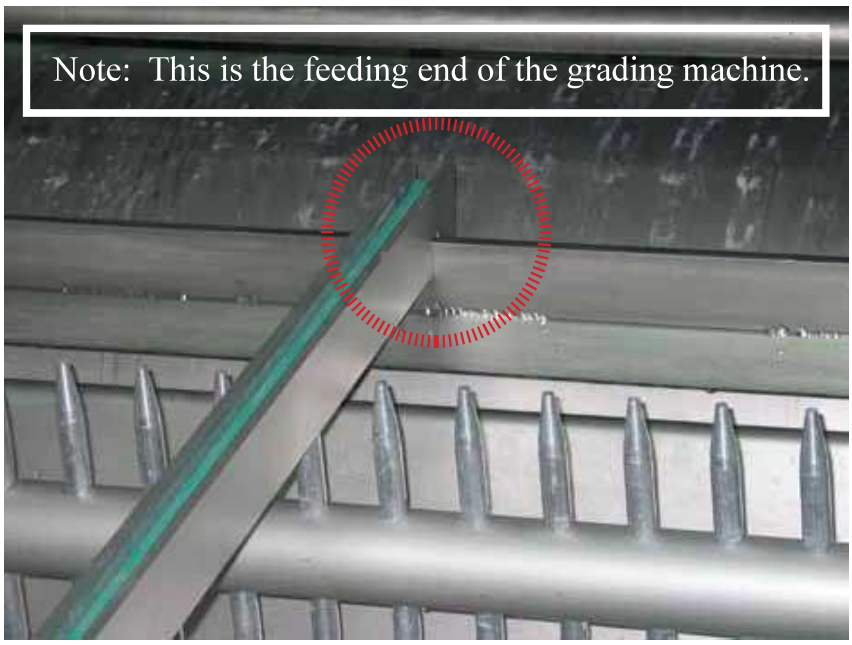


Fig. 1.2.3.e. Here we can see how the first adjusting bar is installed in the grading machine at the feeding end of the grading machine. Note the slot in the grading channel that fits on top of the flat bar that is welded in the frame of the machine. This is to hold the channels in position.

Fig. 1.2.3.f. Here we see how the first grading channel is then installed on top of the aluminium pins in the adjusting bars. Begin in the middle and end out at both sides until all the channels have been installed. No tool needed for this.

Fig. 1.2.3.g. Here we can see how the adjusting bars with the adjusting pins have been installed, grading channels getting installed and grading chains installed.

Fig. 1.2.3.h.
Note: Grading chains, hook forward.

Fig. 1.2.3.i. Here we can see how the adjusting bars with the adjusting pins have been installed, grading channels getting installed and grading chains installed.

1.2.4 Adjusting pans between conveyors # 1 and # 6.

The adjusting pans are installed in the machine in the way that they are hanged over a 20mm. stainless steel bar that has turnable knobs at the ends and are positioned on top of a slotted flat bar on the sides of the machine. See fig.1.2.4.a, b and c, pages 17 and 18.
These bars with the pans are then moved by turning the knobs forward or backwards depending on the needed results.

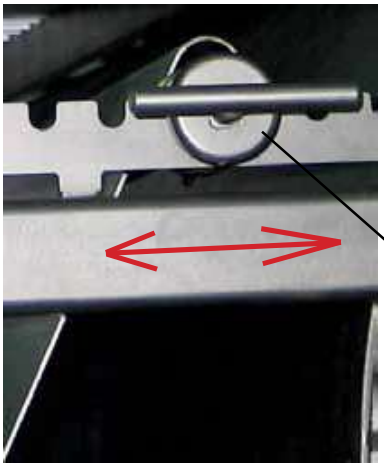


Fig. 1.2.4.a. Turnable knob on adjusting bar for pans.

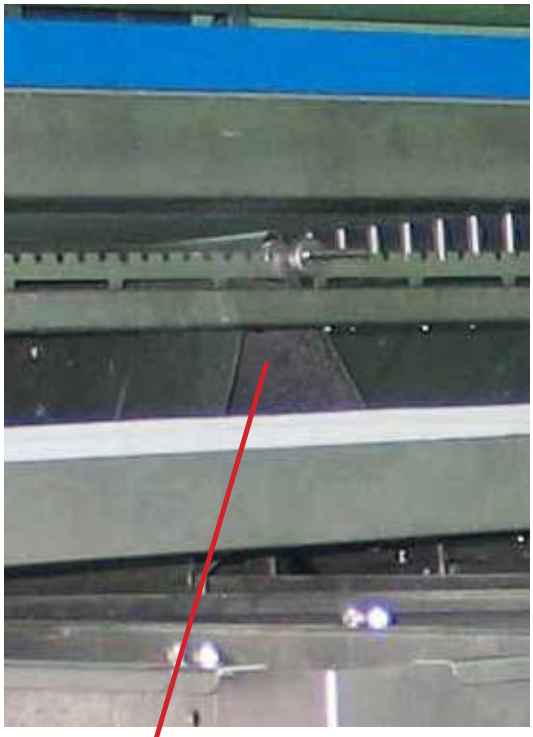


Fig. 1.2.4.b
Adjusting pans on bar between conveyors.

Note: Hook forward.

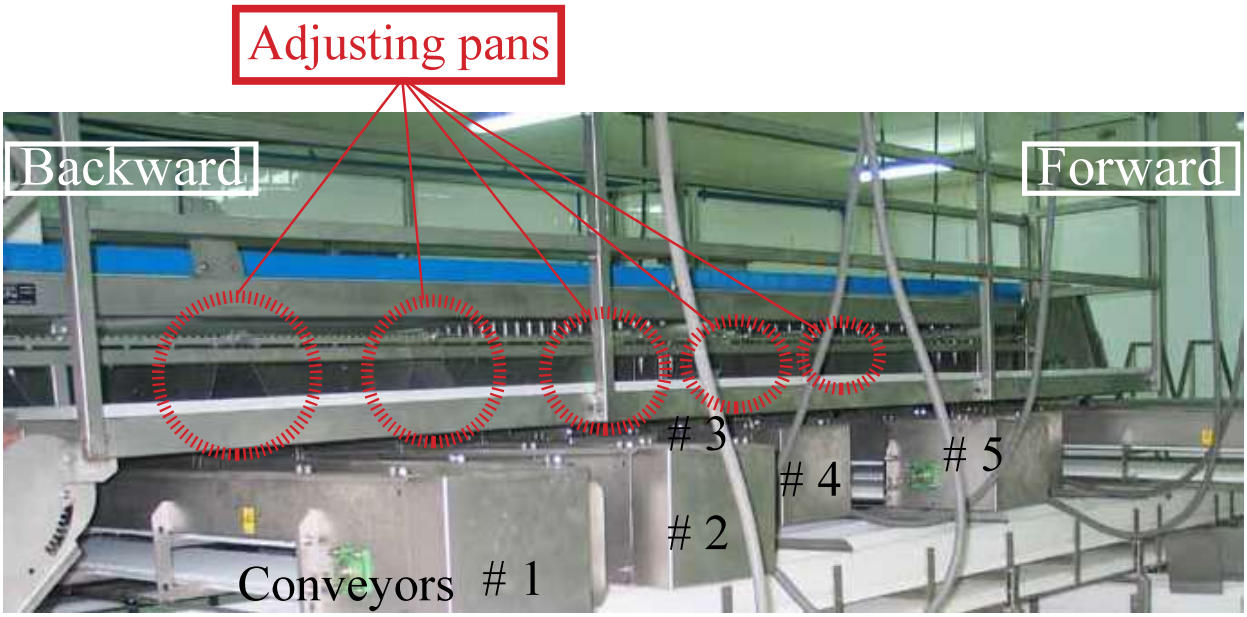


Fig. 1.2.4.c. Here we see how the adjusting pans are installed between the conveyors # 1 to #5 inside the grading machine and the turnable knobs on the side of the grader are used for adjustments. No tool needed for this. Just turn the knobs from either side of the machine, forward or backwards depending on the needed results. There are four sets of adjusting pans in the machine.

If for example turning the knob for the adjusting pans between conveyors # 1 and # 2 forward then the results would be larger fish falling into conveyor # 1 after that movement and visa - versa if turned in the opposite direction.

NOTE:

It is vary important that these adjusting pans are perpendicular to the grading machines frame to receive the same sizes of fish in the conveyors. Care must be taken here and constant inspection needed after cleaning of machinery.

1.2.5 Conveyors # 1 to # 6 inside and underneath the grading machine.

There are five conveyors underneath and inside the grading machine that are driven by electrical motors through a gear reducer. They move graded fish out of the machine and one more conveyor is at the end of the machine to catch the by-catch fish and fish that have to much " rigus mortus " and are vary bent in the shape like a banana. These conveyors are started and stopped either in forward or reverse direction from the control panel. See fig.1.2.1 page 6.

The smallest fish that go into the grading machine fall onto the first conveyor that is positioned just underneath the grading channels in front of the feeding system where the fish come out of the feeding system onto the grading machine. The other conveyors are distributed through the machine to the other end collecting the sizes of fish as the sizes increase to the ferther end of the grading machine from the feeding system. See fig. A on page 2, fig. B on page 3 and fig. 1.2.5.a on this page.

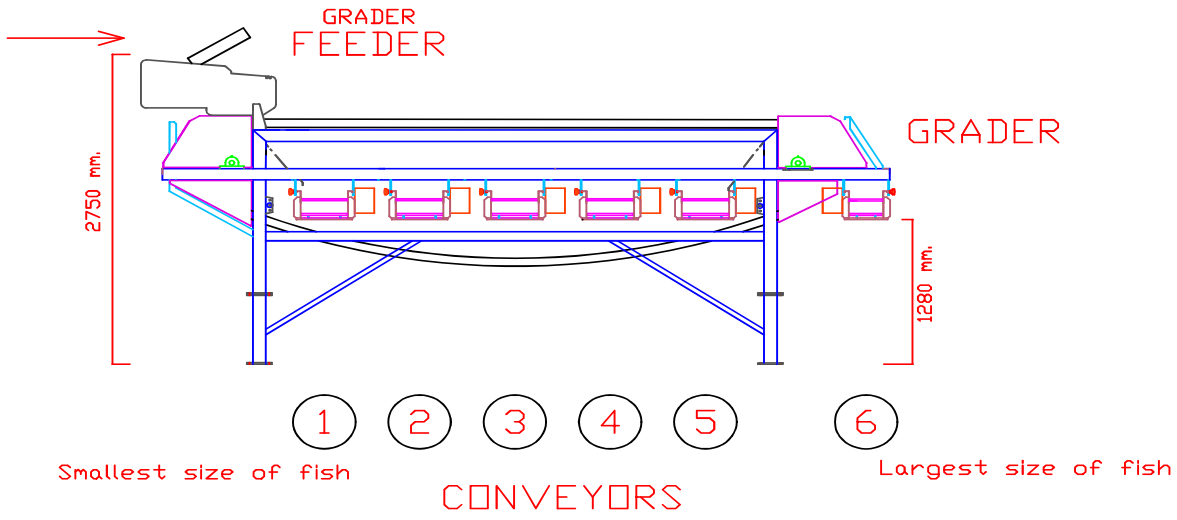


Fig. 1.2.5.a. Side - view of Style grading machine showing conveyors # 1 to # 6.

2. Installation.

2.1 General.

When preparing the Style feeding system, Style grading machine and Style conveyors # 1 to # 6 for installation, the latest International, National and / or Local Requirements should always be adhered to.

The grading machine, feeding system and conveyors must all be leveled, both vertically and horizontally.

It should be made certain that there are no obstructions located on top, inside, underneath the grading machine, feeding system and conveyors # 1 to # 6 that could interfere with the movement of these component parts.

2.2 Electrical connection information.

When Style feeding system, Style grading machine and Style conveyors # 1 to # 6 are installed they must be electrically grounded in accordance with local codes and with IEC / CEE requirements.

The electrical installation including the service connection must comply with local codes and with IEC / CEE requirements. The installation must undergo a complete electrical check before operation of the Style grading machine, Style feeding system and Style conveyors # 1 to # 6.

All connections are made at one common connection at the control cabinet for the Style grading machine, Style feeding system and Style conveyors # 1 to # 6.

These motors are all equipped for 3 x 400V. 50Hz.

For further electrical information, refer to wiring diagram with this manual, fig. 5.1.a to fig.5.1.n.

2.3 Water supply.

The water supply connection should be according to the latest International, National or local Requirements and should be adhered to. The machine needs about 300 ltr. of clean water per hour when in operation. There are two water spray bars on the machine. The pressure of the water should be between two and up to 8 bars to obtain sufficient water supply to the spray bars for the machine. Water is for cleaning and lubricating the grading chains while in operation and the machine should never been run without running water. See fig. 4.5 page 21.

2.3 Water supply.

Fig. 4.5
Water spray bars on feeding system. A and B.

There are two water spray bars with the machine. One (A) is used to lubricate the grading channels and chains and to clean them on the out side while the machine is operated.

The other spray bar (B) is additional (extra) and is used to wash scales that tend to build up on the feeder so they will be washed down between the channels in the beginning of the machine and not interfere with the grading.

The spray bars A and B use about 250 to 300 ltr. of water per hour when grading.

Attention !

It is vary important to have water on grading machine, feeding system and conveyors when in operation. Do not operate the machine if there is no water or if spray bar A does not work. There is no difference if it is just regular water or sea water but it must always be clean water without any sand or particles and not contaminated in any way. If there is sand or similar particles in the water then it will damage the machinery. An additional water filter must then be installed on the inlet of the water supply.

2.4 Special notices.

The operator must understand the function of the feeding system, grading machine, conveyors # 1 to # 6 and control cabinet.

Always avoid that water gets on or in control cabinet and electrical motors of all machinery.

3. Operation.

3.1 Emergency switch.

There is one emergency switch for the grading machine, feeding system and conveyors # 1 to # 6 and it is on the control panel for this total system. See fig. 1.2.1 page 6.
When the switch is pressed then the grading machine, feeding system and conveyors # 1 to # 6 are stopped and off.
To activate the grading machine, feeding system and conveyors # 1 to # 6 turn the knob of the emergency switch counterclockwise until it pops out a little bit and then start the motors accordingly. First start the motors for the conveyors # 1 to # 6, next start the motor for the grading machine and last start the motor for the feeding system. Then it is ok. to start the conveyor from the hopper and put fish into the feeding system, grading machine and conveyors.

3.2 Water supply.

Never run / drive feeding system, grading machine or conveyors # 1 to # 6 without recommended water supply.

3.3 Speed setting for grading machine and feeding system.

The speed of the grading chains for the grading machine and conveyor belts for the feeding system are speed adjustable by the means of turning the speed adjusting knobs for them on the control panel. By turning these knobs counterclockwise the speed is reduced and by turning them clockwise the speed is increased.
See fig. 1.2.1 on page 6.
There is no " best " speed settings available as this will always have to do with the fish species that are graded each time and the quality of the fish each and every time. This has to be experienced and adjusted by the operator to be able to receive the best possible grading results.

A major factor regarding adjusting the speed of the feeding system and the speed of the grading chains on the grading machine has to do with the quantity needed in the production. For example with this Style grading machine the LR-5/24 that can handle up to 25 tons input of small sprat per each hour. If the production needed is let´s say only 15 tons or 20 tons input per hour then there is no need to drive the grading chains as fast as we would when grading larger quantities so we are able to run the machine slower then if the input would be the 25 tons input limit.

Speed setting for grading machine and feeding system.

The correct way of setting the speeds of the conveyor belts for the feeding system and the speed of the grading chains for the grading machine is to realize # 1 how many tons of fish will be put into the machine per hour from the fish hopper. The speed of the conveyor belts for the feeding system are then adjusted in the way that the fish are correctly spread apart and fall into the channels of the grading machine one by one and do not pile up and/or double up in the grading channels between the grading chains.

Then # 2, the speed of the grading chains in the grading channels are adjusted in the way that they are traveling forward away from the feeding system slightly faster than the fish that are falling into the grading channels between the chains the fish are getting a little bit more separated there also. All is this done to be sure that there is only one fish in a specific place at a specific time in the channels between the grading chains and will be measured as one single width for each fish.

The main goal here is to adjust the speed of the conveyors for the feeding system as slow as we can and still to be able to handle the input tonnage needed and then adjust the speed of the grading chains of the grading machine slightly faster. This is important as this minimizes the wearing of all the moving parts in the machinery and increases there life time.

3.3.2 Getting the right settings and keeping them.

Once a good combination has been established between, quantity (input tonnage per hour) and speed adjustments between the conveyors of the feeding system and the grading chains of the grading machine with good grading results then these settings should be written down for future use.

3.4 Start up procedure.

1. Examine the water supply, turn it on and be sure there is enough water flow.

2. Examine the grading machine, feeding system and conveyors # 1 to # 6 and be sure nobody is within the machinery or maintenances in progress of the machinery.

3. On the control panel turn the conveyors # 1 to # 6 On in forward or reverse direction.

4. On the control panel turn the grading machine on and increase the speed of the grading chains to the desired speed and correct settings.

5. On the control panel turn the feeding system on and increase the speed of the conveyor belts to the desired speed and correct settings.

6. Next it would be correct to turn on the conveyor from the fish hopper (see owners manual of fish hopper) to feed fish from the fish hopper to the feeding system and grading machine.

3.5 Shut down procedure.

1. Be sure the conveyor from the fish hopper that feeds the feeding system has been turned off, (see owners manual for fish hopper).

2. On the control panel reduce the speed of the conveyors for the feeding system and turn the feeding system off by pressing the off button.

3. On the control panel reduce the speed of the grading chains for the grading machine and turn the grading machine off by pressing the off button.

4. On the control panel turn off each button for conveyors # 1 to # 6 by pushing the off buttons for each one.

3.6 Power failure.

In case of power failure turn off all switches on the control panel, turn adjustable speed knobs for the conveyors of the feeding system and for the chains of the grading machine to null (O). Remove any fish on the conveyors of the feeding system and grading machine and be sure nobody is inside or close to the machinery or moving parts before starting up again.

After power has been established follow normal start up procedure. See 3.4, page 23.

3. Maintenance.

When cleaning the feeding system, grading machine and conveyors # 1 to # 6 it is best to use a water hose and / or high pressurized water on all of the surfaces except the motors and / or inside the motor boxes. Spraying water on the motors and / or inside the motor boxes can damage the motors and electrical systems. Never spray water on the electrical cabinet as it is both dangerous and can damage the electrical system.

It is required that the feeding system, grading machine and conveyors # 1 to # 6 be inspected for proper functioning. The frequency of inspections is dependent on the usage of the machinery, how every it should be performed at least once a week.

Note:

After service work the machinery has to be tested for proper functioning. Basically the following applies:

- Test that correct and enough water flow is supplied to water spray bars A and B on the feeding system, see fig. 4.5 on page 21.
- Test that all motors are running correctly.
- Test and inspect that the grading chains are running smoothly in the grading channels.
- Test and inspect that the conveyor belts are running smoothly on the feeding system.
- Test and inspect that the conveyor belts are running smoothly on conveyors # 1 to # 6.

4.1 Every day.

Clean the out side and the inside of the feeding system, grading machine and conveyors # 1 to # 6 with mild detergent and water. Rinse machinery vigorously and completely with a lot of fresh water. Salt water should not be used for the purpose of cleaning the machinery.

Clean all excess particles from the machinery and flush the insides of the grading chains by standing at either end of the machine with a water hose but be sure not to take the protection pans off of the machine when doing this as that is vary dangerous as there are many moving parts in the machine that are dangerous and there is no need to go near them while in operation. This flushing is done with a distance of about two meters away from the end of the grading machine with a hose and the water flushes the insides of the grading chains from that distance. When doing this it is good to reduce the speed of the grading machine as slow as possible or about to notch 2 on the speed adjusting knob on the control panel. See fig. 1.2.1. page 6.
There is no need for brushing and brushing should never be attempted when the machine is in moving and / or running mode.

Caution:

Extreem caution must be taken where moving parts are in the machinery as they are extremely dangerous and can cause accidents and lead to death of people.

4.2 Every week.

- Lubricate conveyor bearings on conveyors # 1 to # 6 that are positioned on the drive end of the conveyors.

- Lubricate the bearings on the drums of the grading machine, total of 4 bearings with two on each side of the drums of the machine.

- Lubricate the bearings of the conveyors for the feeding system, total of 8 bearings, 4 on each side of the feeding system.

4.3 Every year.

- Check condition and examine all of the bearings for the feeding system, grading machine and conveyors # 1 to # 6.

- Check condition and examine conveyor belts and sprockets for feeding system.

- Check condition and examine conveyor belts and sprockets for conveyors # 1 to # 6.

- Check condition and examine the aluminium grading profiles for the channels of the grading machine.

- Check condition and examine the grading chains.

- Change oil for gearbox of the grading machine.

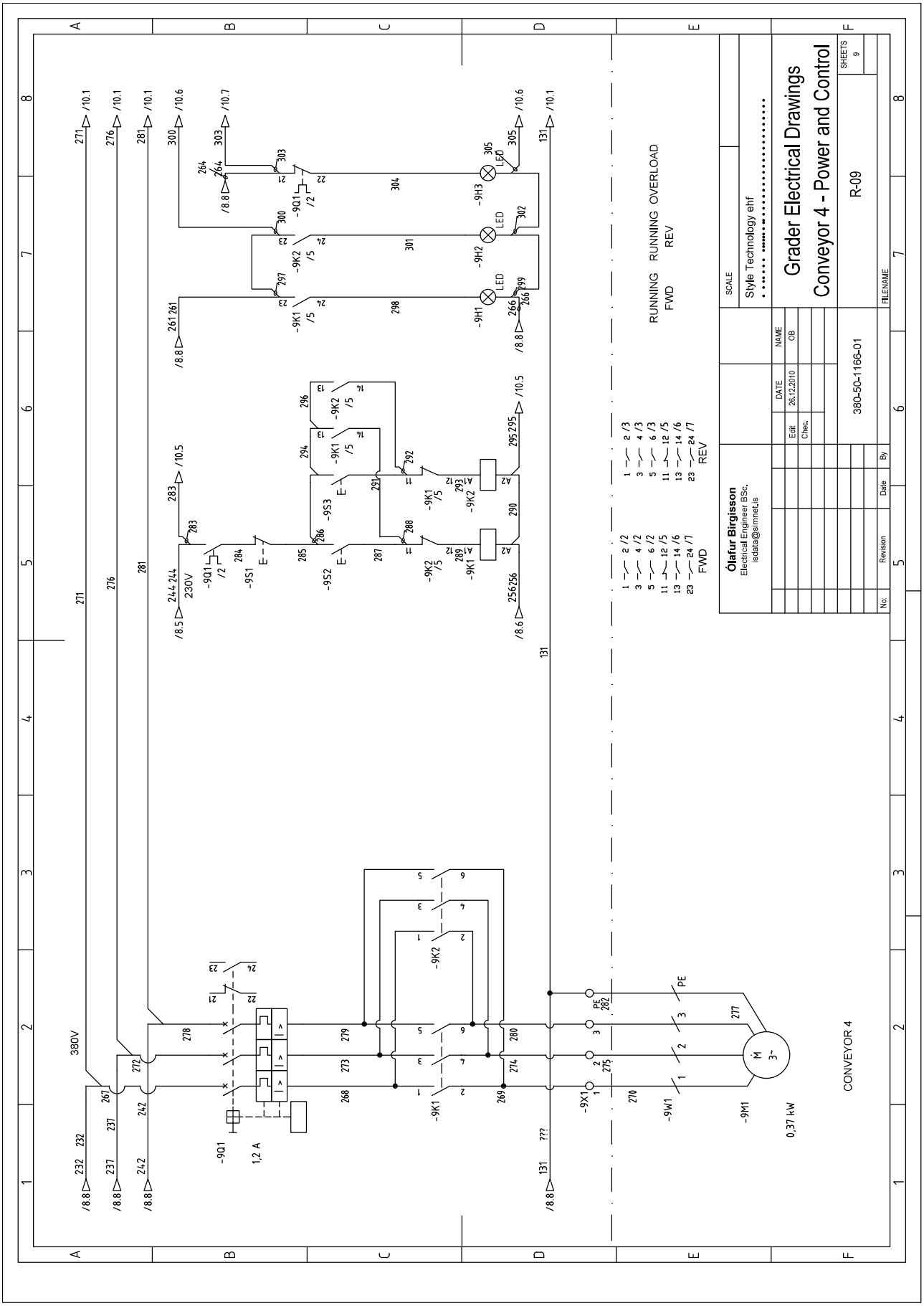
5. Electrical Schematics.

5.1 Electrical drawings of control panel, fig. 5.1.a to 5.1.n.

Grader Electrical drawings

1.a

Type: 380-50-1166-01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isdatal@simnet.is
Style Technology ehf
Grader Electrical Drawings
Conveyor 4 - Power and Control
R-09
380-50-1166-01
CONVEYOR 4
RUNNING FWD
RUNNING REV
OVERLOAD
-9Q1
1,2 A
-9K1
-9K2
-9M1
0,37 kW
-9W1
-9X1
-9S1
-9S2
-9S3
-9H1
-9H2
-9H3
LED
230V
380V
FWD
REV

Fig. 5.1.b

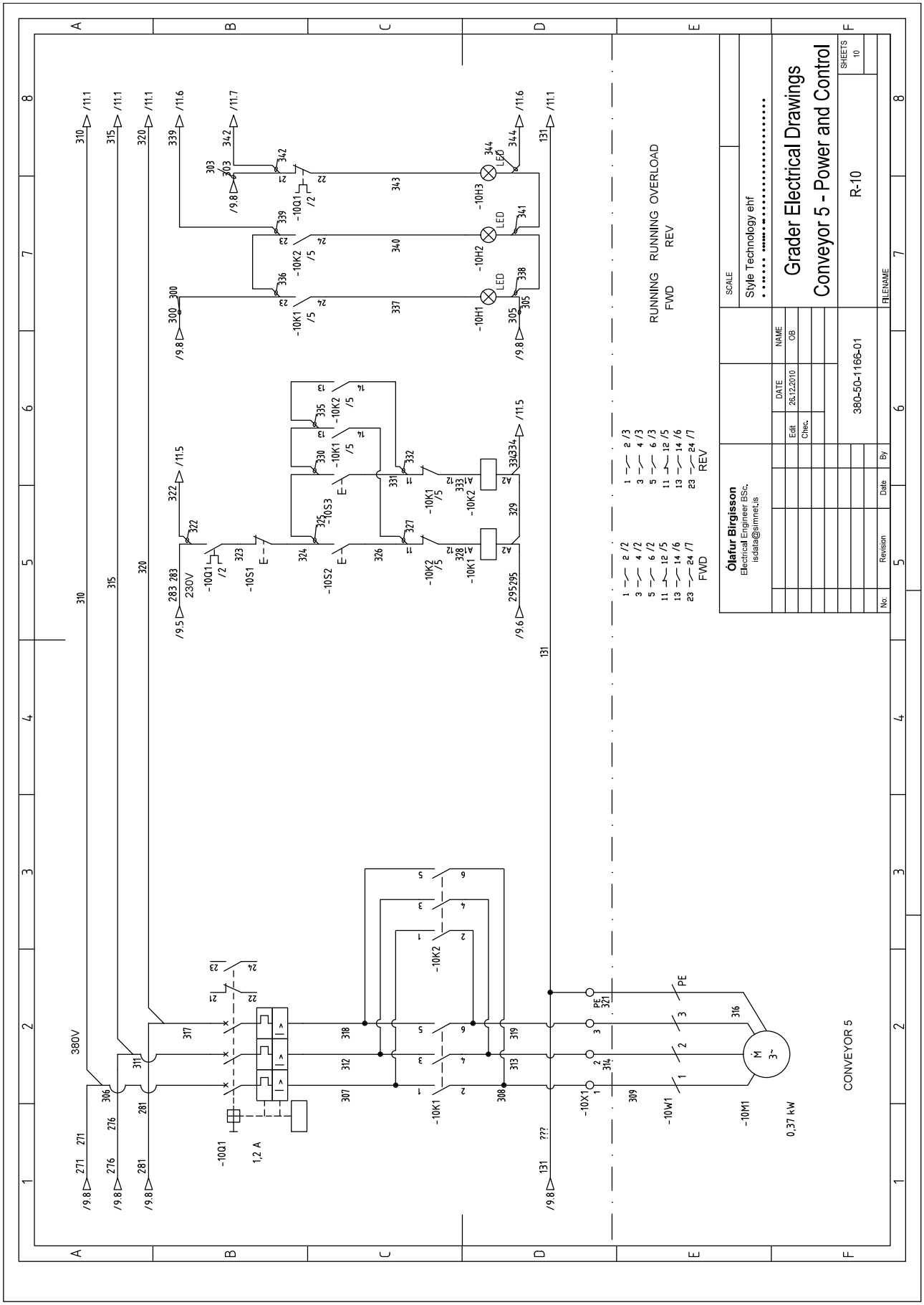
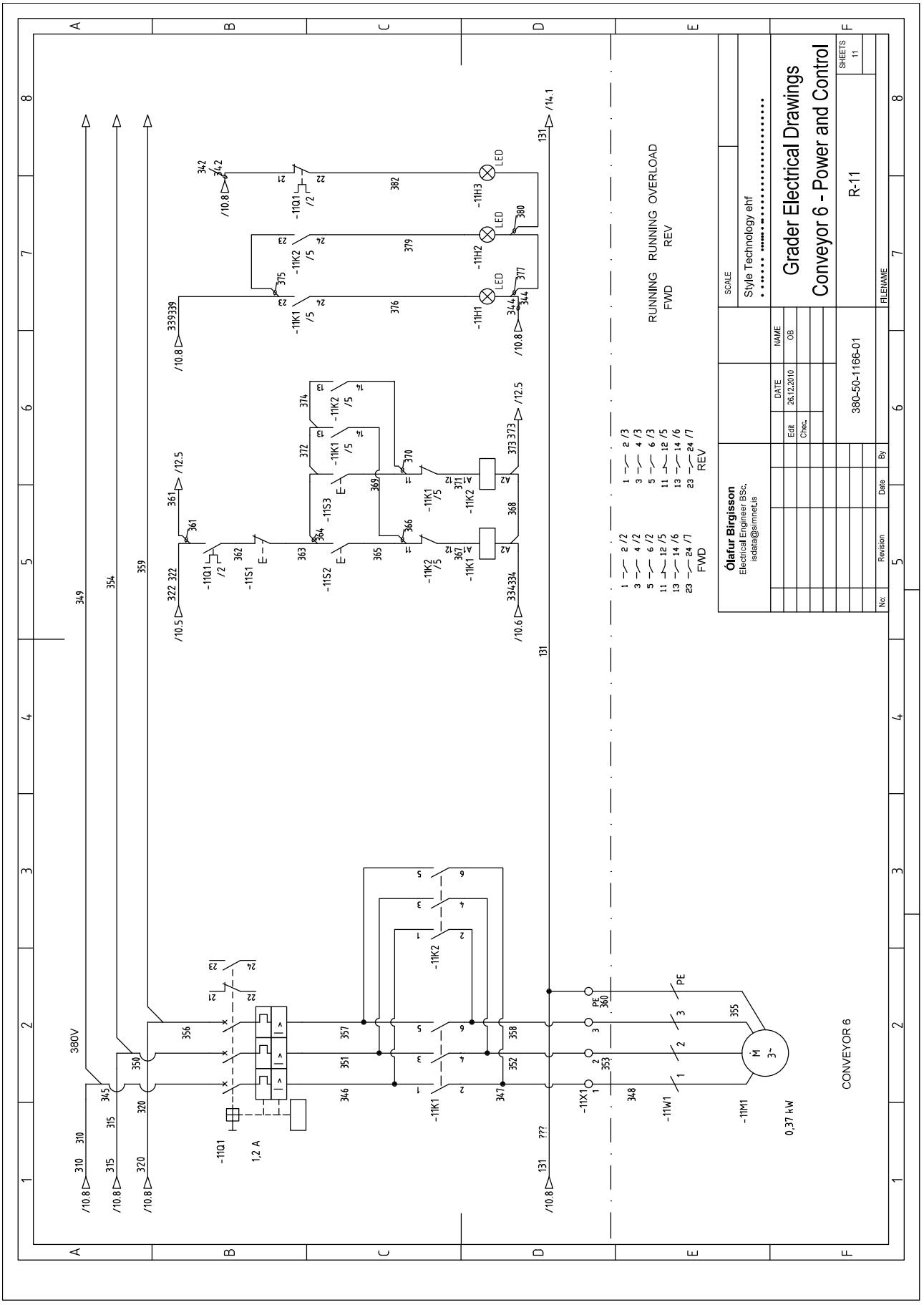

Grader Electrical Drawings
Conveyor 5 - Power and Control
R-10
380-50-1166-01
Style Technology ehf
Ólafur Birgisson
Electrical Engineer BSc.
RUNNING RUNNING OVERLOAD
FWD REV
CONVEYOR 5
380V
1,2 A
0,37 kW
-10Q1
-10K1
-10K2
-10M1
-10W1
-10X1
-10H1
-10H2
-10H3
-10S1
-10S2
-10S3
LED
FWD
REV

Fig. 5.1.c


Grader Electrical Drawings
Conveyor 6 - Power and Control
R-11
380-50-1166-01
Ólafur Birgisson
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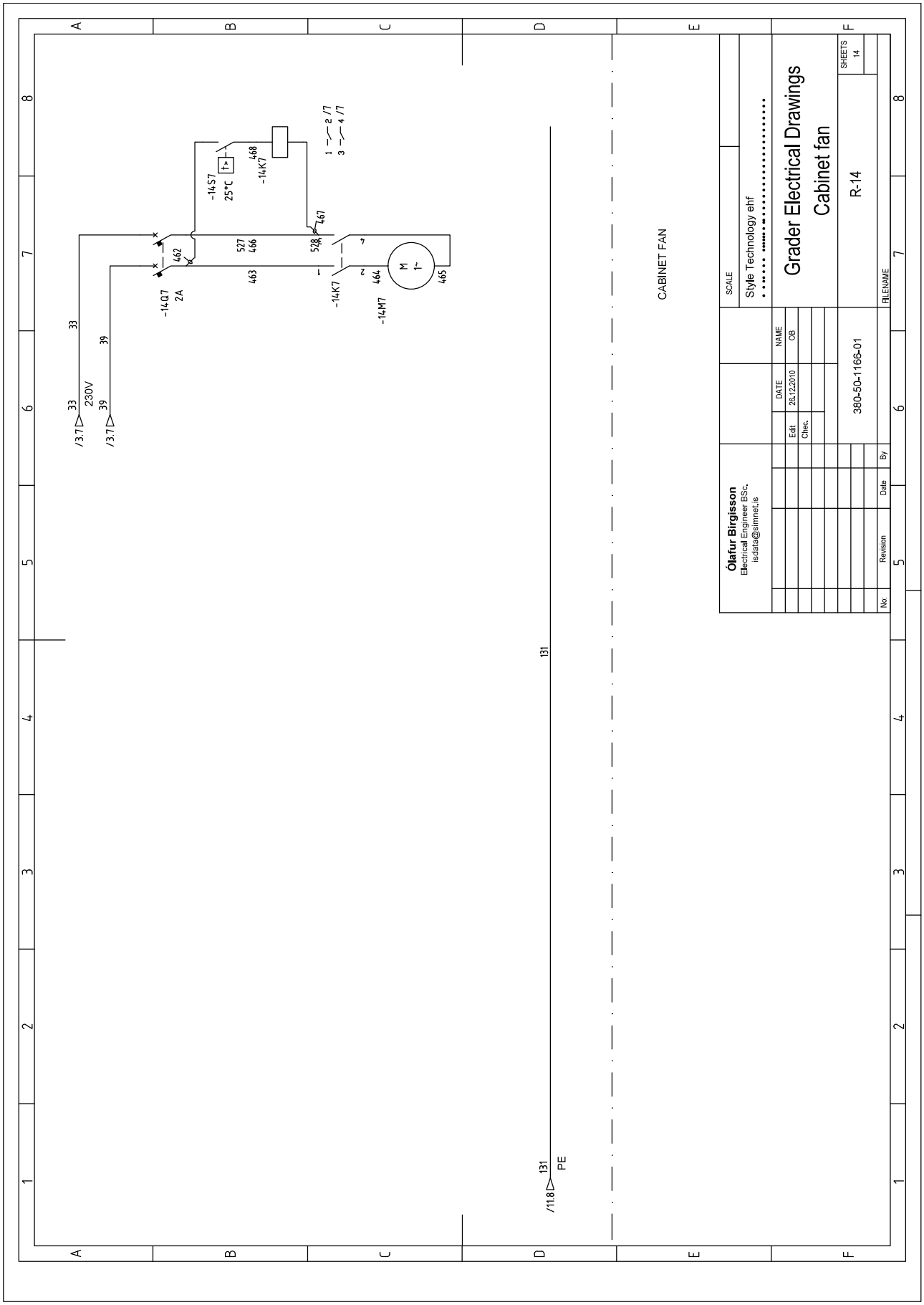
Style Technology ehf
CONVEYOR 6
380V
1,2 A
0,37 kW
RUNNING FWD
RUNNING REV
OVERLOAD
FWD
REV
LED

Fig. 5.1.d


Grader Electrical Drawings
Cabinet fan
R-14
380-50-1166-01
Style Technology ehf
Ólafur Birgisson
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isdata@simnet.is
CABINET FAN
-14Q7
2A
-14K7
-14M7
-14S7
25°C
-14K7
M
1~
230V
PE

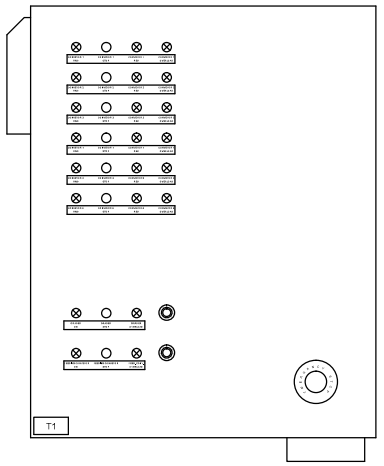
Fig. 5.1.e

Fig. 5.1.f

GRADER - ELECTRICAL CABINET +T1
380 V, 50 Hz

DRAWINGS :

R-02 POWER DISTRIBUTION 380 V
R-03 POWER DISTRIBUTION 230 V
R-04 POWER AND CONTROL, FEEDING CONVEYOR
R-05 POWER AND CONTROL, GRADER
R-06 POWER AND CONTROL, CONVEYOR 1
R-07 POWER AND CONTROL, CONVEYOR 2
R-08 POWER AND CONTROL, CONVEYOR 3
R-09 POWER AND CONTROL, CONVEYOR 4
R-10 POWER AND CONTROL, CONVEYOR 5
R-11 POWER AND CONTROL, CONVEYOR 6
R-14 POWER AND CONTROL, CABINET FAN



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No:	Revision	Date	By
	Edit	26.12.2010	OB
	Chec.		

SCALE

Style Technology ehf

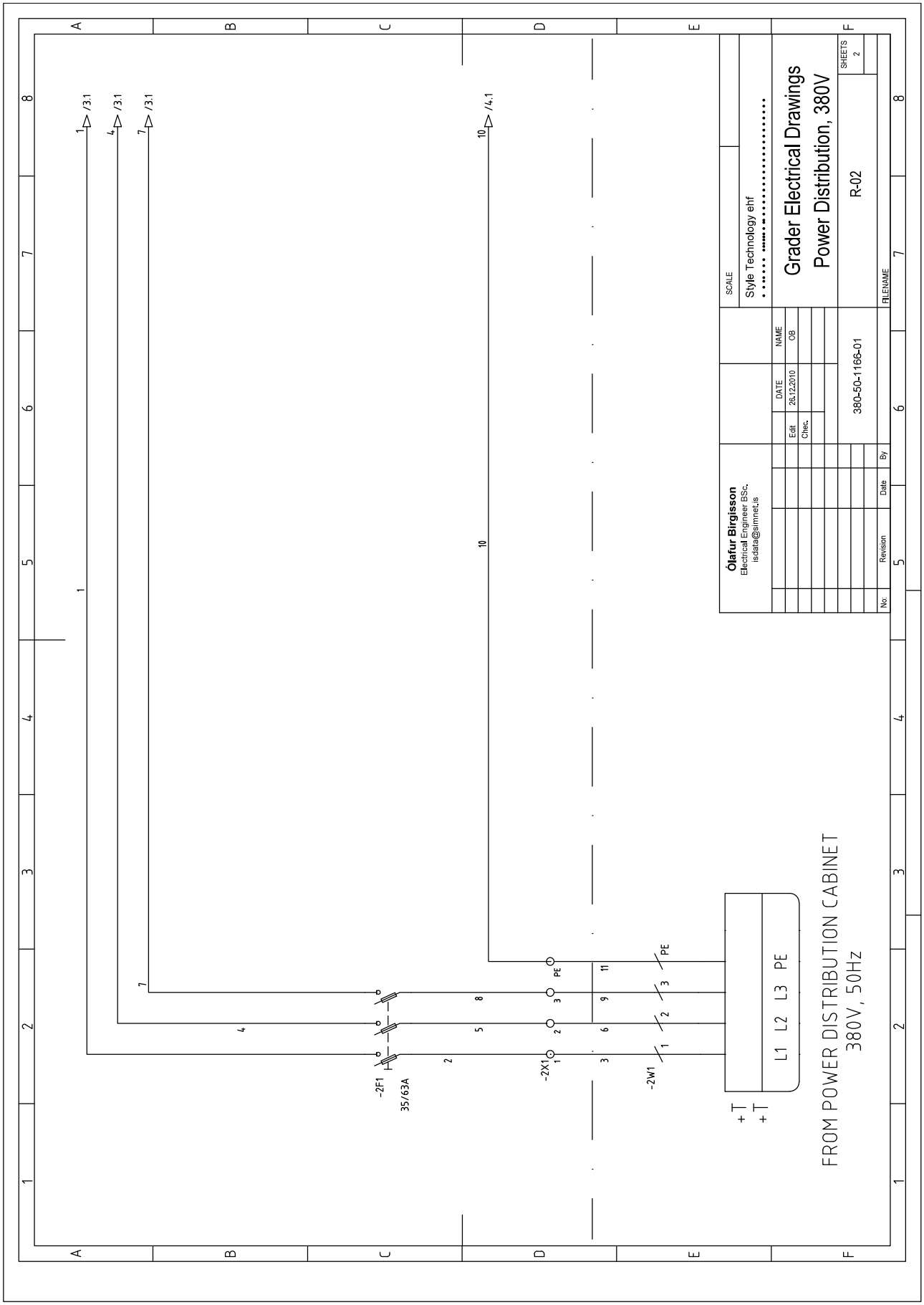
Grader Electrical Drawings
Panel Layout and sheet list

380-50-1166-01

R-01

SHEETS 1

FILENAME


Ólafur Birgisson
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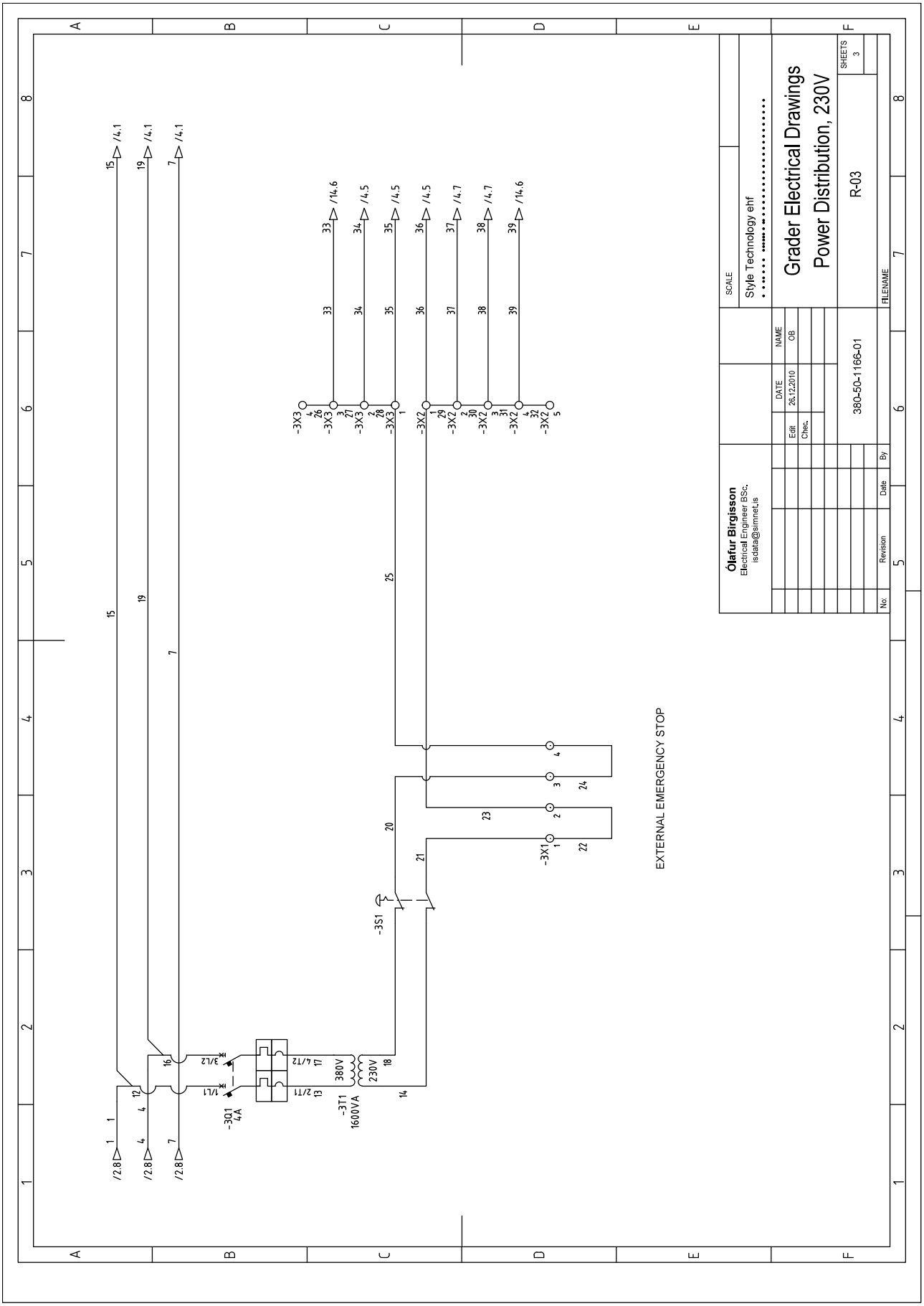
SCALE
Style Technology ehf
Grader Electrical Drawings
Power Distribution, 380V
R-02
380-50-1166-01
SHEETS 2
FILENAME
DATE
26.12.2010
NAME
OB
Edit
Chec.
No.
Revision
Date
By
FROM POWER DISTRIBUTION CABINET
380V, 50Hz
L1 L2 L3 PE
-2F1
35/63A
-2X1
-2W1
PE
+T
+T

Fig. 5.1.g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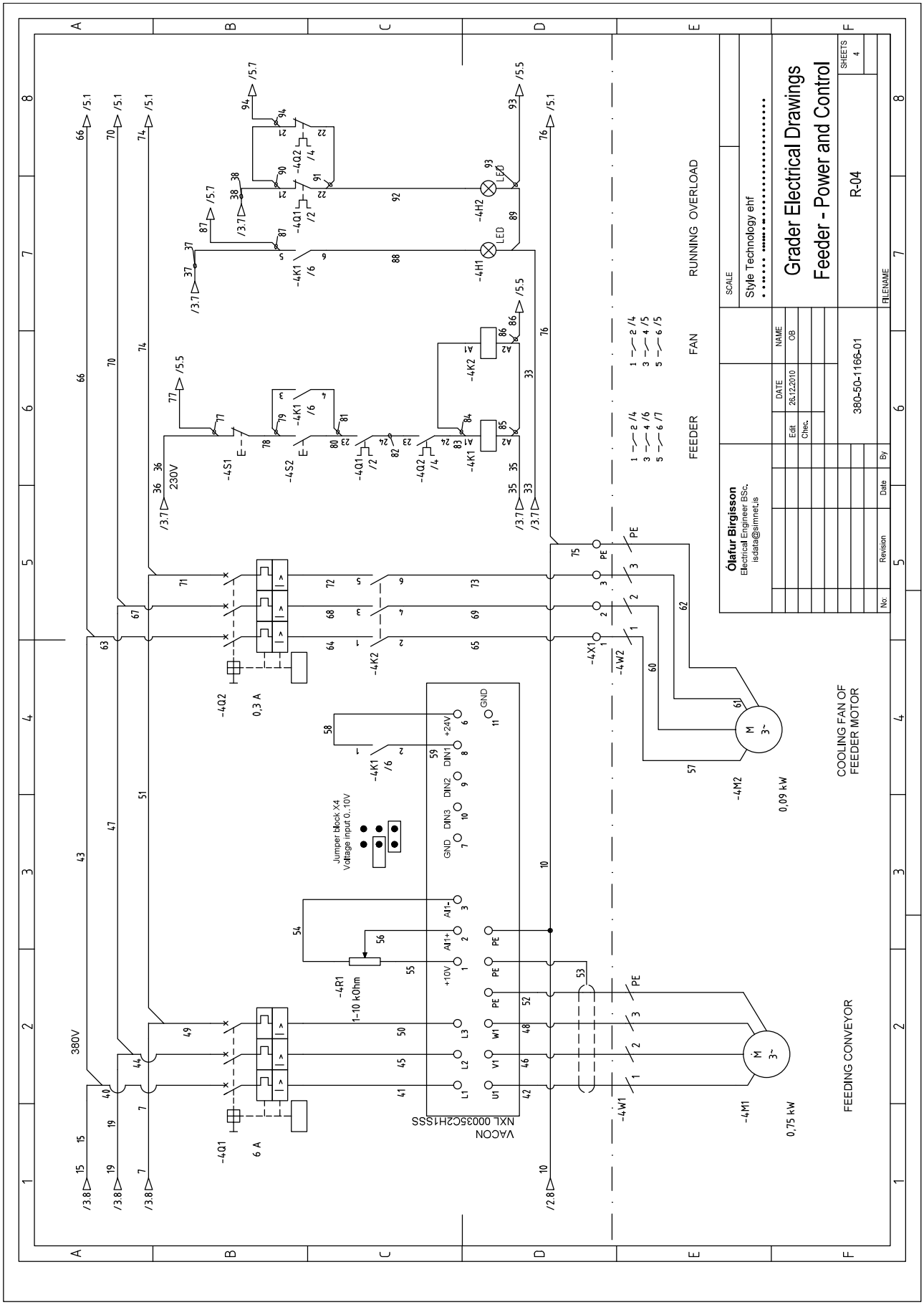
Grader Electrical Drawings
Power Distribution, 230V
R-03
380-50-1166-01
SHEETS 3
SCALE
DATE
NAME
Edit
Chec.
OB
28.12.2010
FILENAME
No.
Revision
Date
By
EXTERNAL EMERGENCY STOP
-3S1
-3Q1 4A
-3T1 1600VA
380V
230V
-3X1
-3X2
-3X3
/2.8
/4.1
/4.5
/4.6
/4.7

Fig. 5.1.h


Grader Electrical Drawings
Feeder - Power and Control
R-04
380-50-1166-01
Ólafur Birgisson
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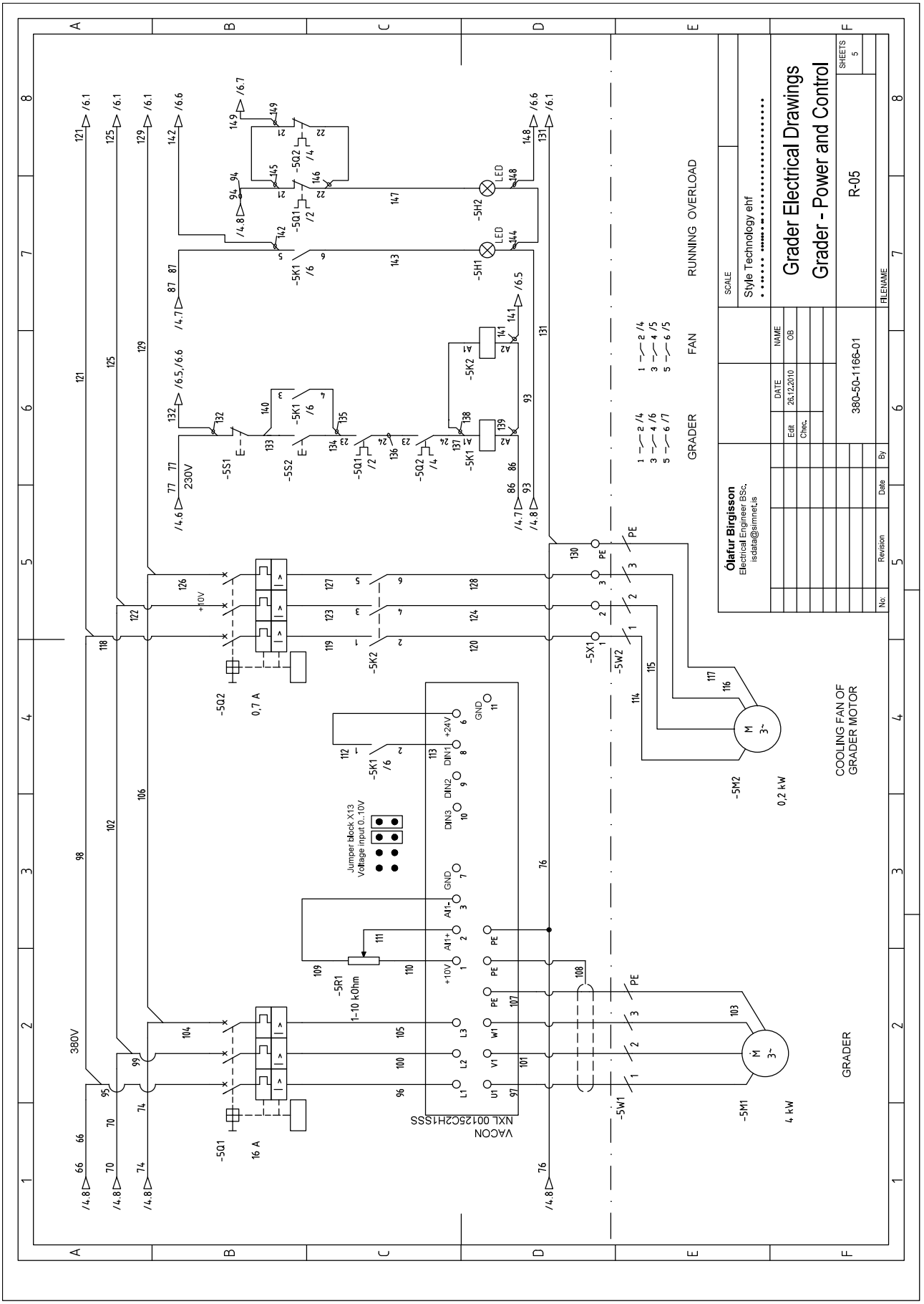
Style Technology ehf
FEEDER
FAN
RUNNING OVERLOAD
FEEDING CONVEYOR
COOLING FAN OF
FEEDER MOTOR
230V
380V
6 A
0,3 A
0,75 kW
0,09 kW
1-10 kOhm
Jumper block X4
Voltage input 0..10V
VACON
NXL 0003S2H1SSS
-4Q1
-4Q2
-4K1
-4K2
-4S1
-4S2
-4R1
-4H1
-4H2
-4X1
-4W1
-4W2
-4M1
-4M2

Fig. 5.1.i


Grader Electrical Drawings
Grader - Power and Control
R-05
380-50-1166-01
Ólafur Birgisson
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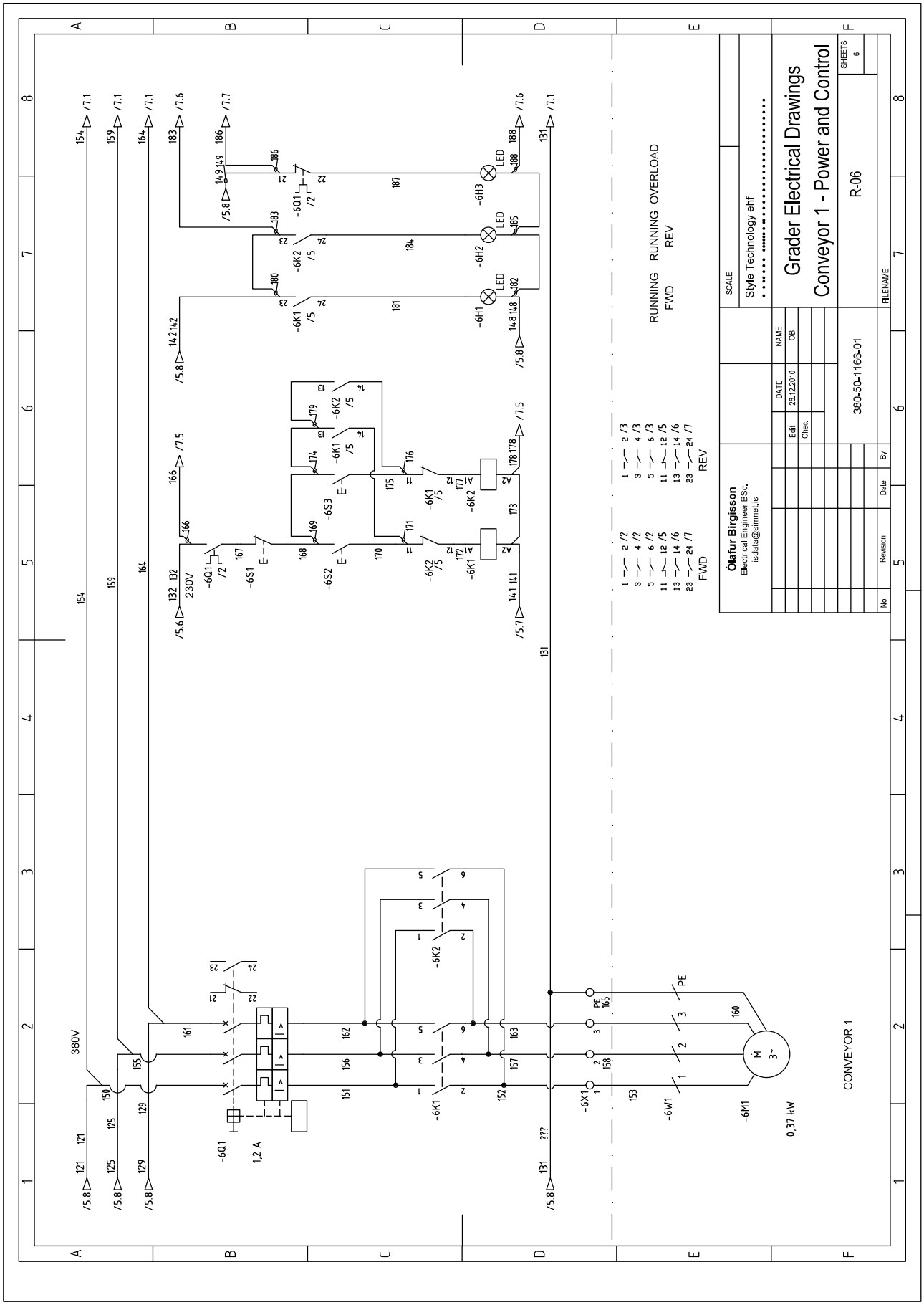
Style Technology ehf
SCALE
DATE
NAME
Edit
Chec.
28.12.2010
OB
SHEETS
5
FILENAME
No.
Revision
Date
By
380V
230V
+10V
GRADER
FAN
RUNNING OVERLOAD
COOLING FAN OF
GRADER MOTOR
0,2 kW
4 kW
0,7 A
16 A
1-10 kOhm
Jumper block X13
Voltage input 0..10V
VACON
NXL 0012SC2H1SSS
-5Q1
-5Q2
-5K1
-5K2
-5S1
-5S2
-5R1
-5W1
-5W2
-5X1
-5M1
-5M2
-5H1
-5H2
LED

Fig. 5.1.j


Grader Electrical Drawings
Conveyor 1 - Power and Control
R-06
380-50-1166-01
Style Technology ehf
Ólafur Birgisson
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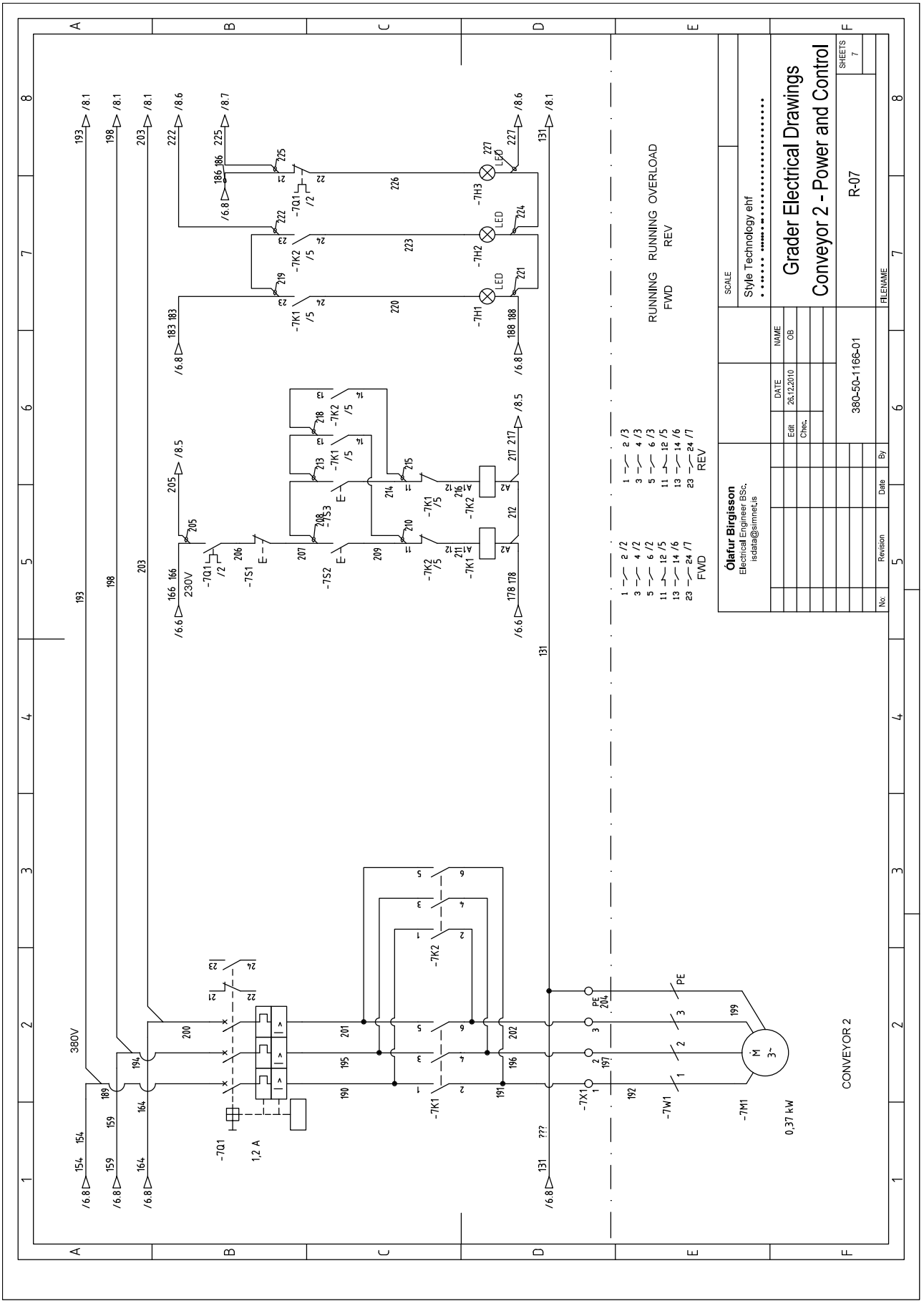
isdata@simnet.is
CONVEYOR 1
380V
230V
1,2 A
0,37 kW
RUNNING FWD
OVERLOAD
RUNNING REV
FWD
REV
-6Q1
-6S1
-6S2
-6S3
-6K1
-6K2
-6H1
-6H2
-6H3
-6W1
-6M1
-6X1
LED
PE

Fig. 5.1.k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Style Technology ehf
Grader Electrical Drawings
Conveyor 2 - Power and Control
R-07
380-50-1166-01
CONVEYOR 2
RUNNING FWD
RUNNING REV
OVERLOAD
FWD
REV
380V
230V
1,2 A
0,37 kW
-7Q1
-7K1
-7K2
-7M1
-7W1
-7X1
-7S1
-7S2
-7S3
-7H1
-7H2
-7H3
LED

Fig. 5.1.1

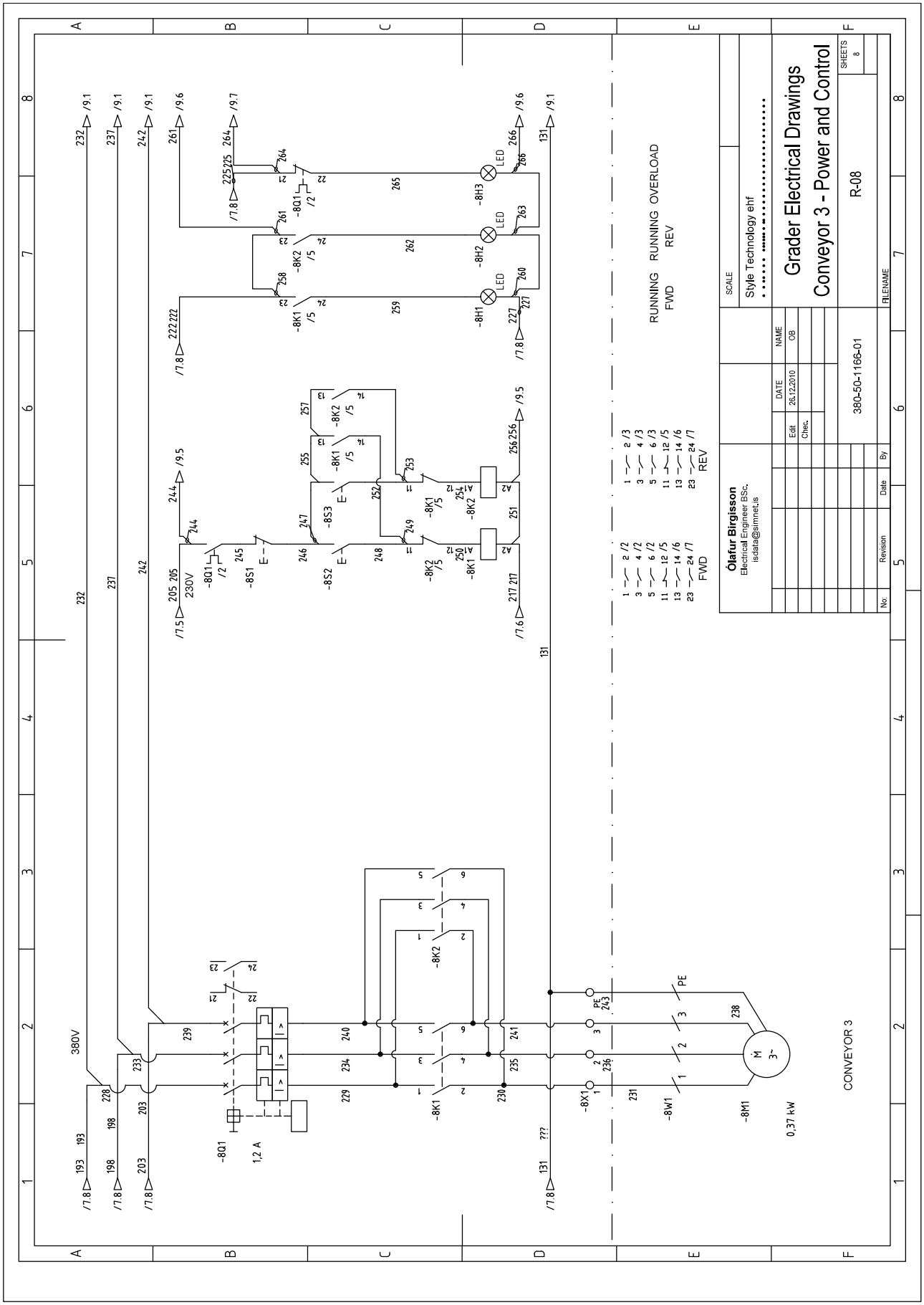
Grader Electrical Drawings
Conveyor 3 - Power and Control
R-08
380-50-1166-01
Style Technology ehf
Ólafur Birgisson
Electrical Engineer BSc.
RUNNING FWD
RUNNING REV
OVERLOAD
CONVEYOR 3
380V
230V
1,2 A
0,37 kW
-8Q1
-8K1
-8K2
-8S1
-8S2
-8S3
-8W1
-8X1
-8M1
-8H1
-8H2
-8H3
LED

Fig. 5.1.m

6. Spare parts.

6.1 Spare parts list.

This spare parts list is separated into three main sections.

Section # 1 is for the Style grading machine.
Section # 2 is for the Style feeding system.
Section # 3 is for the Style conveyors # 1 to # 6.

Please refer to this spare parts list when ordering spare parts from Style Technology ehf.

6.1.1 Section # 1.

Spare parts for Style grading machine:

Part number:	Decription of part:
#SGRM-1001	Blue Style open top grading chain links. (2.725 pcs. in the LR.4/24 grader) There are 109 pcs. in one chain on the grading machine.
#SGRM-1002	4000 mm. long aluminium grading channels. There is a total of 25 pcs. in the LR.4-24 grading machine.
#SGRM-1003	40 mm. stainless steel bearings in thermoplastic housing. There is a total of 4 pcs. in the LR.4/24 grading machine.
#SGRM-1004	Gearbox for grading machine with 40 mm. stainless steel hollow shaft. (1 pcs.)
#SGRM-1005	4 kW. electrical drive motor for grading machine.
#SGRM-1006	Separated electrical fan for electrical drive motor for grading machine.
#SGRM-1007	Rubber support for moment plate between gearbox and grading machine . There are 2 pcs. on the moment arm.

6.1.2 Section # 2.

Spare parts for Style feeding system:

Part number:	Description of part:
#SIFS-1050	0,55 kW. electrical motor for feeding system. 1 pcs per feeding system. One separate cooling fan for this motor.
#SIFS-1051	Gearbox for electrical motor for feeding system with 25mm. hollow shaft, I:10 1.pcs. per feeding system.
#SIFS-1052	50 mm. drive belt for feeding system. 1 pcs. per feeding system.
#SIFS-1053	25 mm. stainless steel bearing in thermoplastic housing. 8 pcs. per feeding system.
#SIFS-1054	Intralox conveyor belt for feeding system. 1770 mm. wide and 2500 mm. long. 1100 series LG - Acetal - Blue.
#SIFS-1055	Intralox sprockets for lower feeding belt in feeding system 24 teeth with 40 x 40 mm. square bore. 19 pcs. per feeding system.
#SIFS-1056	Intralox sprockets for upper feeding belt in feeding system 16 teeth with 40 x 40 mm. square bore. 19 pcs. per feeding system.
#SIFS-1057	Guiding white plastic plates on top of upper feeding intralox belt. This is one set of total 13 plates.
#SIFS-1058	Guiding white plastic plates on top of lower feeding intralox belt. This is one set of total 13 plates.
#SIFS-1059	Guiding white plastic plates on top of Style open top grading chains. This is one set of total 25 plates. On top of grading machine in front of the infeeding system.

6.1.3 Section # 3.

Spare parts for Style conveyor belts # 1 to # 6:

Part number:	Desription of part:
#SCB-1101	Intralox sprocket for S-800 series with 30 mm. bore. Acetal, 8 teeth. 4 pcs. are in each conveyor.
#SCB-1102	Intralox conveyor belt PFT-PE. 254 mm. wide for conveyor # 6.
#SCB-1103	Intralox conveyor belt PFT-PE. 354 mm. wide for conveyors # 1 to # 5.
#SCB-1104	25 mm. stainless steel bearing in thermoplastic housing. 2 pcs. per conveyor.
#SCB-1105	Gearbox for electrical motor for Style conveyors with 25mm. hollow shaft, I:25
#SCB-1106	0,37 kW. electrical motor for Style conveyors.